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FISHERY ECOSYSTEM PLAN OF THE SOUTH ATLANTIC REGION
VOLUME III: SOUTH ATLANTIC HUMAN AND INSTITUTIONAL ENVIRONMENT

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ABBREVIATIONS AND ACRONYMS

ABC	Allowable Biological Catch
ALS	Accumulative Landings System
ACCSP	Atlantic Coastal Cooperative Statistics Program
B	A measure of fish biomass either in weight or other appropriate unit
BMSY	The biomass of fish expected to exist under equilibrium conditions when fishing at FMSY
BOY	The biomass of fish expected to exist under equilibrium conditions when fishing at FOY
BCURR	The current biomass of fish
C	Catch expressed as average landings over some appropriate period
DSEIS	Draft Supplemental Environmental Impact Statement
EFH	Essential Fish Habitat
EFH-HAPC	Essential Fish Habitat - Habitat Area of Particular Concern
EIS	Environmental Impact Statement
ESA	Endangered Species Act of 1973
F	A measure of the instantaneous rate of fishing mortality
FCURR	The current instantaneous rate of fishing mortality
FMSY	The rate of fishing mortality expected to achieve MSY under equilibrium conditions and a corresponding biomass of BMSY
FOY	The rate of fishing mortality expected to achieve OY under equilibrium conditions and a corresponding biomass of BOY
FEIS	Final Environmental Impact Statement
FMU	Fishery Management Unit
MARMAP	Marine Resources Monitoring Assessment and Prediction Program
MFMT	Maximum Fishing Mortality Threshold
MMPA	Marine Mammal Protection Act of 1972
MRFSS	Marine Recreation Fisheries Statistics Survey
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
NEPA	National Environmental Policy Act of 1969
OY	Optimum Yield
RIR	Regulatory Impact Review
SEDAR	Southeast Data, Assessment and Review
SFA	Sustainable Fisheries Act
SIA	Social Impact Assessment
SPR	Spawning Potential Ratio
SSR	Spawning (biomass) per Recruit
TMIN	The length of time in which a stock could be rebuilt in the absence of fishing mortality on that stock
TAC	Total Allowable Catch

Glossary

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5.1 Coastal Communities in the South Atlantic

This description of potential fishing communities for the U. S. South Atlantic coast includes a compilation of various social indicators that are relevant to fishing, fishermen and fishing communities. These indicators provide baseline information from which assumptions about social impacts might be made regarding future regulatory actions. A number of data sources were used to assemble community profiles, including: the U.S. Census Bureau Decennial census and zip code business patterns; the federal permit system and state permit system. These profiles were bolstered by field visits in many of these communities to confirm the presence of fishing related activity and to interview key informants about the interconnectedness of that activity to the larger economy and culture of the community. This was accomplished using what is called rapid assessment. While this methodology is no substitute for the more in-depth ethnographic methods commonly used by anthropologists in community studies, it was all that was possible under the budgetary constraints of this research. In addition, these data were compiled into a Geographic Information System (GIS) to facilitate data mapping and amalgamation with other GIS data.

5.1.1 Methodology for Defining Fishing Communities

Previous descriptions of fishing communities tied to particular management actions have provided an indication of the difficulties in defining community and a community's relation to fishing dependence (Aguirre International, 1996; Impact Assessment, Inc., 1991; NPFMC, 1994; Johnson and Orbach, 1996). Griffith and Dyer (Aguirre International, 1996) developed a typology of fishing community dependence for the Northeast Multi-species Groundfish Fishery (MGF). In that typology, the authors identified indicators of dependence which included specific physical-cultural and general social-geographic indicators, i.e., number of repair/supply facilities; number of fish dealers/ processors; presence of religious art/architecture dedicated to fishing; presence of secular art/architecture to fishing; number of MGF permits; and the number of MGF vessels. Using previous results and rapid appraisal they developed a fishery dependence index score for the five primary ports in the MGF. As a result they were able to document five variables that best predicted dependence upon the MGF: (1) relative isolation or integration of fishers into alternative economic sectors, including political participation; (2) vessel types within the port's fishery; (3) degree of specialization; (4) percentage of population involved in fishery or fishery-related industries; and (5) competition and conflict within the port, between different components of the MGF (Aguirre International, 1996).

McCay and Cieri (2000) recently compiled a social and economic profile of the fishing ports and coastal counties of the Mid-Atlantic region. In their study they used the a variety of sources for information: (1) federal census and employment data, analyzed for the counties associated with the commercial fisheries of each state; (2) NMFS weigh-out data on 1998 landings, by species, gear-type, and port, together with similar data, by county, from the state of North Carolina; and (3) field visits and interviews. Their approach was to identify fishing communities recognized as "ports" by the port agents of the NMFS.

Detailed community profiles have been conducted in Alaska to understand the impacts of harvest allocation on communities and on fisheries (Impact Assessment, Inc., 1991; NPFMC, 1994). These profiles utilized census data, permit data, and other available reports supplemented by ethnographic data collection for each community. The profiles provided baseline data to facilitate social impact assessment for license limitation management of the ground fish and crab fisheries.

Johnson and Orbach (1996) combined several counties into management areas, which reflected many sociological, ecological and environmental differences; differences, which were reflected by the types of fishing found in the various fishing communities. Although they did not attempt to define dependence or specify specific fishing communities, they did contend that management of fisheries would be enhanced if it were to take into consideration the broader social and ecological realities of fishermen's behavior.

More recent research to identify fishing communities has been undertaken in both the Northeast and the Southeast. Hall-Arber et al. 2002 used several approaches in assessing a community's dependence upon fishing. One was a regional model of fishing-related employment compared to alternative employment. Another focused on fishing structure complexity and the degrees of individual communities' gentrification and the third approach used community profiles with detailed port characteristics and stakeholder views on community, way of life, institutions and fisheries management. They conclude that a regional analysis reflects the incorporation of a fishing component into economy of contemporary coastal communities.

In their study of Florida fishing communities, Jacob et al. 2001 used a protocol based on central place theory which combined federal and state fishing permit data and census employment data aggregated at the Zip code level to sort population centers and their surrounding hinterlands into central places for the entire state of Florida. Zip code was used for the basic unit of aggregation because it is a geographic identifier for many forms of commercial and recreational fishing data, it is also a relatively small unit of measure, and its boundaries form a service delivery area. To account for the embedded nature of economic linkages in fishing communities, regional economic multipliers for employment were used to estimate the number of jobs that were directly and indirectly related to fishing in each community. Based upon their measure of dependency a small number of coastal communities were determined to be dependent upon fishing. However, using such a dependency measure is not without its drawbacks as concerns about the undercounting of certain occupations within the census data and the inability to satisfactorily measure the recreational sector in terms of its contribution to the local economy are noted.

Because there has been little or no research to document fishing communities in the South Atlantic, this description of communities will use a modified approach similar to that used by Jacob et al. (2002). Although a regional approach is sometimes warranted, it is apparent that in their Florida research (Jacob et al., 2002) some fishing communities became subsumed within the larger service sector economy of Florida's coastal regions. That economy is fueled by the rapidly growing tourism and recreation sectors. While it is true that most Floridians do participate in an economy that extends beyond their community, it is likely that the majority of their needs are met within the confines of that place they consider their home or what we are referring to as a community. It is improbable that the same boundary serves as community for all individuals. Therefore we have to assume that based upon certain criteria a pre-determined boundary will encompass an area that captures a sense of community for most of those who live within that boundary. Without extensive ethnographic research into social networks and sense of place, it is impractical to assume that we know the exact boundary around a fishing community. For that reason, in this description there will be no definite boundary assumed, however the fishing community will be understood to exist within a range of boundaries.

Data at the census designated place level (CDP) are used for describing the demographic character of most communities. Where zip code level data only are available (permits, NAIC employment figures), data are compiled for the all zip codes associated with the area identified. A map, which shows the zip code boundary for each CDP, is provided along with the outline of the CDP.

One of the difficulties in using CDP data is that it has been shown that fishermen will often live outside the boundaries of the CDP where their vessel is home ported (Jacob et al. 2001). Data at the CDP level will not always have a direct one to one correspondence with other data such as the fisherman's home zip code or zip code business patterns for fishing employment locations. Therefore data that correspond to one level of place may not correspond to another. Consequently, it is important to understand these differences when undertaking any assessment of impacts to a community. Furthermore, it has been noted that census data often underreport certain groups of people. Recent research (Kitner, 2001) has identified coastal communities and fishing communities as being part of those groups who may not be fully represented by census data.

Because at this time there are no standard guidelines for delineating the boundaries of a fishing community, this description will combine data from different levels and concepts of place (zip code, homeport and Census Designated Place). Each, in its own way, may represent some part of a fishing community, but none will represent the community in its entirety. Such boundaries cannot be determined without extensive research, as mentioned before. The data presented here will highlight the differences in the types of data used in determining the boundaries of a community and any such impacts that might ensue.

5.1.2 Census Demographic and Employment Data Caveats

When using census data it is important that certain caveats be made clear. As mentioned previously, census data has been notorious for underreporting certain groups of people who difficult to locate and therefore are often not reported in the census. Commercial fishermen are part of that group as outlined in recent research by Kitner (2001). For that reason, it must be assumed that census data as it relates to fishing communities underreports employment and participation in work related to commercial fishing. As was pointed out in earlier research (Jacob et. al, 2001) any attempt at quantifying employment or income from commercial or recreational fishing becomes problematic. Data may be suppressed or grossly underreported and therefore any description will miss important economic and social contributions of fishing related businesses.

At the same time, census data is the only demographic data that can be applied over large geographic areas and population ranges. It is easily available and represents the most affordable alternative for describing any community at this time. Although these data are suspect, it can only be assumed that any underreporting is consistent across geographic area and population range. Although this situation is not ideal, by combining several different data from various sources, a general description of community and the fishing activity associated with it may be attained. Until more detailed ethnographic research that can examine the social and economic networks that exist in fishing communities can be undertaken, this general and often broad description of community will have to suffice.

Census demographic data were collected for communities and appear under each community description. Those data include the following variables for each community: total population by age; educational attainment; race; industry; occupation; average wage or salary; poverty status. These data were collected for census years 1970, 1980, 1990, and 2000. Census data for the first three decades were compiled using the MARFIN Socioeconomic Database created by the Louisiana Population Data Center. The census data for the year 2000 were compiled from the U.S. Census Bureau's Amercian Factfinder Webpage. In using data from the 2000 census there are several caveats that must be noted. The 2000 census was the first year that individuals were allowed more than one choice when deciding race. Therefore, when comparing the category race to the previous three decades, the association will not be consistent. In order to lessen misunderstanding for this description only those categories where one race alone was chosen were used. In other words, those who chose more than one race were not included. This will result in some underreporting for the year 2000 in the tables presented.

Other significant changes in the 2000 census were made to the industry and occupation categories. This was the first decennial census to use the North American Industry Classification Code (NAIC) in replacement of the Standard Industry Code (SIC). In the transition from SIC to the NAIC, many industry and occupation categories were reclassified making it difficult to compare any previous census and the most recent. For the purposes of comparison here, certain industry categories were reclassified and compiled to reflect the best representation of the previous classification used in the preceding census (See Appendix 1 in Jepson et al., 2006). This recoding was done after comparing certain industry classifications which were moved into other categories with the switch to the NAIC from SIC. While admittedly not perfect, this reclassification was necessary to make comparisons of industry changes over time. The task of reclassifying the occupation category was deemed too onerous and therefore the only category reported for 2000 is the Farm, fish and forestry category, which did not change and most likely contains the majority of fishing related employment.

Employment data collected by the Census Bureau were also used at the zip code level for the community descriptions. Again, it must be assumed for reasons stated earlier that these data are likely to underreport actual fishing employment. In addition, the category of fishing that is reported in the economic census does not include those individuals who report themselves as self-employed, of which most commercial fishermen consider themselves to be. Therefore, employment figures again grossly distort the actual employment from commercial and recreational fishing. In addition, like Jacob et al. 2001, employment for the recreational sector was difficult to quantify and the marinas sector is once again used to provide some indication of community employment for the recreational sector. It is recognized that this measure is inadequate and is one component of a much larger employment sector.

At the end of each state's community profiles, two tables have been provided to categorize both the attendant fishing infrastructure in those communities, but to also begin a process of determining which of the following communities might warrant further consideration as a fishing community. The information provided in these tables is considered highly subjective based upon the presence or absence of certain criteria and an assessment of other information provided through interviews or historical data. It is therefore suggested that any future determination of fishing community status use these tables cautiously and be judicious in attempting to incorporate any other information that might be available to categorize any of the communities included in this document. It must also be noted that during field research and as part of the management process, other communities have been mentioned for inclusion to be considered as fishing communities and therefore those communities included in this document do not constitute an exhaustive listing of potential fishing communities.

5.1.3 North Carolina Communities with Substantial Fishing Activity

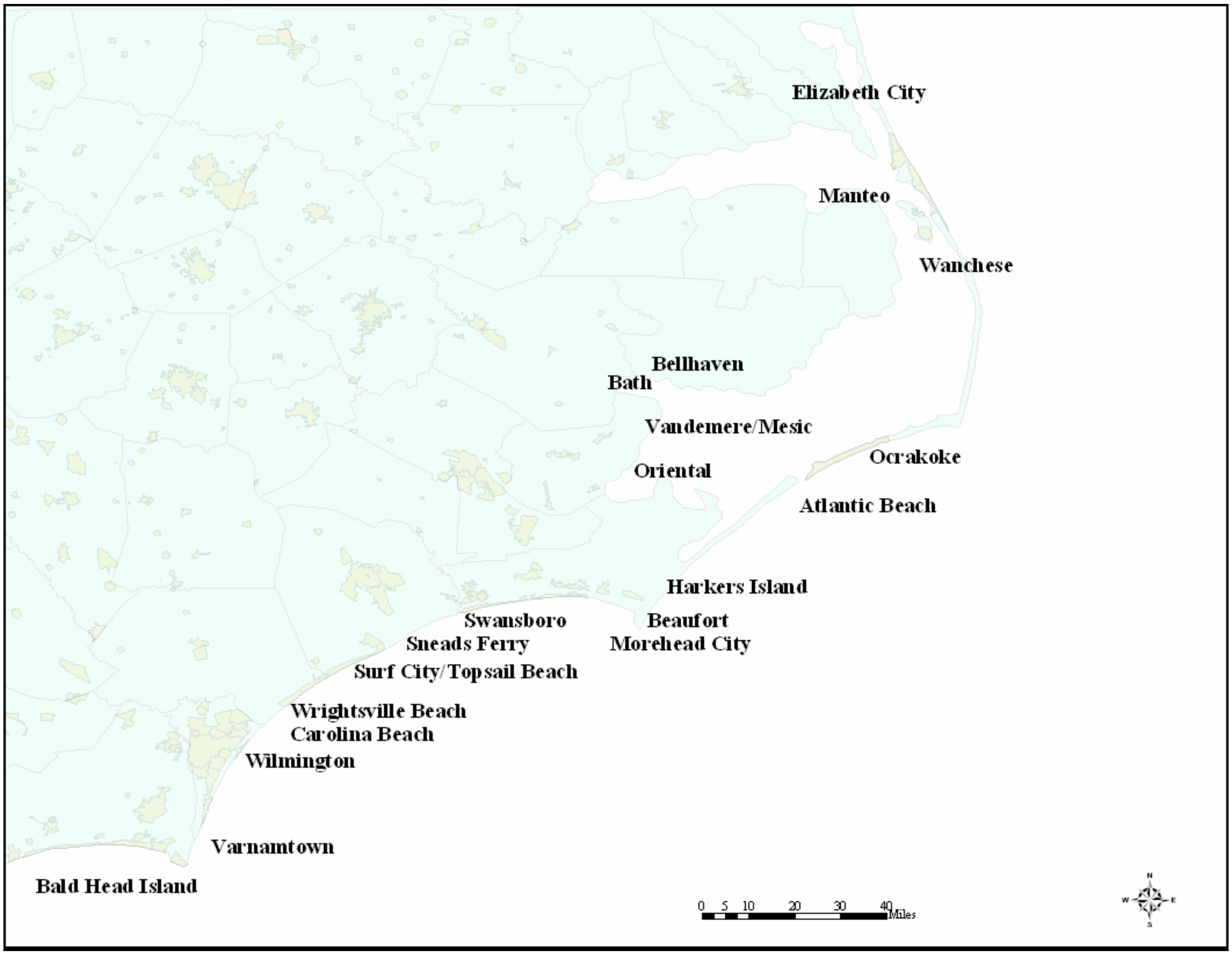


Figure 5.1.3-1. North Carolina Potential Fishing Communities.

According to the National Marine Fisheries Service North Carolina has landed close to 140 and 160 million pounds of seafood in 2001 and 2002 respectively. Two ports, Wanchese-Stumpy Point, and Beaufort-Morehead City, both rank within the top 50 ports in terms of landings and value for those same years. Since 1998, North Carolina has had a high of 535 vessels with federal permits, now down to 439 in 2001 (Table 5.1.3-1). Most vessels with federal permits had either king or Spanish mackerel with snapper grouper class 1 permits being the next most common. Figure 5.1.3-1 shows potential fishing communities in North Carolina.

Table 5.1.3-1. Numbers of Federal Permits by Type for North Carolina (Source: NMFS 2002)

Type of Permit	1998	1999	2000	2001
Total permitted vessels	535	513	477	439
Commercial King Mackerel	428	362	356	336
Commercial Spanish Mackerel	376	256	211	216
Commercial Spiny Lobster	21	23	17	13
Charter/Headboat for Coastal Pelagics	155	148	141	129
Charter/Headboat for Snapper Grouper	89	94	98	95

Snapper Grouper Class 1	153	191	155	164
Snapper Grouper Class 2	28	33	27	26
Swordfish	1	19	17	20
Shark	0	39	24	43
Rock Shrimp	46	39	35	37

There were over 9500 state licenses sold with capability of sale and over 5500 reported sales in 2002 (Table 5.1.3-2). Although the overall number of license sold has been increasing since 1994, the number of licenses reporting sales has been decreasing and the number of licenses without sales has been increasing.

Table 5.1.3-2. Number of licenses sold by the North Carolina Division each license year, the number of licenses with selling privileges that potentially can report catch on trip tickets by license year and the number of licenses actually used to report catches. Individuals may hold more than one license with selling privileges. (Source: NCDMF 2002).

License Year	Number of licenses sold*	Number of licenses reporting sales	Number of licenses sold, but did not report sales
1994	6,781	Not available	Not available
1994/1995	7,535	6,710	825
1995/1996	7,898	7,285	613
1996/1997	8,173	6,700	1,473
1997/1998	8,595	7,000	1,595
1998/1999	8,426*	6,515	1,911
1999/2000+	9,711	6,015	3,696
2000/2001*	9,677	6,057	3,620
2001/2002*	9,712	5,509	4,203

*Licenses from 1994 to June 1999 are Endorsement to Sell licenses. Licenses from 1999 to the present include number of SCFL, RSCFL, Shellfish, Menhaden License for Non-Residents without SCFL, Recreational Fishing Tournament License to Sell Fish, and Land or Sell licenses. License year is July to June. Source: 1994-1997/98 license year sales were derived from historical reports. 1998/99-2001/2002 from FIN license sales reports.

*1998/99 was a transition year and not all dBase licenses were migrated to FIN. The numbers provided were from FIN.

*1999/00 to 2001/02 include licenses sold that were subsequently surrendered without a refund.

+1999/2000 license counts were stated as much higher in other documents. This was due to the grace period when switching from ETS to SCFL. The number above is correct.

The majority of license sales are for commercial fishing vessels, with over 9400 permits or 46.9 percent in 2002 (Table 5.1.3-3). Standard commercial fishing license is the next most frequent with 32.9 and shellfish licenses third at 11.4 percent. There were 832 dealer licenses sold for the year 2002 in North Carolina.

Table 5.1.3-3. Number of State Permits by Type for North Carolina (Source: NCDMF 2002).

Type	Permits	Percent

Commercial Fishing Vessel Registration	9469	46.9
Dealer License	832	4.1
Flounder License	133	.7
Land or Sell License	59	.3
Non-resident Menhaden License	10	.0
Ocean Fishing Pier License	25	.1
Spotter Plane License	11	.1
Retired Standard Commercial Fishing License	676	3.3
Standard Commercial Fishing License	6632	32.9
Shellfish License	2302	11.4
Recreational Fishing Tournament to Sell License	31	.2
Total	20180	100.0

There has been considerable research conducted with North Carolina fishermen and their communities over time. Johnson and Orbach's research (1996) combined several counties into management areas which reflected many sociological, ecological and environmental differences. Those differences were related to the different types of fishing found in the various communities. Although they did not attempt to specify specific fishing communities, they did contend that management of fisheries would be enhanced if it were to take into consideration the broader social and ecological realities of fishermen's behavior. Griffith (1999) has written extensively about North Carolina fishermen and their communities and Garrity-Blake (1994) has also provided an in-depth look at the menhaden fishery. Numerous journal articles and gray papers have also contributed to an understanding of North Carolina and its fisheries. But to date there has been no systematic attempt to identify fishing communities and begin baseline data collection. The communities describe here were selected from a list of fishing communities identified by various advisory panel members who are knowledgeable about North Carolina fisheries and their communities. The list was modified after conducting rapid assessment in some of those communities. These descriptions are not a definitive list of fishing communities in North Carolina, but represent the first phase of assembling both the data and descriptions to begin identifying those communities which may indeed be classified as "fishing community."

A map for each community is provided which displays federal dealers and a symbol indicating the number of federal permits by zipcode. The zipcode area name is displayed in light blue while the CDP name is in black. The symbol for permits is centered within the zipcode area and does not represent the precise location of any permit holder. Dealer permits are displayed near their physical location.

5.1.3.1 Varnamtown

Varnamtown (Figure 5.1.3-2) has seen a slight population increase from 1990 to 2000. The majority of housing is owner occupied (Table 5.1.3-5) and residence is fairly stable with most living in the same house within the last five years for both the 1990 and 2000 census (Table 5.1.3-6). Just over fifty percent of the population is in the labor force for the last two decennial censuses, but the percent unemployed has declined from 8.2 percent in 1990 to 5.1 percent in 2000. The population is almost entirely White with a few Latinos according to Table 5.1.3-8. The poverty rate has declined from 17.2 percent in 1990 to 11.2 percent in 2000 (Table 5.1.3-10). Employment in the retail and wholesale industry leads with construction and transportation next (Table 5.1.3-11). There has been a slight decline in both the categories of Agriculture, Fishing and Mining (Table 5.1.3-11) and Farm, Fish, Forest (Table 5.1.3-12) from 1990 to 2000.

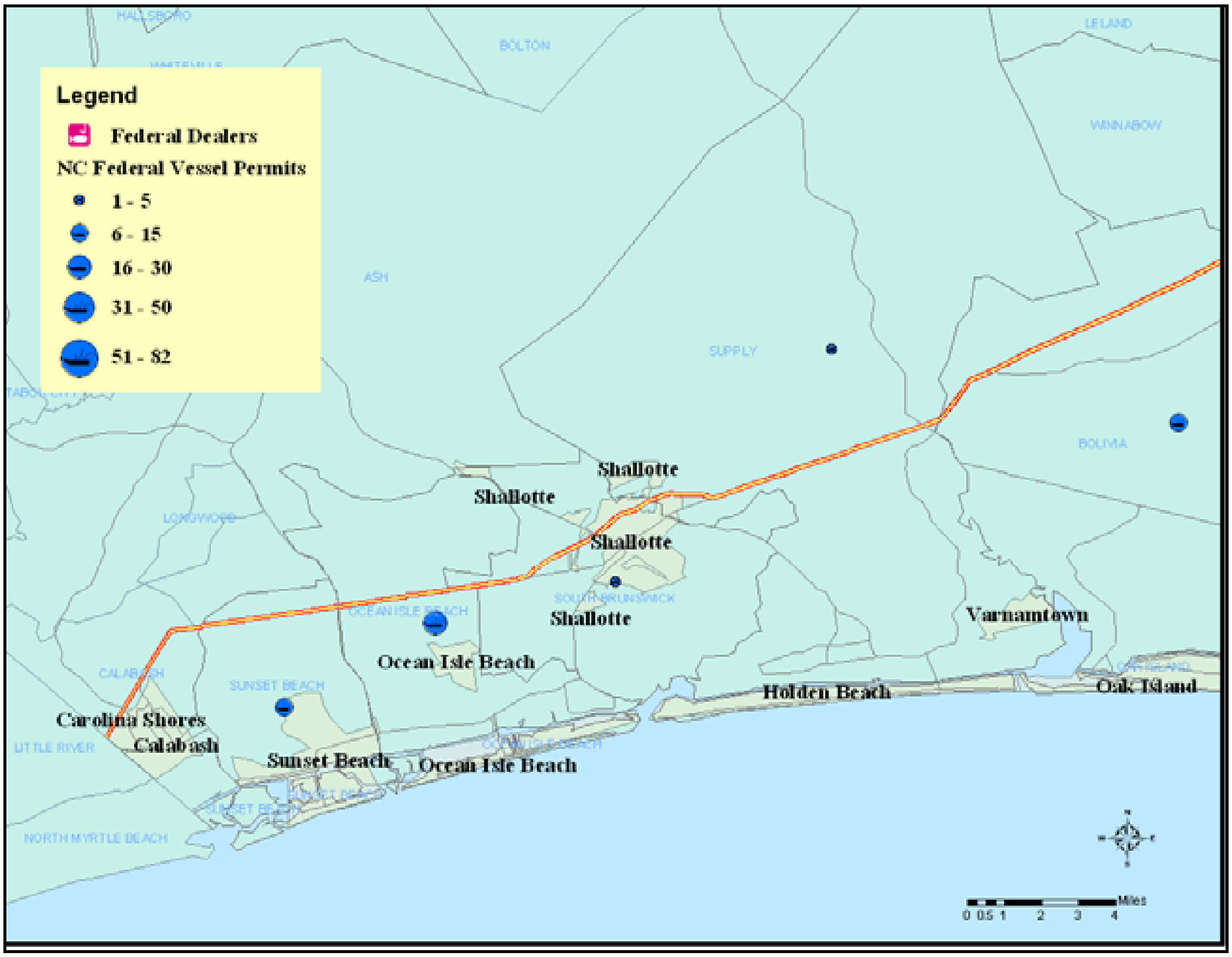


Figure 5.1.3-2. Varnamtown, NC.

Varnamtown is supposedly the fishing hub for this region, although as evidenced by the above map (Figure 5.1.3-2) and Tables 5.1.3-4 and 5.1.3-5, many fishermen list Supply as their residence for some reason, which may be where the post office is located. A sign at the town entrance prominently displays a shrimp trawler welcoming you to the community. Varnamtown is relatively rural and surrounded by farmland. There are at least five fish houses and a marina which services non-commercial boats. One of the fish houses does have charter operations and a jet-ski business that operate under the same roof.

One fish house owner commented that they struggle with their seafood business because shrimpers are having difficulty making ends meet. Most fishermen who dock and sell at local fish houses live near the town itself. A large percentage of locals make some kind of a living off the water – harvesting fish, clams, or oysters according to those interviewed. Some fish year-round, but many have other jobs such as carpentry and work on dredge boats. Development has changed the community; outsiders are a more common sight now, according to one individual, whereas in the past it was primarily locals living in the community.

Sunset Beach / Seaside

Sunset Beach is really two communities – one on the creek side and the other the ocean side. The creek side with its strip malls and mobile homes is where the locals live year-round. It appears to be much more working-class than its ocean side counterpart. The beach side is developed with expensive homes, gift shops, and beach wear stores. On the creek side and a little more inland is the town of Seaside, where there is some fishing. There is the Pelican Point Marina in nearby Shallotte; it is primarily a recreational marina and has no commercial boats. There is a seafood restaurant where some small trawlers dock and a steel and aluminum welding shop that caters to the fishing population.

Holden Beach, North Carolina

Developed much like Sunset Beach, Holden Beach has one marina but no charter operations. It is tourist centered, with beach wear marts and a couple seafood restaurants.

Supply, North Carolina

Supply is an unincorporated area, yet the zip code area is named after this small community. Viewing the permit tables and the zip code related employment table it is obvious there is considerable fishing activity within the zip code area that does not appear in federal permit tables (Table 5.1.3-13) nor the state permit table (Table 5.1.3-15) for Varnamtown. Supply has over 600 licenses issued in 2002 with 167 shell fishing licenses and over 130 standard commercial fishing licenses. There are 22 dealers licensed in Supply and over 260 commercial vessels according to Table 5.1.3-16.

Varnamtown Census Demographics

Population

Table 5.1.3-4. Total Persons and Persons by Age category for Varnamtown, North Carolina 1970-2000 (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	.	434	492
Persons Age 0-5	.	.	24	37
Persons Age 6-15	.	.	50	45
Persons Age 16-17	.	.	21	11
Persons Age 18-24	.	.	61	30
Persons Age 25-34	.	.	44	59
Persons Age 35-44	.	.	60	80
Persons Age 45-54	.	.	57	57
Persons Age 55-64	.	.	59	93
Persons Age 65+	.	.	58	80

Housing Tenure

Table 5.1.3-5. Housing Tenure for Varnamtown, North Carolina 1990-2000 (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	15.1	14.2
Percent Owner Occupied	**1990**	**2000**
	84.9	85.8

Residence in 1985 and 1995

Table 5.1.3-6. Residence in 1985 and 1995 for Varnamtown, North Carolina 1990-2000 (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	72	67
Same House	**1990**	**2000**
	296	333

Employment/Unemployment

Table 5.1.3-7. Employment and Unemployment for Varnamtown, North Carolina 1990 2000 (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	51.4	52.9
Percent unemployed	8.2	5.1

Race

Table 5.1.3-8. Race for Varnamtown, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	.	0	0
Latino Black Persons	.	.	0	0
Latino Persons	.	.	0	3
White Persons	.	.	432	475
Latino White Persons	.	.	0	2

Education

Table 5.1.3-9. Years of Education by Category for those 25 Years and Older for Varnamtown, North Carolina 1970-2000 (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**

25+ w/ 0-8 years education	.	.	68	46
25+ w/ 9-11 years education	.	.	59	48
25+ w/ HS diploma	.	.	90	126
25+ w/ 13-15 years. education	.	.	43	74
25+ w/ College Degree	.	.	11	71
Drop outs	.	.	10	4

Income and Poverty

Table 5.1.3-10. Average Household Wage/Salary and Persons Below the Poverty Level for Varnamtown, North Carolina 1970-2000 (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	.	.	$26590	$33750
Poverty Level				
Persons Below Poverty Level	.	.	75	55
Age 65+ Below Poverty Level	.	.	24	14
Households with Public Assistance	.	.	19	4

Industry

Table 5.1.3-11. Employment by Industry for Varnamtown, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	.	.	16	15
Construction	.	.	37	40
Business Services	.	.	21	6
Communication/Utilities	.	.	0	10
Manufacturing	.	.	8	1
Financial, Insurance & Real Estate	.	.	4	9
Services	.	.	2	76
Wholesale/Retail Trade	.	.	55	42
Transportation	.	.	42	2

Occupation

Table 5.1.3-12. Employment by Occupation for Varnamtown, North Carolina 1970-2000 (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	.	.	35	-
Clerical	.	.	12	-
Craft	.	.	23	-
Exec/Managerial	.	.	10	-

Farm/Fish/Forest	.	.	18	15
Household Services	.	.	4	-
Laborer/Handler	.	.	10	-
Operative/Transport	.	.	12	-
Service, except Household	.	.	20	-
Technical	.	.	0	-

Varnamtown Fishing Demographics

Table 5.1.3-13. Number of Federal Permit by Type for Varnamtown, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	2	1	0	0
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	1	1	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-14. Employment in Fishing Related Industry for Varnamtown, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	16
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	36
Fish and Seafood Markets	445220	8
Marinas	713930	8
Total Fishing Employment		52

Table 5.1.3-15. Number of State Permit by Type for Varnamtown, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	0
Dealer License	0
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0

Retired Standard Commercial Fishing License	0
Standard Commercial Fishing License	0
Shellfish License	0
Recreational Fishing Tournament to Sell License	0
Total	0

Table 5.1.3-16. Number of State Permit by Type for Supply, North Carolina (Source: NCDMF 2002).

Type	**Permits**
Commercial Fishing Vessel Registration	264
Dealer License	22
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	21
Standard Commercial Fishing License	131
Shellfish License	167
Recreational Fishing Tournament to Sell License	0
Total	605

5.1.3.2 Southport/ Bald Head Island (28461)

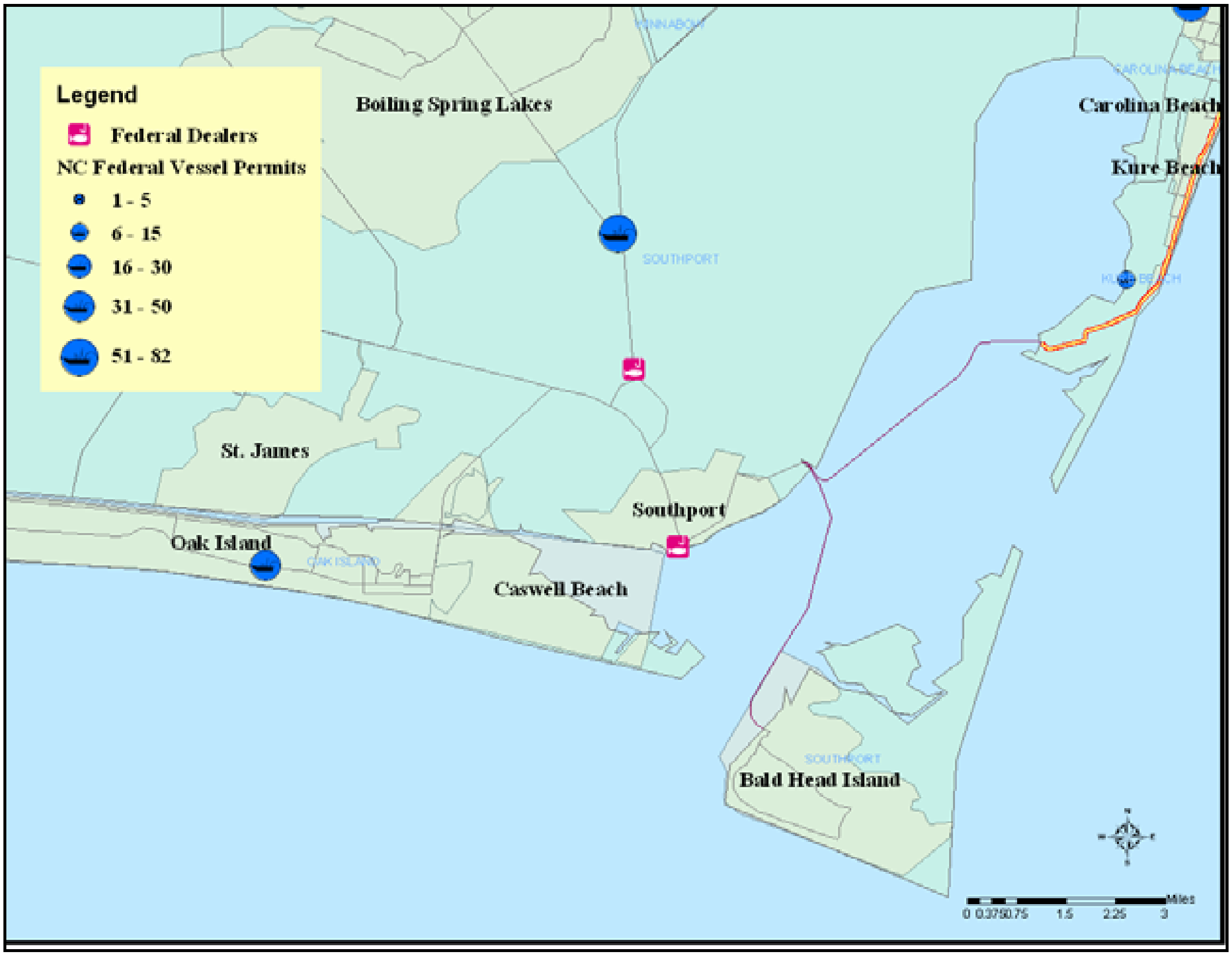


Figure 5.1.3-3. Southport/Bald Head Island, North Carolina.

Southport

Southport (Figure 5.1.3-3) is a quaint fishing community located at the mouth of the Cape Fear River, originally incorporated in 1792; this community caters to both tourists and locals. The downtown marina has restaurants, gift shops and several inns. There are at least three marinas in the area, with several seafood restaurants nearby. There is a dredging company and a nearby boat yard and a welding company that provide marine repairs. The North Carolina State Ports Authority has a small boat harbor located here and the NC Maritime Museum has a branch in Southport.

There are several recreational fishing tournaments held in Southport including the US Open King Mackerel Fishing Tournament held in October which attracts more than 500 boats annually. Other tournaments include the Lady Anglers King Mackerel Tournament in August and the Wildlife Bait and Tackle Flounder Tournament held in September.

Southport has some seafood employment with most in seafood processing and fish and seafoods as shown in Table 5.1.3-37. There are over 200 state permits with the majority being commercial vessel registrations and the next being standard commercial fishing licenses at 76. There were 14 dealer permits listed also.

Southport has seen a decrease in its population since 1980 from 2835 to 2386 in 2000. Approximately 70 percent of the housing was owner occupied in 1990 and 2000 and a large majority of the population has remained stable, living in the same home as five years before for both censuses. The percentage of people in the work force has increased while the percentage of unemployed has dropped according to Table 5.1.3-20. The majority of the population is White (76%) with 22% Black and less than 2% Latino (Table 5.1.3-21). The poverty rate in 2000 was 12.5 percent which is up from 10 percent in 1980 (Table 5.1.3-23). There has been a decline in both the Agriculture, Fishing and Mining industry category and the Farm, Fish, and Forestry occupation category since 1990 (Tables 5.1.3-24 and 5.1.3-25).

Bald Head Island

Bald Head Island is an exclusive community with a private ferry operated by the island. Many Southport residents work on the island or for the ferry system. There are a few restaurants, an inn, and gift shops located around a marina on the island. The marina is a full service marina with electrical service which will accommodate vessels up to 90 feet in length. There is a charter fishing operation at the marina, but no commercial vessels dock there. People do fish from shore and there is the annual fishing rodeo in May.

The population on Bald Head Island has doubled since 1990 to 165 persons. Housing tenure has shifted somewhat with the percent renter occupied growing from 8.3 percent in 1990 to 37.9 percent in 2000 (Table 5.1.3-27). Residence is beginning to show some stability with the percentage of people living in the same house as five years ago in 2000 more than in 1990 according to Table 5.1.3-28. A greater percentage of people are now in the labor force and unemployment has risen also as shown in Table 5.1.3-29 The population is predominately White according to Table 5.1.3-30, but there has been a recent increase in the category for Blacks although relatively slight in terms of overall population. According to Table 5.1.3-23 the average wage or salary has dropped considerably since 1990 and the number of persons in poverty has also risen. These dramatic changes reflect the total persons identified in the census for this island which has a relatively small population.

Southport Census Demographics

<u>Population</u>

Table 5.1.3-17. Total Persons and Persons by Age category for Southport, North Carolina 1970-2000 (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	2835	2359	2386
Persons Age 0-5	.	125	89	156
Persons Age 6-15	.	133	113	277

Persons Age 16-17	.	514	297	46
Persons Age 18-24	.	96	67	107
Persons Age 25-34	.	216	162	212
Persons Age 35-44	.	385	298	309
Persons Age 45-54	.	343	322	375
Persons Age 55-64	.	302	236	325
Persons Age 65+	.	304	279	579

Housing Tenure

Table 5.1.3-18. Housing Tenure for Southport, North Carolina 1990-2000 (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	29.9	31.8
Percent Owner Occupied	**1990**	**2000**
	70.1	68.2

Residence in 1985 and 1995

Table 5.1.3-19. Residence in 1985 and 1995 for Southport, North Carolina 1990-2000 (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	238	182
Same House	**1990**	**2000**
	1388	1331

Employment/Unemployment

Table 5.1.3-20. Employment and Unemployment for Southport, North Carolina 1990-2000 (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	48.7	56.3
Percent unemployed	8.9	5

Race

Table 5.1.3-21. Race for Southport, North Carolina 1970-2000 (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	785	622	512
Latino Black Persons	.	19	0	0
Latino Persons	.	51	8	34
White Persons	.	2044	1737	1777
Latino White Persons	.	32	8	24

Education

Table 5.1.3-22. Years of Education by Category for those 25 Years and Older for Southport, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	275	192	73
25+ w/ 9-11 years education	.	365	220	195
25+ w/ HS diploma	.	534	476	407
25+ w/ 13-15 years. education	.	363	331	489
25+ w/ College Degree	.	301	340	622
Drop outs	.	7	0	14

Income and Poverty

Table 5.1.3-23. Average Household Wage/Salary and Persons Below the Poverty Level for Southport, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$16282	$28062	$33714
Poverty Level				
Persons Below Poverty Level	.	283	281	298
Age 65+ Below Poverty Level	.	44	108	75
Households with Public Assistance	.	138	90	36

Industry

Table 5.1.3-24. Employment by Industry for Southport, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	0	16	5
Construction	.	89	4	97
Business Services	.	37	31	75
Communication/Utilities	.	137	126	64
Manufacturing	.	67	54	49
Financial, Insurance & Real Estate	.	0	36	80
Services	.	49	65	429
Wholesale/Retail Trade	.	196	307	159
Transportation	.	186	157	37

Occupation

Table 5.1.3-25. Employment by Occupation for Southport, North Carolina 1970-2000 (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	64	128	-
Clerical	.	1680	120	-
Craft	.	170	47	-
Exec/Managerial	.	100	104	-
Farm/Fish/Forest	.	0	22	2
Household Services	.	21	9	-
Laborer/Handler	.	54	39	-
Operative/Transport	.	27	35	-
Service, except Household	.	174	144	-
Technical	.	38	54	-

Bald Head Census Demographics

Population

Table 5.1.3-26. Total Persons and Persons by Age category for Bald Head Island, North Carolina 1970-2000 (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	.	78	165
Persons Age 0-5	.	.	6	9
Persons Age 6-15	.	.	0	6
Persons Age 16-17	.	.	0	0
Persons Age 18-24	.	.	0	0
Persons Age 25-34	.	.	4	20
Persons Age 35-44	.	.	8	5
Persons Age 45-54	.	.	19	40
Persons Age 55-64	.	.	22	65
Persons Age 65+	.	.	19	20

Housing Tenure

Table 5.1.3-27. Housing Tenure for Bald Head Island, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	8.3	37.9
Percent Owner Occupied	**1990**	**2000**
	91.7	62.1

Residence in 1985 and 1995

Table 5.1.3-28. Residence in 1985 and 1995 for Bald Head Island, North Carolina 1990-2000 (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	12	6
Same House	**1990**	**2000**
	6	56

Employment/Unemployment

Table 5.1.3-29. Employment and Unemployment for Bald Head Island, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	48.6	56.7
Percent unemployed	0.0	5.9

Race

Table 5.1.3-30. Race for Bald Head Island, North Carolina 1970-2000 (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	.	0	5
Latino Black Persons	.	.	0	0
Latino Persons	.	.	0	0
White Persons	.	.	78	165
Latino White Persons	.	.	0	0

Education

Table 5.1.3-31. Years of Education by Category for those 25 Years and Older for Bald Head Island, North Carolina 1970-2000 (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	.	.	0	0
25+ w/ 9-11 years education	.	.	0	0
25+ w/ HS diploma	.	.	6	10
25+ w/ 13-15 years. education	.	.	15	28
25+ w/ College Degree	.	.	47	112
Drop outs	.	.	0	0

Income and Poverty

Table 5.1.3-32. Average Household Wage/Salary and Persons Below the Poverty Level for Bald Head Island, North Carolina 1970-2000 (Source: U.S. Census Bureau &

MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	.	108616	62083
Poverty Level				
Persons Below Poverty Level	.	.	4	17
Age 65+ Below Poverty Level	.	.	0	0
Households with Public Assistance	.	.	0	0

Industry

Table 5.1.3-33. Employment by Industry for Bald Head Island, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	.	0	0
Construction	.	.	0	5
Business Services	.	.	0	19
Communication/Utilities	.	.	0	1
Manufacturing	.	.	4	3
Financial, Insurance & Real Estate	.	.	2	24
Services	.	.	17	4
Wholesale/Retail Trade	.	.	6	11
Transportation	.	.	0	2

Occupation

Table 5.1.3-34. Employment by Occupation for Bald Head Island, North Carolina 1970-2000 (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	.	9	-
Clerical	.	.	0	-
Craft	.	.	0	-
Exec/Managerial	.	.	14	-
Farm/Fish/Forest	.	.	0	0
Household Services	.	.	0	-
Laborer/Handler	.	.	0	-
Operative/Transport	.	.	0	-
Service, except Household	.	.	2	-
Technical	.	.	0	-

Southport/Bald Head Island Fishing Demographics

Table 5.1.3-35. Number of Federal Permit by Type for Southport, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	42	40	34	35
Commercial King Mackerel	35	23	26	25
Commercial Spanish Mackerel	34	18	14	15
Commercial Spiny Lobster	4	5	2	2
Charter/Headboat for Coastal Pelagics	8	6	7	5
Charter/Headboat for Snapper Grouper	5	4	6	6
Snapper Grouper Class 1	20	25	18	18
Snapper Grouper Class 2	2	3	2	2
Swordfish	0	0	0	0
Shark	0	2	1	1
Rock Shrimp	2	0	0	0
Federal Dealers	4	3	3	2

Table 5.1.3-36. Number of Federal Permit by Type for Bald Head Island, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	2	2	2	2
Commercial King Mackerel	2	2	2	2
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	2	2	2	2
Charter/Headboat for Snapper Grouper	1	2	2	2
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-37. Employment in Fishing Related Industry for Southport/Bald Head Island, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	16
Boat Building	336612	0
Fish and Seafoods	422460	12
Fish and Seafood Markets	445220	4
Marinas	713930	12
Total Fishing Employment		28

Table 5.1.3-38. Number of State Permit by Type for Southport, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	103
Dealer License	14
Flounder License	0
Land or Sell License	0

Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	12
Standard Commercial Fishing License	76
Shellfish License	7
Recreational Fishing Tournament to Sell License	1
Total	213

Table 5.1.3-39. Number of State Permit by Type for Bald Head Island, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	3
Dealer License	0
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	0
Standard Commercial Fishing License	2
Shellfish License	0
Recreational Fishing Tournament to Sell License	1
Total	6

5.1.3.3 Carolina Beach (28428)

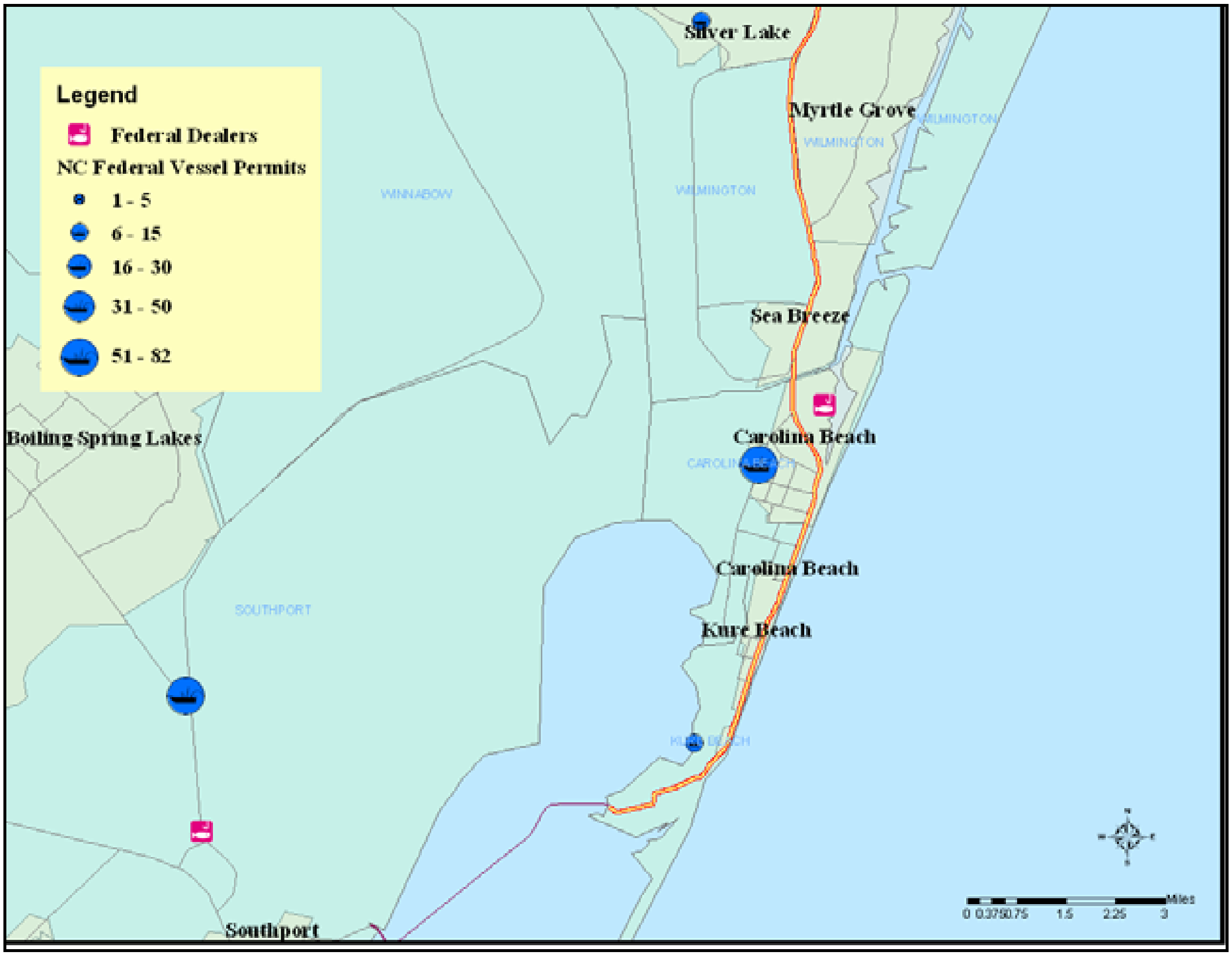


Figure 5.1.3-4. Carolina Beach, North Carolina.

Carolina Beach is situated along what is referred to as the Crystal Coast and has a storied history from Colonial times to the Civil War. Close to Wrightsville Beach, this community is not nearly as crowded or developed, but is still a major tourist destination that relies heavily on the charter boat industry. The municipal marina is where the charter and head boats are docked. Three head boats and three party/cruise boats and approximately 22 charters utilize the municipal marina. There are several bait & tackle shops nearby and there remains one commercial fish house in the community; out of at least five in the past. Five commercial vessels dock at the municipal marina. There are about eight seafood restaurants in the community and most of the hotels are independently owned rather than national chains. The area hosts three fishing tournaments each year: the Atlantic Anglers' Spring Classic Surf Fishing Tournament in May, the East Coast Got-Em-On-Live-Bait Classic King Mackerel Tournament by the in July, and the Carolina Beach Surf Fishing Tournament in October. The community also hosts an annual Fall Seafood, Blues and Jazz festival.

Carolina Beach's population has grown steadily since 1980 to over 4,700 people in 2000 (Table 5.1.3-40). Housing tenure has grown in the area of owner occupied since 1990

(Table 5.1.3-41) and more people seem to be living in the same house as they did five years ago (Table 5.1.3-42). The number of persons in the labor force has not changed much while unemployment has dropped from 1990 to 2000 (Table 5.1.3-43). Racial percentages for the population have remained relatively stable with a predominantly White population according to Table 5.1.3-44.

Carolina Beach has over twenty vessels with federal permits and by far the majority of those vessels hold charter permits for both snapper grouper and coastal pelagics (Table 5.1.3-49). Most of the employment for the zip code area is in fish and seafood (Table 5.1.3-50) while the majority of the 184 state permits are for commercial fishing vessels at 84 Table 5.1.3-51. There are another 57 standard commercial fishing licenses and 22 shellfish licenses in Carolina Beach.

Carolina Beach Census Demographics

Population

Table 5.1.3-40. Total Persons and Persons by Age category for Carolina Beach, North Carolina 1970-2000 (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	1992	3631	4729
Persons Age 0-5	.	102	231	210
Persons Age 6-15	.	268	381	402
Persons Age 16-17	.	77	51	66
Persons Age 18-24	.	230	357	317
Persons Age 25-34	.	314	593	660
Persons Age 35-44	.	225	646	778
Persons Age 45-54	.	254	504	943
Persons Age 55-64	.	216	404	771
Persons Age 65+	.	292	464	582

Housing Tenure

Table 5.1.3-41. Housing Tenure for Carolina Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	50.4	32.3
Percent Owner Occupied	**1990**	**2000**
	49.6	67.7

Residence in 1985 and 1995

Table 5.1.3-42. Residence in 1985 and 1995 for Carolina Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000

	874	593
Same House	**1990**	**2000**
	1115	2164

Employment/Unemployment

Table 5.1.3-43. Employment and Unemployment for Carolina Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	65.8	68.0
Percent unemployed	8.2	3.1

Race

Table 5.1.3-44. Race for Carolina Beach, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	11	31	56
Latino Black Persons	.	0	0	0
Latino Persons	.	26	16	36
White Persons	.	1969	3574	4536
Latino White Persons	.	24	16	21

Education

Table 5.1.3-45. Years of Education by Category for those 25 Years and Older for Carolina Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	183	104	38
25+ w/ 9-11 years education	.	299	355	355
25+ w/ HS diploma	.	445	782	1175
25+ w/ 13-15 years. education	.	258	693	1000
25+ w/ College Degree	.	116	492	1157
Drop outs	.	30	31	9

Income and Poverty

Table 5.1.3-46. Average Household Wage/Salary and Persons Below the Poverty Level for Carolina Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$14147	$28055	$37662

Poverty Level				
Persons Below Poverty Level	.	202	520	439
Age 65+ Below Poverty Level	.	26	33	0
Households with Public Assistance	.	51	61	36

Industry

Table 5.1.3-47. Employment by Industry for Carolina Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	17	80	19
Construction	.	80	202	419
Business Services	.	38	103	219
Communication/Utilities	.	36	51	61
Manufacturing	.	120	174	138
Financial, Insurance & Real Estate	.	44	92	126
Services	.	41	156	1127
Wholesale/Retail Trade	.	167	575	483
Transportation	.	227	462	78

Occupation

Table 5.1.3-48. Employment by Occupation for Carolina Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	111	191	-
Clerical	.	1180	199	-
Craft	.	162	265	-
Exec/Managerial	.	81	245	-
Farm/Fish/Forest	.	29	92	9
Household Services	.	0	0	-
Laborer/Handler	.	32	81	-
Operative/Transport	.	55	46	-
Service, except Household	.	142	253	-
Technical	.	13	93	-

Carolina Beach Fishing Demographics

Table 5.1.3-49. Number of Federal Permit by Type for Carolina Beach, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	23	25	23	26
Commercial King Mackerel	19	20	21	23
Commercial Spanish Mackerel	13	9	9	9

Commercial Spiny Lobster	3	2	1	1
Charter/Headboat for Coastal Pelagics	16	18	17	21
Charter/Headboat for Snapper Grouper	14	18	17	19
Snapper Grouper Class 1	7	9	9	9
Snapper Grouper Class 2	1	2	2	2
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	1	0	0	0
Federal Dealers	0	0	3	2

Table 5.1.3-50. Employment in Fishing Related Industry for Carolina Beach, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	36
Fish and Seafood Markets	445220	4
Marinas	713930	4
Total Fishing Employment		44

Table 5.1.3-51. Number of State Permit by Type for Carolina Beach, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	84
Dealer License	13
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	1
Spotter Plane License	0
Retired Standard Commercial Fishing License	6
Standard Commercial Fishing License	57
Shellfish License	22
Recreational Fishing Tournament to Sell License	1
Total	184

5.1.3.4 Wilmington (28401, 28403, 28405, 28411, 28412)

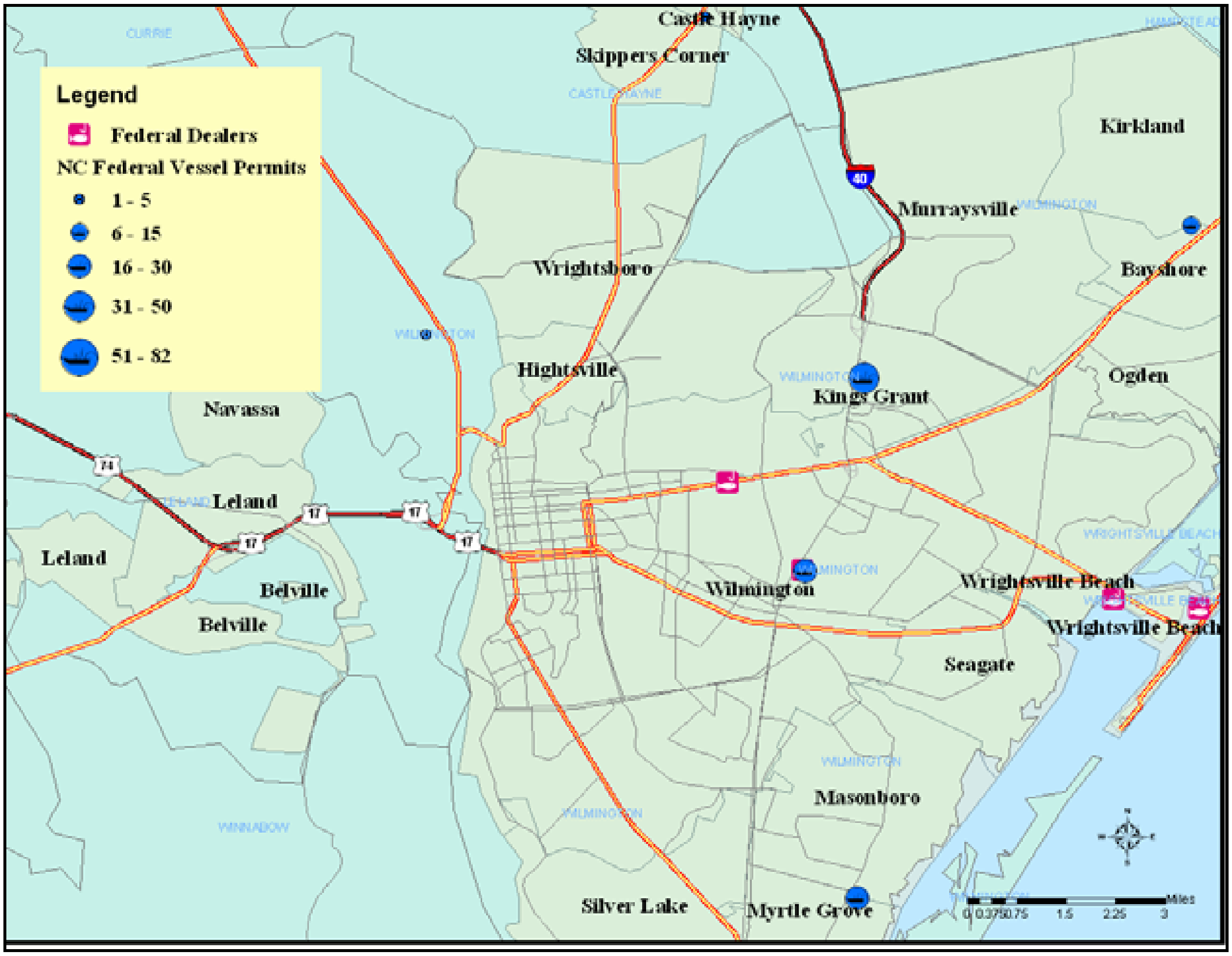


Figure 5.1.3-5. Wilmington, North Carolina.

Wilmington was previously known as New Liverpool, New Town and Newton, and founded by a group of Englishmen, many of whom were maritime businessmen. Located on the Cape Fear River, the town became an important port, but growth was originally slow following the Revolutionary War because of a lack of decent roads and the long distance of the port from the mouth of the river. However, in the mid-1800s, the port began to develop into a center for exports with rice, peanuts, flax, cotton, and naval stores being shipped all over the world. With the advent of the Civil War the export trade in Wilmington halted, but the town gained prominence however as “the lifeline of the Confederacy,” involving itself in the blockade running/profiteering business. After the war, cotton exports were still an important commodity shipped from the port, but World War II brought a shift in the economy with more of an emphasis upon ship building. Today, Wilmington continues to be an important port with the State’s Port Authority located there.

The total number of persons living in Wilmington has grown steadily since the 1970s according to Table 5.1.3-52. Housing tenure has not changed much with an almost even split between owner and renter occupied housing (Table 5.1.3-53). Residence has changed to some degree with more people living in a different house outside the county, so the new migration from outside the county and state must be taking place (Table 5.1.3-54). The percentage of people in the labor force has not changed much but unemployment has risen since 1990 from 3.8 to 8.6 in the year 2000 (Table 5.1.3-55). The population is still predominantly white, yet there is a substantial Black population that has historically been there (Table 5.1.3-56). The poverty rate has dropped since 1970 when it was 25.2, but still remains at 18.8 percent for the year 2000 ((Table 5.1.3-58). As with most communities there has been a substantial drop in the number of those persons employed in the agriculture, fishing and mining category of industry as well as the category of farm, fish and forestry under occupation for Wilmington (Tables 5.1.3-59 and 5.1.3-60).

Wilmington has had between 30 to 40 vessels with federal permits since 1998 and most of those have had permits to fish coastal pelagics and snapper grouper (Table 5.1.3-61). There is considerable employment in the realm of fish and seafood and seafood markets, but the majority is in marinas and some also in boat building as reported in Table 5.1.3-62. There were over 1000 state permits issued for Wilmington with the majority of those issued for commercial vessels. There were almost 300 standard commercial fishing licenses and 152 shellfish licenses sold for Wilmington residents. Over 50 dealer licenses were issued as were 6 recreational fishing tournaments to sell licenses (Table 5.1.3-63).

Wilmington Census Demographics

Population

Table 5.1.3-52. Total Persons and Persons by Age category for Wilmington, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	46169	44000	55530	75542
Persons Age 0-5	3858	2805	4157	4838
Persons Age 6-15	8874	6453	6530	7491
Persons Age 16-17	1904	1411	1453	1394
Persons Age 18-24	5496	6816	8393	12985
Persons Age 25-34	5203	6856	9064	38669
Persons Age 35-44	4568	3865	7364	75048
Persons Age 45-54	5679	3966	4901	8952
Persons Age 55-64	5120	4996	4856	6546
Persons Age 65+	4681	6237	8812	11704

Housing Tenure

Table 5.1.3-53. Housing Tenure for Wilmington, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	52.9	51.4

Percent Owner Occupied	1990	2000
	47.1	48.6

Residence in 1985 and 1995

Table 5.1.3-54. Residence in 1985 and 1995 for Wilmington, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	13901	3785
Same House	**1990**	**2000**
	23715	26649

Employment/Unemployment

Table 5.1.3-55. Employment and Unemployment for Wilmington, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	61.9	63.7
Percent unemployed	3.8	8.6

Race

Table 5.1.3-56. Race for Wilmington, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	15823	17357	18785	19342
Latino Black Persons	58	208	48	145
Latino Persons	115	385	393	1991
White Persons	30165	26425	36130	52227
Latino White Persons	57	168	234	831

Education

Table 5.1.3-57. Years of Education by Category for those 25 Years and Older for Wilmington, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	7870	5795	3421	2053
25+ w/ 9-11 years education	5786	5303	6010	5880
25+ w/ HS diploma	6544	6864	9402	11303
25+ w/ 13-15 years. education	2655	3763	6625	10670
25+ w/ College Degree	2396	4195	7258	18570
Drop outs	1121	472	347	358

Income and Poverty

Table 5.1.3-58. Average Household Wage/Salary and Persons Below the Poverty Level for Wilmington, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	$7151	$15057	$26529	$31099
Poverty Level				
Persons Below Poverty Level	11643	10393	11780	14196
Age 65+ Below Poverty Level	1574	1584	1439	0
Households with Public Assistance	957	2166	2466	201

Industry

Table 5.1.3-59. Employment by Industry for Wilmington, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	202	185	275	99
Construction	1234	1091	1935	88
Business Services	492	556	1177	11
Communication/Utilities	554	596	651	3193
Manufacturing	4753	3458	3722	2839
Financial, Insurance & Real Estate	1849	1676	1506	847
Services	710	777	1252	5209
Wholesale/Retail Trade	5093	3377	9061	1410
Transportation	3663	3953	7009	1079

Occupation

Table 5.1.3-60. Employment by Occupation for Wilmington, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	1136	1949	3774	-
Clerical	2609	23170	3294	-
Craft	2681	1894	2794	-
Exec/Managerial	1729	1613	2618	-
Farm/Fish/Forest	60	213	262	79
Household Services	855	385	303	-
Laborer/Handler	1065	937	1032	-
Operative/Transport	2753	1803	1868	-
Service, except Household	2924	3484	4700	-
Technical	248	420	835	-

Wilmington Fishing Demographics

Table 5.1.3-61. Number of Federal Permit by Type for Wilmington, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	37	40	36	31
Commercial King Mackerel	34	33	29	28
Commercial Spanish Mackerel	29	22	11	10
Commercial Spiny Lobster	2	2	1	2
Charter/Headboat for Coastal Pelagics	4	5	6	2
Charter/Headboat for Snapper Grouper	4	4	5	2
Snapper Grouper Class 1	17	21	16	16
Snapper Grouper Class 2	3	4	4	2
Swordfish	0	1	1	1
Shark	0	2	1	2
Rock Shrimp	0	0	0	0
Federal Dealers	1	0	2	2

Table 5.1.3-62. Employment in Fishing Related Industry for Wilmington, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	12
Fish and Seafoods	422460	42
Fish and Seafood Markets	445220	24
Marinas	713930	64
Total Fishing Employment		142

Table 5.1.3-63. Number of State Permit by Type for Wilmington, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	515
Dealer License	53
Flounder License	1
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	44
Standard Commercial Fishing License	298
Shellfish License	152
Recreational Fishing Tournament to Sell License	6
Total	1069

5.1.3.5 Wrightsville Beach (28480)

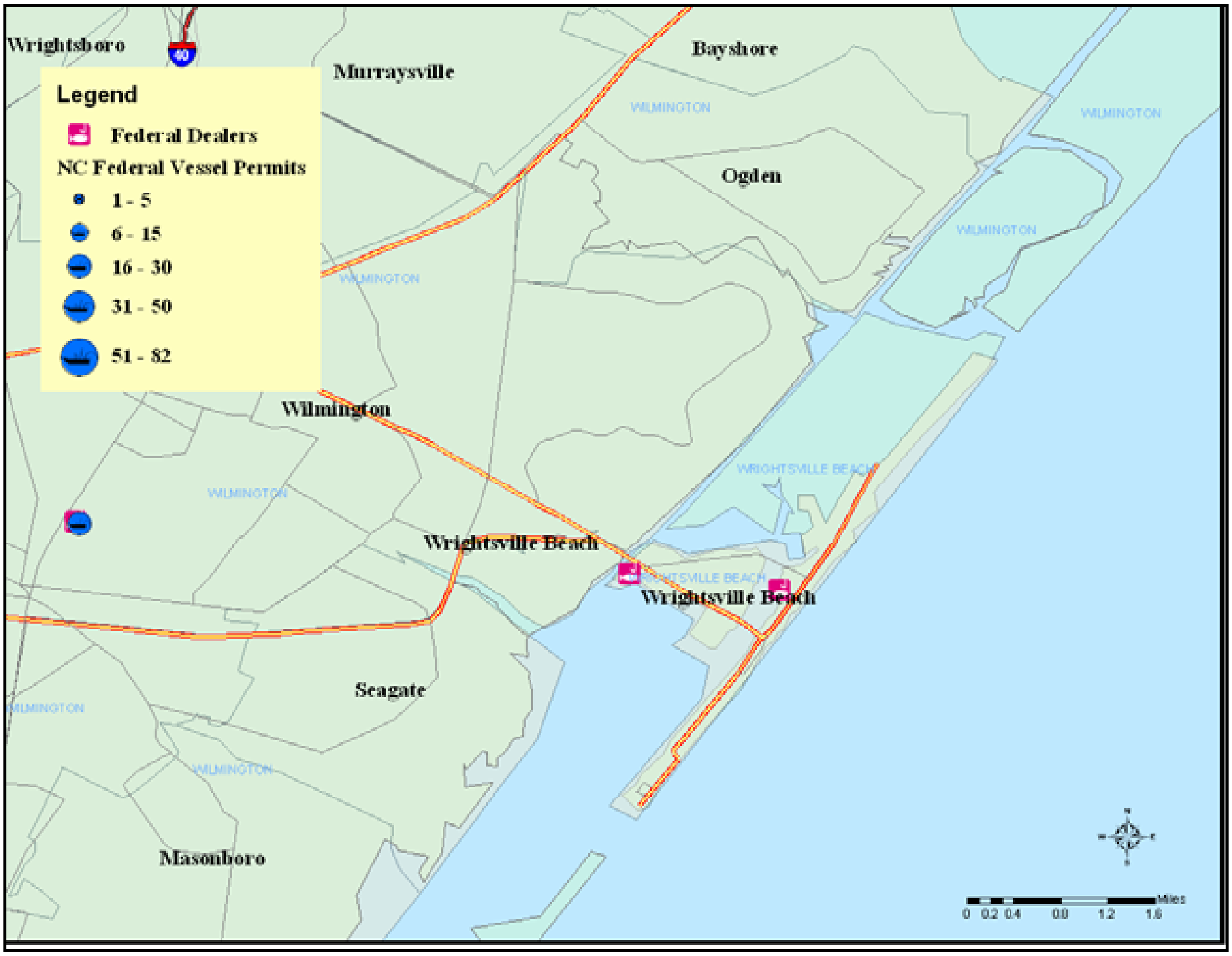


Figure 5.1.3-5. Wrightsville Beach, North Carolina.

The town of Wrightsville Beach occupies one of the barrier islands along North Carolina's southeastern coast. Today, the island is 1,000 to 5,000 feet in width and stretches almost four miles from Masonboro Inlet on the south to Mason Inlet on the north. Originally the island was called New Hanover Banks, a sandy barrier island cut by the shallow Moor's Inlet. The northern part of the island was called Shell Island. Development of the island was slow due to the distance and lack of transportation other than boats. The island was once owned by the State of North Carolina until it was transferred into private hands in three separate grants between 1791 and 1881. One of the families who owned land was the Wright family, for which the island is named. For a century following, there were no residents on the island. However, hunters and fishermen were drawn to the area for the Spanish Mackerel and Blue Fish. Sailing also became popular around the area and frequent races led to the establishment of the Carolina Yacht Club in 1853. Members of the Carolina Yacht Club erected a clubhouse, which was the first structure built on what would be called Wrightsville Beach. The Club is recognized as the third oldest yacht club in the United States.

A turnpike was completed in 1887, which connected Wilmington to Wrightsville Sound, and increased development and growth on the island. Also the Wilmington Seacoast Railroad Company extended its track from Wilmington to the island. More yacht clubs were established, along with beach cottages, hotels and local stores, leading the area to become a popular summer vacation spot. On March 6, 1889, the town of Wrightsville Beach was incorporated. A public pavilion was created in 1905 on the end of the rail line. This pavilion included a bowling alley, shooting gallery, movie theatre and snack bar. In 1935, a large two-lane bridge across the Intracoastal Waterway to Harbor Island, then over Bank's Channel to Wrightsville Beach. A population of about 110 year-round residents in 1930 grew to about 1500 in 1945.

There has been a slight decline in the total population for Wrightsville Beach since 1980 (Table 5.1.3-64). Housing tenure has remained approximately the same with a slight increase in the number of owner occupied housing (Table 5.1.3-65). There seems to be increased stability residence with more people living in the same house in 2000 than there were in 1990 in terms of percentage (Table 5.1.3-66). The percentage of individuals in the labor force has remained about the same with a slight decrease and unemployment is relatively unchanged at 2.0 percent since 1990 (Table 5.1.3-67). The majority of the population remains White with slight increases in the number of Latinos and Blacks (Table 5.1.3-68). Average wage or salary saw a significant increase from 1980 to 1990 but a much smaller increase in 2000. The poverty rate has remained around 9.0 percent throughout the last three decades (Table 5.1.3-70).

There has been a steady decrease in the number of vessels with federal permits from Wrightsville Beach with only 14 in 2001 and most of those permits have been for coastal pelagics (Table 5.1.3-73). There are 5 federal dealers in the community and most of the fishing related employment has been in the marina sector according to Table 5.1.3-74. There were 12 commercial vessels registered with the state and two dealers (Table 5.1.3-75).

Wrightsville Beach Census Demographics

Population

Table 5.1.3-64. Total Persons and Persons by Age category for Wrightsville Beach, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	2884	2797	2719
Persons Age 0-5	.	64	75	84
Persons Age 6-15	.	170	165	121
Persons Age 16-17	.	56	37	34
Persons Age 18-24	.	630	465	421
Persons Age 25-34	.	625	650	595
Persons Age 35-44	.	405	456	314
Persons Age 45-54	.	321	349	474

Persons Age 55-64	.	307	241	258
Persons Age 65+	.	291	359	418

Housing Tenure

Table 5.1.3-65. Housing Tenure for Wrightsville Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	47.9	44.8
Percent Owner Occupied	**1990**	**2000**
	52.1	55.2

Residence in 1985 and 1995

Table 5.1.3-66. Residence in 1985 and 1995 for Wrightsville Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	692	392
Same House	**1990**	**2000**
	998	1176

Employment/Unemployment

Table 5.1.3-67. Employment and Unemployment for Wrightsville Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	71.9	65.6
Percent unemployed	2.9	2.0

Race

Table 5.1.3-68. Race for Wrightsville Beach, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	0	9	7
Latino Black Persons	.	0	0	0
Latino Persons	.	0	9	17
White Persons	.	2853	2788	2532
Latino White Persons	.	0	9	12

Education

Table 5.1.3-69. Years of Education by Category for those 25 Years and Older for Wrightsville Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau &

MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	95	23	15
25+ w/ 9-11 years education	.	126	68	10
25+ w/ HS diploma	.	399	327	277
25+ w/ 13-15 years. education	.	553	462	378
25+ w/ College Degree	.	776	1001	1379
Drop outs	.	0	0	0

Income and Poverty

Table 5.1.3-70. Average Household Wage/Salary and Persons Below the Poverty Level for Wrightsville Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$22649	$54474	$55903
Poverty Level				
Persons Below Poverty Level	.	275	276	255
Age 65+ Below Poverty Level	.	0	0	9
Households with Public Assistance	.	22	18	14

Industry

Table 5.1.3-71. Employment by Industry for Wrightsville Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	17	29	0
Construction	.	55	171	151
Business Services	.	39	54	202
Communication/Utilities	.	98	92	59
Manufacturing	.	184	197	65
Financial, Insurance & Real Estate	.	81	79	174
Services	.	123	119	640
Wholesale/Retail Trade	.	242	558	347
Transportation	.	570	540	31

Occupation

Table 5.1.3-72. Employment by Occupation for Wrightsville Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	301	404	-

Clerical	.	1890	177	-
Craft	.	139	89	-
Exec/Managerial	.	293	351	-
Farm/Fish/Forest	.	16	0	0
Household Services	.	5	0	-
Laborer/Handler	.	17	54	-
Operative/Transport	.	29	42	-
Service, except Household	.	305	191	-
Technical	.	60	80	-

Wrightsville Beach Fishing Demographics

Table 5.1.3-73. Number of Federal Permit by Type for Wrightsville Beach, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	31	25	22	14
Commercial King Mackerel	29	19	19	14
Commercial Spanish Mackerel	24	13	13	5
Commercial Spiny Lobster	2	1	1	0
Charter/Headboat for Coastal Pelagics	5	4	5	3
Charter/Headboat for Snapper Grouper	3	2	2	2
Snapper Grouper Class 1	8	8	7	7
Snapper Grouper Class 2	2	2	1	0
Swordfish	0	1	0	0
Shark	0	2	1	0
Rock Shrimp	0	0	0	0
Federal Dealers	2	2	5	5

Table 5.1.3-74. Employment in Fishing Related Industry for Wrightsville Beach, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	4
Fish and Seafood Markets	445220	8
Marinas	713930	32
Total Fishing Employment		44

Table 5.1.3-75. Number of State Permit by Type for Wrightsville Beach, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	12
Dealer License	2
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0

Spotter Plane License	0
Retired Standard Commercial Fishing License	2
Standard Commercial Fishing License	10
Shellfish License	0
Recreational Fishing Tournament to Sell License	0
Total	26

5.1.3.6 Surf City/Topsail Beach (28445) and Hampstead (28443)

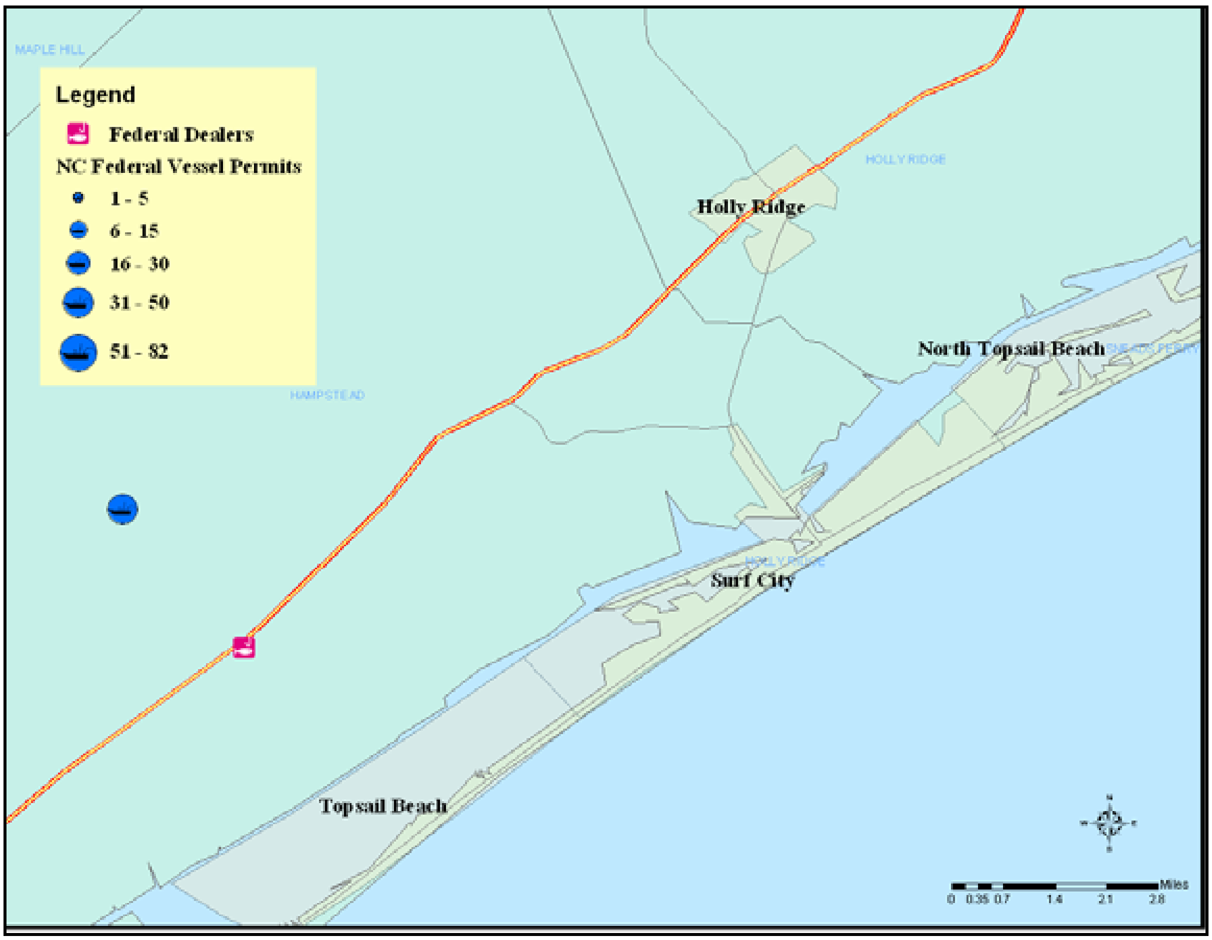


Figure 5.1.3-6. Surf City/Topsail Beach, North Carolina.

Surf City is located in Pender County and had at one time as many as seven long fishing piers. But, like Atlantic Beach and other places, hurricanes reduced that number to two. Fishing is still important but does not contribute as much to the economy as it once used to according to several key informants. There are still a few trawlers that dock here, but they are very small, inlet only trawlers. Most fishermen do not live on the island or in town, but live more inland in places like Hampstead and Holly Ridge. Several respondents commented that it is too expensive for anyone but “northerners” and tourists to live around the beach. Another factor that makes it hard to fish this area is because they are in the middle of the island, and it takes a long time to get out to the sound. It is 13 miles to the inlet from the inter-coastal waterway that they are on.

There is only one fish market in the town today. According to one informant around 1940 to 1960 this place was a “fisherman’s paradise” and there was so much business that the one fish house was open 24 hours a day. With the influx of outsiders, property values have increased making it difficult for fishermen to survive in this area. There are few commercial fishermen and few vessels in the area today that call this community home. Where it once was a commercial fishing village, it has now become more of a tourist/recreational community according to some.

Hampstead is changing from a small fishing village into one of the fastest growing areas in North Carolina. Fishing is still a major piece of the area’s identity. There are two wholesale-only fresh fish dealers in the town. One donates approximately 5,000 pounds of fish to the yearly seafood festival which is held in October. The annual Spot Festival celebrates fishing and the fish for which it is named. .

Of the three communities listed, Topsail Beach is the only recognized Census Designated Place and therefore is the only one with census demographics reported. The population has seen a steady increase but remains relatively small with only 404 in the 2000 census (Table 5.1.3-76). Housing tenure has remained relatively the same with three quarters of the housing owner occupied (Table 5.1.3-77). Residence has changed little with slightly more people living in the same house as they did five years ago (Table 5.1.3-78). The percentage of people in the labor force has also remained the same as has the unemployment rate, which is very low at 0.5 percent (Table 5.1.3-79). The population is almost entirely White with a few Latinos appearing in the 2000 census as shown in Table 5.1.3-80.

While Topsail Beach shows few federal or state permits ((Tables 5.1.3-87 and 5.1.3-90, respectively), Hampstead does have more permits listed. Most federal permits that list Hampstead as homeport are either for coastal pelagics or snapper grouper (Table 5.1.3-85). The majority of fishing related employment listed for Hampstead is in fish and seafood while both Topsail and Hampstead each show relatively little employment in fishing (Tables 5.1.3-86 and 5.1.3-88). Hampstead does have over 400 state permits issued with 212 being for commercial vessels and another 112 being standard commercial fishing licenses. There were 74 shellfish licenses issued and 23 dealers in the area (Table 5.1.3-89).

Topsail Beach Census Demographics

Population

Table 5.1.3-76. Total Persons and Persons by Age category for Topsail Beach, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	270	362	404
Persons Age 0-5	.	11	4	4

Persons Age 6-15	.	27	23	11
Persons Age 16-17	.	5	7	11
Persons Age 18-24	.	15	21	18
Persons Age 25-34	.	30	35	57
Persons Age 35-44	.	32	58	26
Persons Age 45-54	.	25	75	69
Persons Age 55-64	.	76	56	97
Persons Age 65+	.	49	83	111

Housing Tenure

Table 5.1.3-77. Housing Tenure for Topsail Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	26.0	25.6
Percent Owner Occupied	**1990**	**2000**
	74.0	74.4

Residence in 1985 and 1995

Table 5.1.3-78. Residence in 1985 and 1995 for Topsail Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	33	15
Same House	**1990**	**2000**
	150	208

Employment/Unemployment

Table 5.1.3-79. Employment and Unemployment for Topsail Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	56.8	53.7
Percent unemployed	0.0	0.5

Race

Table 5.1.3-80. Race for Topsail Beach, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	0	1	0
Latino Black Persons	.	0	0	0
Latino Persons	.	0	0	2
White Persons	.	268	358	467
Latino White Persons	.	0	0	1

Education

Table 5.1.3-81. Years of Education by Category for those 25 Years and Older for Topsail Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	.	10	1	2
25+ w/ 9-11 years education	.	30	30	34
25+ w/ HS diploma	.	78	46	59
25+ w/ 13-15 years. education	.	42	85	103
25+ w/ College Degree	.	52	123	162
Drop outs	.	0	4	0

Income and Poverty

Table 5.1.3-82. Average Household Wage/Salary and Persons Below the Poverty Level for Topsail Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	.	$12739	$39762	$55750
Poverty Level				
Persons Below Poverty Level	.	40	17	27
Age 65+ Below Poverty Level	.	5	0	0
Households with Public Assistance	.	2	0	6

Industry

Table 5.1.3-83. Employment by Industry for Topsail Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	.	0	10	0
Construction	.	23	14	30
Business Services	.	0	0	22
Communication/Utilities	.	0	0	9
Manufacturing	.	0	9	18
Financial, Insurance & Real Estate	.	0	7	19
Services	.	6	29	50
Wholesale/Retail Trade	.	16	41	48
Transportation	.	39	76	8

Occupation

Table 5.1.3-84. Employment by Occupation for Topsail Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	15	65	-
Clerical	.	100	23	-
Craft	.	17	4	-
Exec/Managerial	.	27	40	-
Farm/Fish/Forest	.	0	6	0
Household Services	.	0	0	-
Laborer/Handler	.	7	0	-
Operative/Transport	.	0	0	-
Service, except Household	.	25	19	-
Technical	.	0	2	-

Topsail Beach Fishing Demographics

Table 5.1.3-85. Number of Federal Permit by Type for Hampstead, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	13	15	15	11
Commercial King Mackerel	12	12	12	9
Commercial Spanish Mackerel	9	6	4	2
Commercial Spiny Lobster	0	0	2	1
Charter/Headboat for Coastal Pelagics	1	0	0	1
Charter/Headboat for Snapper Grouper	1	0	0	1
Snapper Grouper Class 1	10	12	14	10
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	1	1	1	1
Federal Dealers			1	

Table 5.1.3-86. Employment in Fishing Related Industry for Hampstead, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	4
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	4
Fish and Seafoods	422460	52
Fish and Seafood Markets	445220	4
Marinas	713930	0
Total Fishing Employment		64

Table 5.1.3-87. Number of Federal Permit by Type for Topsail Beach, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	1	2	2	2
Commercial King Mackerel	1	2	2	2
Commercial Spanish Mackerel	1	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	1	1	1
Charter/Headboat for Snapper Grouper	0	0	1	1
Snapper Grouper Class 1	1	1	1	1
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-88. Employment in Fishing Related Industry for Topsail Beach, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	5
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	5
Marinas	713930	0
Total Fishing Employment		10

Table 5.1.3-89. Number of State Permit by Type for Hampstead, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	212
Dealer License	23
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	15
Standard Commercial Fishing License	112
Shellfish License	74
Recreational Fishing Tournament to Sell License	0
Total	436

Table 5.1.3-90. Number of State Permit by Type for Topsail Beach, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	6
Dealer License	3
Flounder License	0

Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	1
Spotter Plane License	0
Retired Standard Commercial Fishing License	1
Standard Commercial Fishing License	4
Shellfish License	0
Recreational Fishing Tournament to Sell License	1
Total	15

5.1.3.7 Sneads Ferry (28460)

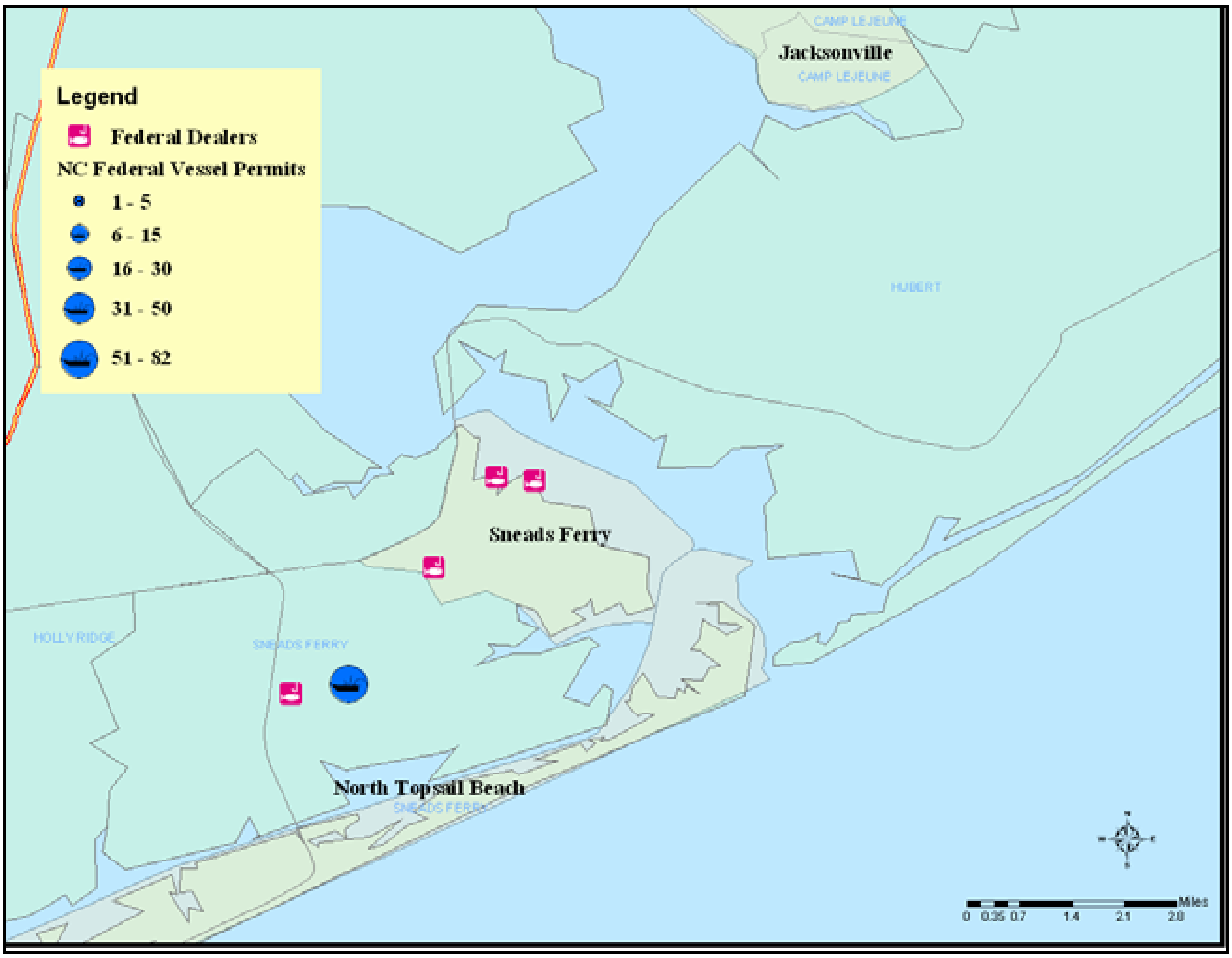


Figure 5.1.3-7. Sneads Ferry, North Carolina.

The white rubber boots worn by commercial fishermen in this community and many other parts of North Carolina are commonly referred to as “Snead’s Ferry Sneakers.” With such an icon named after the community it suggests the importance of commercial fishing to the area.

Snead's Ferry is a small town with very little of the large-scale development that is evident elsewhere on the North Carolina coast. However, there are apparently more retirees moving here from places like Atlantic Beach because it is more affordable according to some individuals. Many houses in the community have fishing vessels docked in front of the house or on the lawn. Snead's Ferry's location is an advantage for fishermen, because the channel leads directly to the sound without having to travel through many creeks; this offers larger boats more accessibility. One respondent commented that at least half of the people in the community have something to do with the fishing industry. Others living in Surf City supposed that Snead's Ferry is now made up of at least 20% of residents who are either servicemen or who work on the base. Some of these individuals also shrimp at night or on the weekends. This is a source of resentment, because these people are no longer full time fishermen, and have more disposable income with which to purchase better equipment or simply have better standards of living. The community celebrates the Shrimp Festival each second weekend in August.

One fish house owner who has been working in Snead's Ferry for 12 years has 15 boats that sell to him and dock at his place of business, These fishermen do everything, including net fishing, crabbing, clamming, and shrimping. He commented that he doesn't see much of a future in fishing because younger people are not getting involved. This same individual commented that a lot of new people are moving in from other places and he considers it only a matter of years before his place sells. The fish house next door is for sale and he is just waiting for the right price, and he will sell, too. Most of the captains and crew live within two miles of his fish house and there does not seem to be a problem finding crew; primarily because they have worked in the industry for so long and most have been with the same captains for quite some time. He also commented that most of the fishermen in town are shrimpers and net fishermen who go out daily which allows them to be home at night and have a more stable life.

Snead's Ferry had 25 vessels with federal permits in 2001 and most vessels held snapper grouper class 1 and coastal pelagic permits (Table 5.1.3-100). There were over 340 state commercial fishing vessel registrations for Snead's Ferry and, among those, there were 228 standard commercial fishing licenses (Table 5.1.3-102). The community also had 2 recreational sell licenses (Table 5.1.3-102). According to Table 5.1.3-101 there was some seafood employment in other areas with 16 persons employed in fish and seafood and 2 in marinas.

Sneads Ferry Census Demographics

Population

Table 5.1.3-91. Total Persons and Persons by Age category for Sneads Ferry, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	**1970**	**1980**	**1990**	**2000**
Total Persons	.	.	2042	2152

Persons Age 0-5	.	.	179	153
Persons Age 6-15	.	.	276	242
Persons Age 16-17	.	.	27	56
Persons Age 18-24	.	.	229	120
Persons Age 25-34	.	.	330	383
Persons Age 35-44	.	.	252	334
Persons Age 45-54	.	.	241	287
Persons Age 55-64	.	.	283	268
Persons Age 65+	.	.	225	309

Housing Tenure

Table 5.1.3-92. Housing Tenure for Sneads Ferry, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	30.3	28.8
Percent Owner Occupied	**1990**	**2000**
	69.7	71.2

Residence in 1985 and 1995

Table 5.1.3-93. Residence in 1985 and 1995 for Sneads Ferry, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	467	203
Same House	**1990**	**2000**
	1035	1199

Employment/Unemployment

Table 5.1.3-94. Employment and Unemployment for Sneads Ferry, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	59.3	59.0
Percent unemployed	7.8	2.2

Race

Table 5.1.3-95. Race for Sneads Ferry, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	.	182	113
Latino Black Persons	.	.	0	2
Latino Persons	.	.	10	38

White Persons	.	.	1840	2029
Latino White Persons	.	.	10	16

Education

Table 5.1.3-96. Years of Education by Category for those 25 Years and Older for Sneads Ferry, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	.	177	101
25+ w/ 9-11 years education	.	.	221	176
25+ w/ HS diploma	.	.	576	654
25+ w/ 13-15 years. education	.	.	239	367
25+ w/ College Degree	.	.	80	267
Drop outs	.	.	23	16

Income and Poverty

Table 5.1.3-97. Average Household Wage/Salary and Persons Below the Poverty Level for Sneads Ferry, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	.	$21901	$34509
Poverty Level				
Persons Below Poverty Level	.	.	427	290
Age 65+ Below Poverty Level	.	.	56	12
Households with Public Assistance	.	.	43	30

Industry

Table 5.1.3-98. Employment by Industry for Sneads Ferry, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	.	121	77
Construction	.	.	47	120
Business Services	.	.	73	34
Communication/Utilities	.	.	0	21
Manufacturing	.	.	16	66
Financial, Insurance & Real Estate	.	.	10	63
Services	.	.	49	309
Wholesale/Retail Trade	.	.	243	135
Transportation	.	.	187	64

Occupation

Table 5.1.3-99. Employment by Occupation for Sneads Ferry, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	.	73	-
Clerical	.	.	58	-
Craft	.	.	77	-
Exec/Managerial	.	.	88	-
Farm/Fish/Forest	.	.	132	83
Household Services	.	.	0	-
Laborer/Handler	.	.	31	-
Operative/Transport	.	.	6	-
Service, except Household	.	.	145	-
Technical	.	.	21	-

Sneads Ferry Fishing Demographics

Table 5.1.3-100. Number of Federal Permit by Type for Sneads Ferry, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	23	25	30	25
Commercial King Mackerel	17	16	18	17
Commercial Spanish Mackerel	11	9	12	8
Commercial Spiny Lobster	1	2	2	1
Charter/Headboat for Coastal Pelagics	4	7	9	6
Charter/Headboat for Snapper Grouper	5	6	8	5
Snapper Grouper Class 1	18	21	19	21
Snapper Grouper Class 2	0	1	2	1
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	1	1	1	1
Federal Dealers	0	4	5	5

Table 5.1.3-101. Employment in Fishing Related Industry for Sneads Ferry, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	12
Fish and Seafood Markets	445220	0
Marinas	713930	4
Total Fishing Employment		16

Table 5.1.3-102. Number of State Permit by Type for Sneads Ferry, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	347
Dealer License	18
Flounder License	3
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	28
Standard Commercial Fishing License	228
Shellfish License	169
Recreational Fishing Tournament to Sell License	2
Total	794

5.1.3.8 Swansboro (28584)

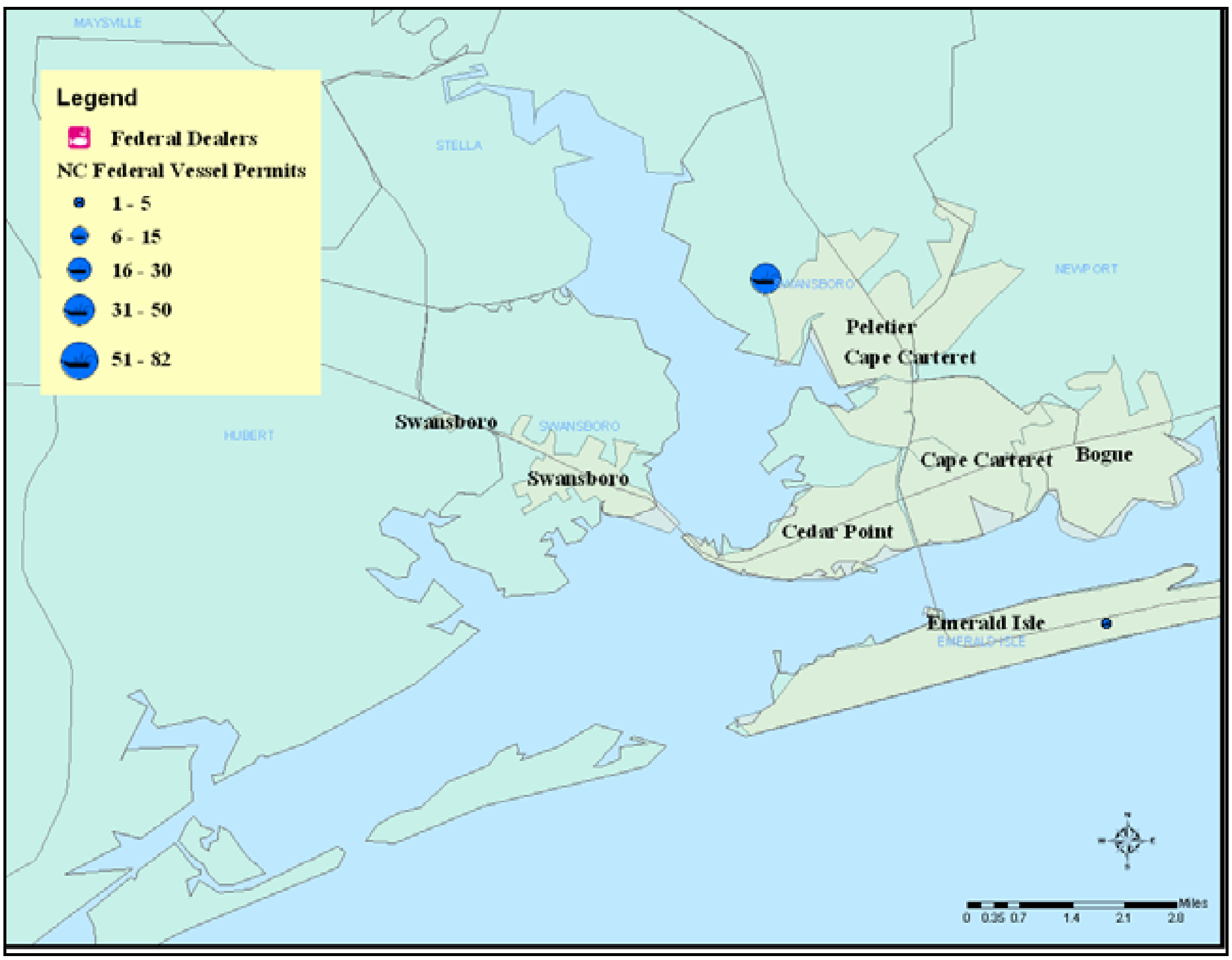


Figure 5.1.3-8. Swansboro, North Carolina.

Swansboro is supposedly the second oldest town in North Carolina. Settlement of the surrounding lands by English colonists probably was influenced by its proximity to Bogue Inlet and the White Oak River. Shipbuilding and the export of naval stores were the mainstays of the local economy. The town was a major port in the late eighteenth century, and relied mainly on ship building. The end of the Civil War brought a close to that prosperity and fishing became important socially and economically.

The community has a small historic section that has been well preserved with many old buildings still intact and restored, now used mostly for tourist shops. There are two fish houses with some small trawlers docked nearby. There are at least five seafood restaurants and two seafood markets. Though Swansboro has all the trappings of a fishing community, according to some, it is more a tourist community now. According to one fisherman, from Swansboro, the community was much more of a fishing town around ten years ago when there was close to double the fleet. Shrimping has experienced a recent downturn because imports with lower prices have affected the market. Because of the costs involved, local shrimp are more expensive and they are not as big, therefore more and more people are buying imports according to one individual. There are two main docks in the community, one has three trawlers and the other has two. Almost all captains and crew live in town, although crew may come from other places, fishing has always been a family business in Swansboro. There are a few charter businesses in town with one in particular that has a seafood market, a head boat and one charter.

Most of the ten federally permitted vessels in Swansboro have coastal pelagic permits and snapper grouper class 1, with about half of those vessels also holding charter permits for those species (Table 5.1.3-112). Much of the employment according to census zip code data is in marinas with a few employed in fish and seafood (Table 5.1.3-113). There were over 170 state-permitted vessels with 96 standard commercial licenses and over 100 shellfish licenses according to Table 5.1.3-114, and 2 recreational tournament sell licenses.

Swansboro Census Demographics

Population

Table 5.1.3-103. Total Persons and Persons by Age category for Swansboro, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	976	1165	1433
Persons Age 0-5	.	30	101	96
Persons Age 6-15	.	141	131	204
Persons Age 16-17	.	32	22	40
Persons Age 18-24	.	88	152	116
Persons Age 25-34	.	96	204	152
Persons Age 35-44	.	120	139	238

Persons Age 45-54	.	156	114	210
Persons Age 55-64	.	147	114	166
Persons Age 65+	.	150	188	211

Housing Tenure

Table 5.1.3-104. Housing Tenure for Swansboro, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	43.7	23.5
Percent Owner Occupied	**1990**	**2000**
	56.3	76.5

Residence in 1985 and 1995

Table 5.1.3-105. Residence in 1985 and 1995 for Swansboro, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	124	148
Same House	**1990**	**2000**
	484	637

Employment/Unemployment

Table 5.1.3-106. Employment and Unemployment for Swansboro, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	59.5	65.2
Percent unemployed	4.9	2.8

Race

Table 5.1.3-107. Race for Swansboro, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	0	24	66
Latino Black Persons	.	0	0	0
Latino Persons	.	4	14	40
White Persons	.	972	1115	1274
Latino White Persons	.	4	8	12

Education

Table 5.1.3-108. Years of Education by Category for those 25 Years and Older for Swansboro, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	106	67	25
25+ w/ 9-11 years education	.	131	80	72
25+ w/ HS diploma	.	251	269	289
25+ w/ 13-15 years. education	.	109	157	267
25+ w/ College Degree	.	72	138	324
Drop outs	.	4	0	0

Income and Poverty

Table 5.1.3-109. Average Household Wage/Salary and Persons Below the Poverty Level for Swansboro, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$17162	$25410	$37740
Poverty Level				
Persons Below Poverty Level	.	86	172	171
Age 65+ Below Poverty Level	.	30	30	16
Households with Public Assistance	.	28	34	11

Industry

Table 5.1.3-110. Employment by Industry for Swansboro, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	5	8	5
Construction	.	31	36	74
Business Services	.	10	11	28
Communication/Utilities	.	8	6	23
Manufacturing	.	30	34	17
Financial, Insurance & Real Estate	.	8	23	31
Services	.	13	18	266
Wholesale/Retail Trade	.	45	166	141
Transportation	.	86	135	26

Occupation

Table 5.1.3-111. Employment by Occupation for Swansboro, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	42	86	-
Clerical	.	540	60	-
Craft	.	84	48	-
Exec/Managerial	.	39	43	-
Farm/Fish/Forest	.	4	8	5
Household Services	.	2	0	-
Laborer/Handler	.	8	7	-
Operative/Transport	.	22	15	-
Service, except Household	.	58	54	-
Technical	.	11	22	-

Swansboro Fishing Demographics

Table 5.1.3-112. Number of Federal Permit by Type for Swansboro, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	14	12	9	10
Commercial King Mackerel	12	7	7	10
Commercial Spanish Mackerel	10	5	4	6
Commercial Spiny Lobster	4	1	0	0
Charter/Headboat for Coastal Pelagics	5	4	3	5
Charter/Headboat for Snapper Grouper	5	4	5	7
Snapper Grouper Class 1	4	5	4	7
Snapper Grouper Class 2	1	1	0	1
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	1	1	1	0

Table 5.1.3-113. Employment in Fishing Related Industry for Swansboro, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	4
Marinas	713930	16
Total Fishing Employment		20

Table 5.1.3-114. Number of State Permit by Type for Swansboro, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	171
Dealer License	15

Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	0
Standard Commercial Fishing License	92
Shellfish License	106
Recreational Fishing Tournament to Sell License	2
Total	393

5.1.3.9 Atlantic Beach (28512)

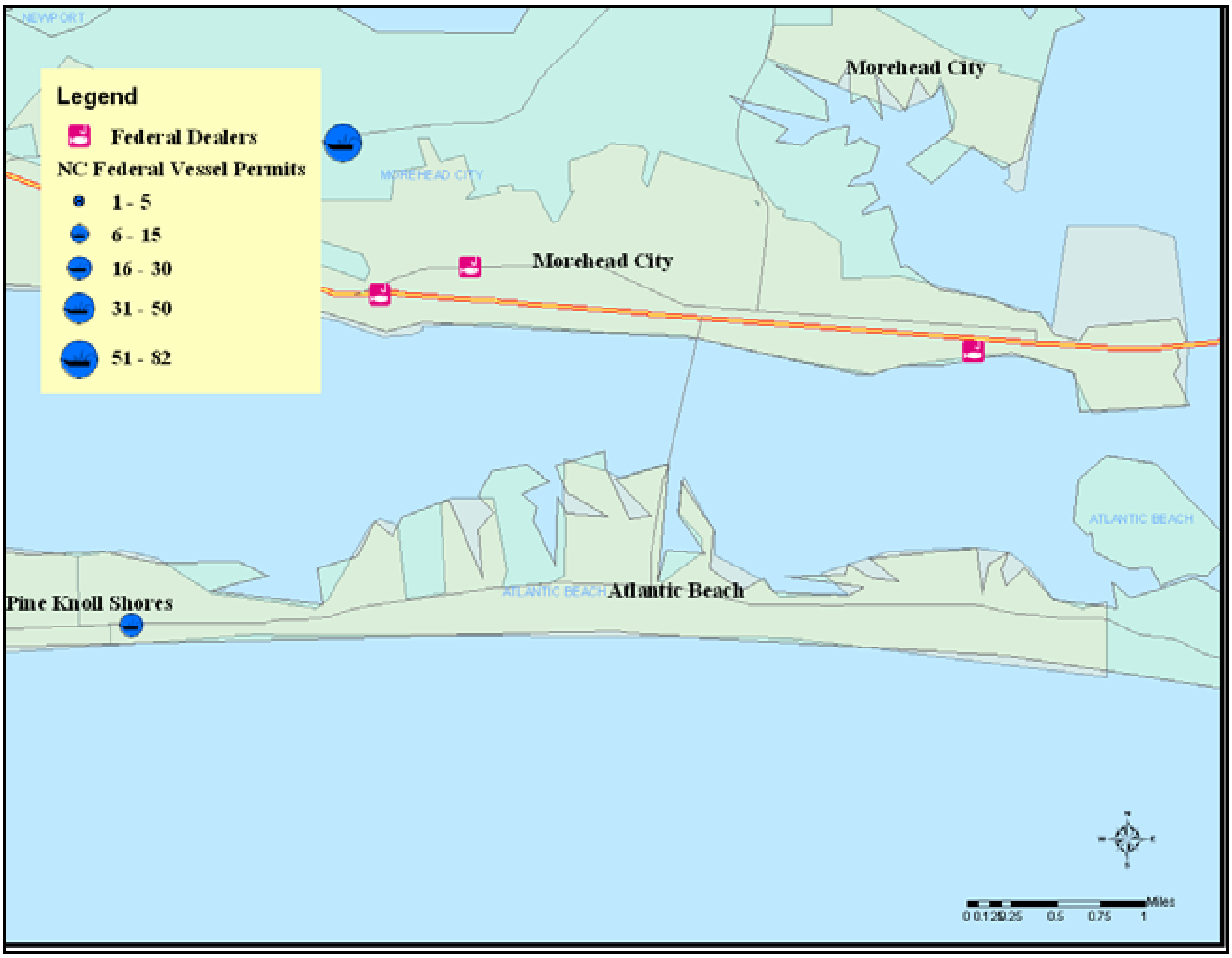


Figure 5.1.3-9. Atlantic Beach, North Carolina.

Atlantic Beach has been a popular resort town since the 1870s. The first bathing pavilion was built on Bogue Banks in 1887. Other resorts and tourism related development occurred over the next century and the area remains today a popular vacation destination. Today there is a boardwalk with rides, a video arcade, shops, restaurants, etc., along the waterfront. The beach is the primary attraction and there is a defined seasonal tourism during the summer months. There is a small marina in the community, with charter boats, but there is no commercial fishing out of Atlantic Beach. There are about 12-14 charter boats total, according to one respondent. Some boats that advertise as being from Atlantic Beach actually dock in Morehead. The charter business is also very seasonal, and there seems to be plenty of competition. During the off season, charter fishermen take on other jobs, like carpentry or anything they can find.

The number of federally permitted vessels in Atlantic Beach has decreased over the years to where today there are only 11. Most of those have coastal pelagic, snapper grouper class 1 and charter permits for both coastal pelagic and snapper grouper (Table 5.1.3-124). There are, however, over 50 state commercially registered vessels and 47 standard commercial fishing licenses (Table 5.1.3-126).

Salter Path/Indian Beach area is south of Atlantic Beach and may have more fishing related businesses than Atlantic Beach. There are five or more seafood restaurants and several fish houses that sell retail and wholesale seafood. The community has many hotels and also a miniature golf course. A small area along the creek is where most of the fish houses and restaurants are located. One individual commented that most people make their living from seafood here, yet most fishermen have other jobs and their wives work because it is difficult to make a living solely from the fishing industry year round. Another commented that Salter Path used to be a fishing community with shrimp boats, net fishing, clam and scallop, but there is no offshore fishing from the area. Overall, this area has become more dependent upon tourism and the associated service economy.

Salter Path has 73 state registered commercial vessels and 54 standard commercial licenses issued for the year 2002. There were also 9 dealer licenses for the community (Table 5.1.3-127).

Atlantic Beach Census Demographics

Population

Table 5.1.3-115. Total Persons and Persons by Age category for Atlantic Beach, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	930	1938	1811
Persons Age 0-5	.	26	84	51
Persons Age 6-15	.	75	139	89
Persons Age 16-17	.	34	59	27
Persons Age 18-24	.	204	157	125
Persons Age 25-34	.	196	363	222
Persons Age 35-44	.	142	316	251
Persons Age 45-54	.	100	316	389
Persons Age 55-64	.	108	261	323
Persons Age 65+	.	45	243	334

Housing Tenure

Table 5.1.3-116. Housing Tenure for Atlantic Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Rent	**1990**	**2000**
	38.6	35.4
Percent Own	**1990**	**2000**
	61.4	66.6

Residence in 1985 and 1995

Table 5.1.3-117. Residence in 1985 and 1995 for Atlantic Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	378	163
Same House	**1990**	**2000**
	718	908

Employment/Unemployment

Table 5.1.3-118. Employment and Unemployment for Atlantic Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	69.3	63.3
Percent unemployed	3.0	5.4

Race

Table 5.1.3-119. Race for Atlantic Beach, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	10	20	11
Latino Black Persons	.	0	0	0
Latino Persons	.	19	14	12
White Persons	.	902	1882	1735
Latino White Persons	.	19	12	11

Education

Table 5.1.3-120. Years of Education by Category for those 25 Years and Older for Atlantic Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**

25+ w/ 0-8 years education	.	45	45	40
25+ w/ 9-11 years education	.	89	179	109
25+ w/ HS diploma	.	209	398	354
25+ w/ 13-15 years. education	.	121	412	428
25+ w/ College Degree	.	127	362	585
Drop outs	.	5	7	3

Income and Poverty

Table 5.1.3-121. Average Household Wage/Salary and Persons Below the Poverty Level for Atlantic Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	.	$15156	$30093	$38313
Poverty Level				
Persons Below Poverty Level	.	81	195	131
Age 65+ Below Poverty Level	.	3	17	5
Households with Public Assistance	.	15	23	6

Industry

Table 5.1.3-122. Employment by Industry for Atlantic Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	.	12	31	7
Construction	.	26	117	135
Business Services	.	7	26	54
Communication/Utilities	.	10	27	30
Manufacturing	.	39	82	21
Financial, Insurance & Real Estate	.	22	41	104
Services	.	49	110	303
Wholesale/Retail Trade	.	74	288	222
Transportation	.	148	307	31

Occupation

Table 5.1.3-123. Employment by Occupation for Atlantic Beach, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	.	67	256	-
Clerical	.	710	124	-
Craft	.	53	126	-
Exec/Managerial	.	109	164	-

Farm/Fish/Forest	.	11	28	5
Household Services	.	0	3	-
Laborer/Handler	.	10	35	-
Operative/Transport	.	7	22	-
Service, except Household	.	47	139	-
Technical	.	4	34	-

Atlantic Beach Fishing Demographics

Table 5.1.3-124. Number of Federal Permit by Type for Atlantic Beach, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	17	17	15	11
Commercial King Mackerel	14	11	9	7
Commercial Spanish Mackerel	10	4	5	7
Commercial Spiny Lobster	1	2	2	1
Charter/Headboat for Coastal Pelagics	8	6	6	3
Charter/Headboat for Snapper Grouper	9	6	5	4
Snapper Grouper Class 1	7	8	5	5
Snapper Grouper Class 2	3	3	3	1
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-125. Employment in Fishing Related Industry for Atlantic Beach, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	4
Marinas	713930	56
Total Fishing Employment		60

Table 5.1.3-126. Number of State Permit by Type for Atlantic Beach, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	56
Dealer License	10
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	5
Spotter Plane License	0

Retired Standard Commercial Fishing License	5
Standard Commercial Fishing License	42
Shellfish License	6
Recreational Fishing Tournament to Sell License	2
Total	126

Table 5.1.3-127. Number of State Permit by Type for Salter Path, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	73
Dealer License	9
Flounder License	1
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	4
Standard Commercial Fishing License	54
Shellfish License	17
Recreational Fishing Tournament to Sell License	0
Total	158

5.1.3.10 Morehead City (28557)

Figure 5.1.3-10. Morehead City, North Carolina.

Morehead City was founded in the 1840s and soon had a railroad line that connected its deep-water harbor with inland markets. Following several severe hurricanes during the 1880s and 1890s, fishermen who had lived on Shackleford Banks moved their houses by boat onto the mainland in the areas between 10th and 15th Streets. They called this area the Promise Land and it became the nucleus of the fishing industry that continues to be an important part of the economy of Morehead City. In recent years, a large charter-fishing fleet has developed, and Morehead City has become widely known as a center for sport and tournament fishing, drawing fishermen from all over the eastern United States. It is the location of one of the major, annual international Blue Marlin tournaments, as well as other fishing tournaments.

Today Morehead City has a community college, several strip malls and commercial enterprises. There is a coastal theme to many of the businesses and art galleries, with a focus on tourism. The waterfront is small but crowded with several tourist attractions and numerous charter boats. According to one captain of a charter boat, the best fishing area on the NC coast is 50-100 miles offshore of here. The Big Rock Marlin tournament held the second week in June is the biggest paying tournament on the East Coast. The tournament brings approximately 200 boats to the area. With an estimated four people per boat plus families, the tournament generates considerable economic benefit to the community. Many of the local charter boats are chartered for this tournament, which has an entry fee of $12,000 per person. There are also several small tournaments held in the community during the mackerel and marlin season. While there are no local fishing clubs, the Raleigh Sport Fishing Alliance is a regional fishing club with many of its members fishing out of Morehead City. One charter crew member said that he commercial fished for 21 years, but tired of weather problems and the "feast or famine" economy of commercial fishing. He said he had seen some commercial fishermen go out by themselves in any kind of weather because they couldn't find crew members, just to survive. He also mentioned that there are good crew around that migrate up and down the coast according to work.

There were 22 federally permitted vessels homeported in Morehead City; most of them with coastal pelagic and snapper grouper class 1 permits (Table 5.1.3-137). About half held charter permits for both species groups. There are about 100 people employed in fishing related business according to census business figures in Table 5.1.3-138. About half of those are in marinas and 36 are employed in fish and seafood business. Over 200 state commercial vessel licenses were issued for Morehead City and 150 standard commercial fishing permits. There were 53 shellfish licenses and 14 dealer licenses issued by the state (Table 5.1.3-139).

Morehead City Census Demographics

Population

Table 5.1.3-128. Total Persons and Persons by Age category for Morehead City, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	5226	4359	6046	7649
Persons Age 0-5	394	256	497	578
Persons Age 6-15	1037	601	744	780
Persons Age 16-17	225	152	109	106
Persons Age 18-24	543	379	528	584
Persons Age 25-34	556	594	1037	1058
Persons Age 35-44	584	478	792	975
Persons Age 45-54	642	434	549	1128
Persons Age 55-64	576	576	535	748
Persons Age 65+	570	854	1255	1692

Housing Tenure

Table 5.1.3-129. Housing Tenure for Morehead City, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Rent	1990	2000

	44.7	44.8
Percent Own	**1990**	**2000**
	55.3	55.2

Residence in 1985 and 1995

Table 5.1.3-130. Residence in 1985 and 1995 for Morehead City, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	1710	1061
Same House	**1990**	**2000**
	2532	3296

Employment/Unemployment

Table 5.1.3-131. Employment and Unemployment for Morehead City, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	59.4	60.2
Percent unemployed	4.1	7.8

Race

Table 5.1.3-132. Race for Morehead City, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	1009	789	1066	1071
Latino Black Persons	0	5	0	4
Latino Persons	151	50	26	180
White Persons	4170	3563	4941	6213
Latino White Persons	151	45	26	71

Education

Table 5.1.3-133. Years of Education by Category for those 25 Years and Older for Morehead City, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	884	721	495	401
25+ w/ 9-11 years education	655	724	730	660
25+ w/ HS diploma	717	712	1231	1467
25+ w/ 13-15 years. education	425	453	890	1474
25+ w/ College Degree	247	326	552	1547
Drop outs	84	29	35	52

Income and Poverty

Table 5.1.3-134. Average Household Wage/Salary and Persons Below the Poverty Level for Morehead City, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	$6676	$13267	$22827	$28737
Poverty Level				
Persons Below Poverty Level	1008	782	1098	1105
Age 65+ Below Poverty Level	185	125	155	199
Households with Public Assistance	120	152	276	99

Industry

Table 5.1.3-135. Employment by Industry for Morehead City, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	51	43	84	37
Construction	114	125	183	394
Business Services	51	39	86	260
Communication/Utilities	50	84	28	87
Manufacturing	151	202	226	252
Financial, Insurance & Real Estate	74	100	120	272
Services	70	112	190	1404
Wholesale/Retail Trade	602	291	727	543
Transportation	543	409	797	62

Occupation

Table 5.1.3-136. Employment by Occupation for Morehead City, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	114	238	406	-
Clerical	272	2550	285	-
Craft	306	253	391	-
Exec/Managerial	246	188	297	-
Farm/Fish/Forest	5	52	86	37
Household Services	117	41	10	-
Laborer/Handler	116	105	121	-
Operative/Transport	148	92	92	-
Service, except Household	389	289	495	-
Technical	0	33	65	-

Morehead City Fishing Demographics

Table 5.1.3-137. Number of Federal Permit by Type for Morehead City, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	29	29	23	22
Commercial King Mackerel	22	18	17	18
Commercial Spanish Mackerel	18	13	11	15
Commercial Spiny Lobster	2	5	2	2
Charter/Headboat for Coastal Pelagics	8	9	6	5
Charter/Headboat for Snapper Grouper	6	7	5	7
Snapper Grouper Class 1	12	15	13	16
Snapper Grouper Class 2	2	2	2	1
Swordfish	0	0	0	0
Shark	0	0	1	3
Rock Shrimp	1	4	1	0
Federal Dealers	2	3	4	6

Table 5.1.3-138. Employment in Fishing Related Industry for Morehead City, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	4
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	16
Fish and Seafoods	422460	36
Fish and Seafood Markets	445220	4
Marinas	713930	40
Total Fishing Employment		100

Table 5.1.3-139. Number of State Permit by Type for Morehead City, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	211
Dealer License	14
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	19
Standard Commercial Fishing License	150
Shellfish License	53
Recreational Fishing Tournament to Sell License	2
Total	448

5.1.3.11 Beaufort (28516)

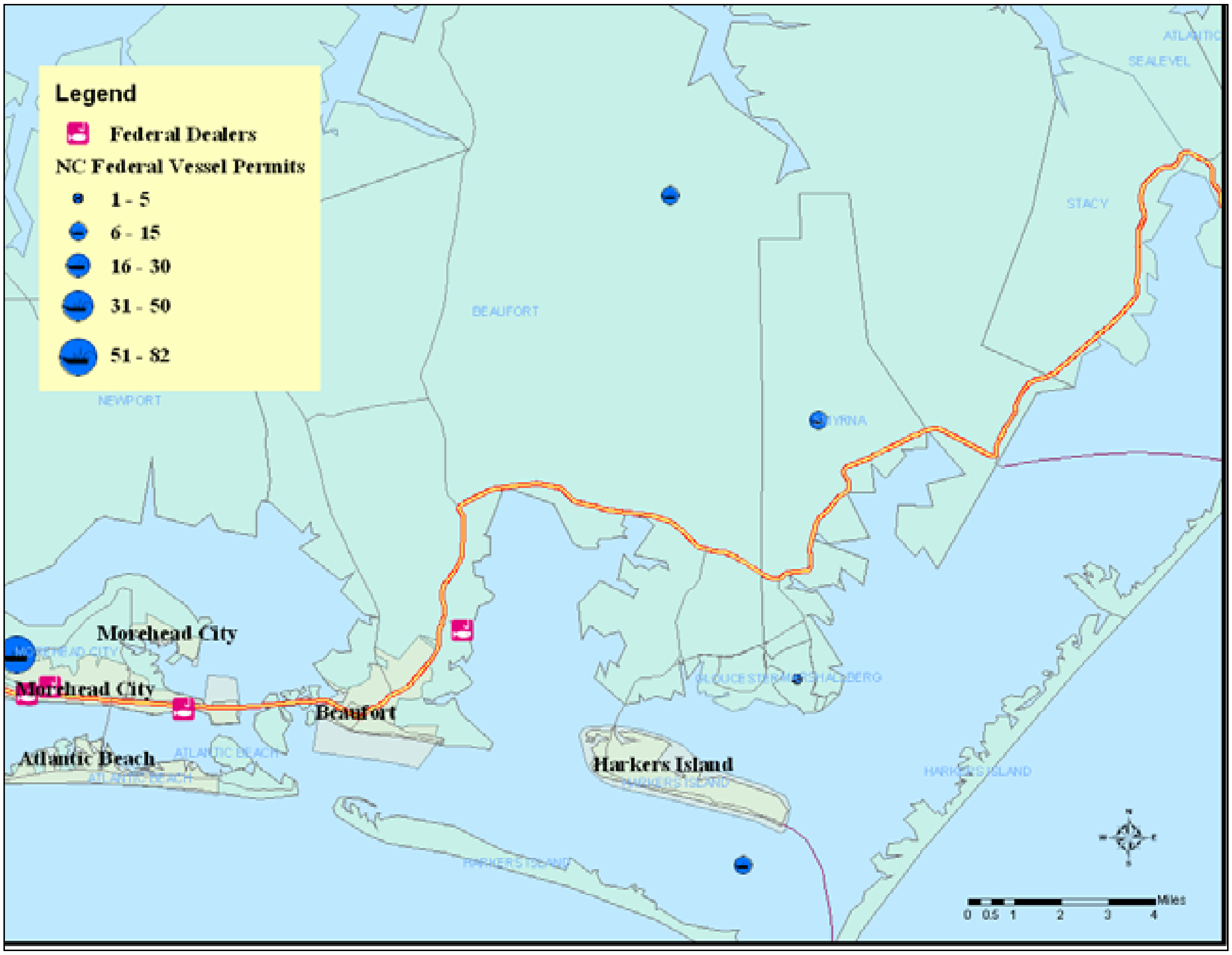


Figure 5.1.3-11. Beaufort, North Carolina.

Beaufort was built on a former Native American village, called Warelock which means "fish town" or "fishing village," near Cape Lookout and borders the southern portion of the Outer Banks. Its deep water harbor is home to vessels of all sizes and its marinas are a favorite stop-over for transient boaters. Originally a fishing village and port of safety, it was known as "Fishtowne" until incorporated in 1722. A whaling community, Diamond City, was located on Shackleford Banks, six miles to the southeast by boat during the eighteenth and nineteenth centuries. Lumber, barrel staves, rum, and molasses comprised some of Beaufort's main exports. However, when the port declined as a trade center, commercial fishing gained greater importance and became the primary economic activity of the town. Beaufort served as home port for a large menhaden fishing fleet and had numerous processing facilities for menhaden products.

Today, tourism, service industries, retail businesses and construction are important mainstays of the area, with many shops and restaurants catering to visitors from outside the area. The community has some exclusive homes along the waterfront but overall most housing is modest. It is home to both the NOAA Center for Coastal Fisheries and Habitat Research and Duke Marine Sciences Center. Directly across the bridge from

Morehead city is Radio Island, which is the commercial fishing hub for Beaufort. There are a few private boats along the waterfront in downtown Beaufort, but the commercial enterprises are predominantly located on Radio Island. The waterfront does have two tour/party boats, in addition to private boats, some of which may be smaller charter vessels. There are several marinas in the community and several businesses that provide support services for both the recreational and commercial fishing industries.

According to one individual, Beaufort is a commercial fishing community, although less so now, than in the past. This seems to be largely due to fewer young people getting into the fishing business as it does not seem to pay well. This same individual has seven trawlers and four small snapper/grouper boats as part of his business. During the summer, three longline vessels travel from New York and dock at his facility. The majority of fish they purchase is marketed in Virginia and farther north. Shrimp is a large part of the seafood industry here, but, imports are having an impact on the domestic market lowering prices. His facility is a full service fish house, with processing, ice, fuel, and its own net repair. There was, at one time, an ice plant across the bridge, which has now become a condominium development. The last shad factory in the state is located on Front St. in Beaufort. At the time, there were only two shad vessels left in the state, and they are there, too. Shad built the fishing industry in Beaufort. He said that people are trying to put them (the Shad Company) out of business because their property is valuable. He estimates that on Radio Island there are 20 trawlers that dock there permanently.

Another individual said that his fish house used to process year round, but now only operates seven months of the year due to closures. They used to have four employees, but now employ only two. It was in1987 that Beaufort had its best year for shrimp. According to this individual most people involved in the fishery live in Beaufort or Morehead City. There are three fish houses in Beaufort, one of which deals primarily in bait. In 1987 there were about 25 larger commercial vessels (70-90') in addition to a lot of smaller boats; now there are approximately 11 large commercial vessels in Beaufort.

There were only 10 federally permitted vessels in Beaufort in 2001and those vessels held primarily coastal pelagic permits (Table 5.1.3-148). Most of the employment that is fishing related according to census business pattern data is related to boat building with 184 persons employed in that business. Others are employed in fish processing and fish and seafood according to Table 5.1.3-149. There are over 400 commercial vessels registered with the state from Beaufort with almost 300 standard commercial fishing licenses. There are 172 shellfish licenses and 32 dealer license (Table 5.1.3-150).

Beaufort Census Demographics

Population

Table 5.1.3-140. Total Persons and Persons by Age category for Beaufort, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000

Total Persons	3368	3826	3808	3528
Persons Age 0-5	155	199	305	145
Persons Age 6-15	665	498	393	299
Persons Age 16-17	152	126	76	75
Persons Age 18-24	272	401	376	208
Persons Age 25-34	372	621	597	451
Persons Age 35-44	337	353	511	516
Persons Age 45-54	448	414	399	518
Persons Age 55-64	451	557	423	508
Persons Age 65+	465	616	728	808

Housing Tenure

Table 5.1.3-141. Housing Tenure for Beaufort, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Rent	**1990**	**2000**
	44.3	42.9
Percent Own	**1990**	**2000**
	55.7	57.1

Employment/Unemployment

Table 5.1.3-142. Employment and Unemployment for Beaufort, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	61.0	56.3
Percent unemployed	6.8	4.7

Race

Table 5.1.3-143. Race for Beaufort, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	1042	922	908	751
Latino Black Persons	0	0	0	3
Latino Persons	28	26	71	142
White Persons	2326	2897	2815	2812
Latino White Persons	28	26	0	49

Education

Table 5.1.3-144. Years of Education by Category for those 25 Years and Older for Beaufort, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	697	555	229	151
25+ w/ 9-11 years education	490	562	432	415
25+ w/ HS diploma	506	572	832	747
25+ w/ 13-15 years. education	222	412	542	691
25+ w/ College Degree	158	460	399	773
Drop outs	78	49	26	24

Income and Poverty

Table 5.1.3-145. Average Household Wage/Salary and Persons Below the Poverty Level for Beaufort, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$6803	$13988	$23933	$28763
Poverty Level				
Persons Below Poverty Level	774	614	660	568
Age 65+ Below Poverty Level	170	126	120	84
Households with Public Assistance	67	216	163	64

Industry

Table 5.1.3-146. Employment by Industry for Beaufort, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	38	153	51	40
Construction	43	27	87	165
Business Services	43	44	39	90
Communication/Utilities	9	18	18	61
Manufacturing	130	171	233	124
Financial, Insurance & Real Estate	46	104	134	52
Services	26	63	68	675
Wholesale/Retail Trade	386	148	440	315
Transportation	358	362	486	66

Occupation

Table 5.1.3-147. Employment by Occupation for Beaufort, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	114	178	268	-
Clerical	131	1910	282	-
Craft	269	170	177	-

Exec/Managerial	123	169	228	-
Farm/Fish/Forest	0	124	16	20
Household Services	72	12	0	-
Laborer/Handler	63	59	91	-
Operative/Transport	164	68	101	-
Service, except Household	224	196	270	-
Technical	0	40	40	-

Beaufort Fishing Demographics

Table 5.1.3-148. Number of Federal Permit by Type for Beaufort, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	15	10	10	10
Commercial King Mackerel	11	7	7	8
Commercial Spanish Mackerel	11	6	5	6
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	2	5	3	2
Snapper Grouper Class 2	1	1	1	1
Swordfish	0	1	3	3
Shark	0	1	2	3
Rock Shrimp	2	1	2	2
Federal Dealers	2	0	3	4

Table 5.1.3-149. Employment in Fishing Related Industry for Beaufort, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	8
Seafood Canning	311711	0
Seafood Processing	311712	36
Boat Building	336612	184
Fish and Seafoods	422460	20
Fish and Seafood Markets	445220	4
Marinas	713930	48
Total Fishing Employment		300

Table 5.1.3-150. Number of State Permit by Type for Beaufort, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	430
Dealer License	32
Flounder License	21
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	1
Retired Standard Commercial Fishing License	37

Standard Commercial Fishing License	294
Shellfish License	178
Recreational Fishing Tournament to Sell License	1
Total	994

5.1.3.12 Harker's Island (28531)

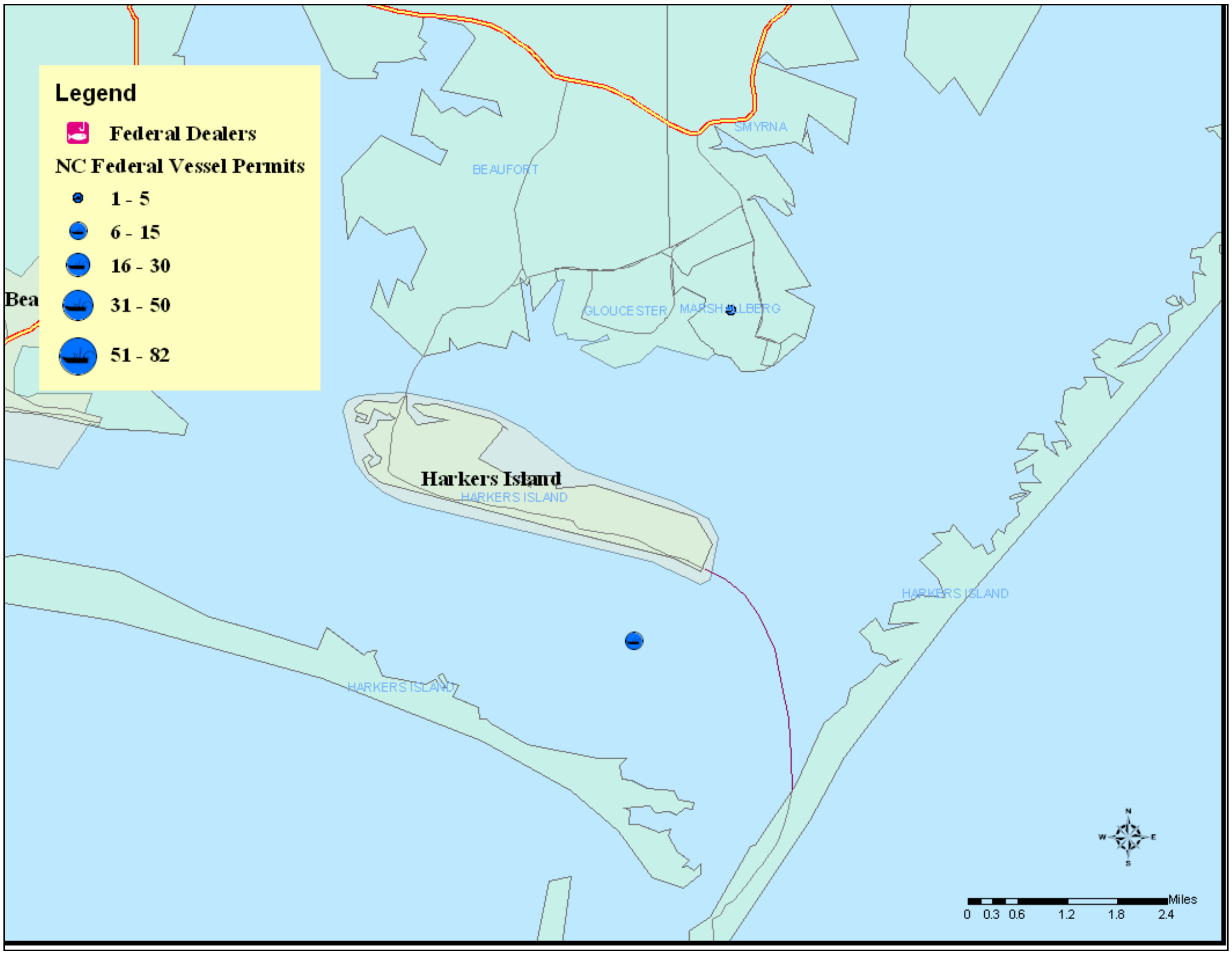


Figure 5.1.3-12. Harker's Island, North Carolina.

Harker's Island has a small marina at the entrance to the island where approximately nine small trawlers dock. The island does not seem to have seen the same residential development that many other coastal communities have, although it has reportedly been discovered by outsiders who are using it as a retirement destination. Fishermen on Cedar Island that were interviewed indicated that many of the locals from Harker's Island have moved to Gloucester because of high property taxes.

A few individuals consider Harker's Island a fishing community, even though landings are not nearly as high as in the past. Increasingly, there are more part-time fishermen, whereas in the past most were full-time. Accordingly, most have other jobs in order to make a living and fishing is to supplement income or solely more of a recreational endeavor. The hardcore old-timers who were the fishing mainstay on the island are too old and can't fish anymore or have passed away. Approximately one quarter of the island residents are full or part-time commercial fishermen according to several individuals. The island is also known for its boat building.

Ten years ago the island's economy was split evenly between fishing and tourism according to one individual, but more recently tourism has become the dominant industry. Rising property values have made it difficult for second and third generation islanders to remain. Recently, some undeveloped lots have been priced at or near $125,000; in addition property taxes seem to double every few years according to that individual. Locals are slowly being pushed from their heritage (commercial fishing), because they cannot afford the higher costs of living associated with the demographic shift when those of a higher socioeconomic class move to the area and are willing pay higher prices for land and housing. Imports are also taking a toll on the fishing industry as the domestic seafood has to compete with cheaper imports. The majority of the boats built in the past were commercial and made of wood; today there are more, larger sport and head boats that are often built in Florida or other states. It is estimated that there are approximately 25 trawlers in the area today. There is some long hauling that is also done by some, where two boats pull a net with 5-8 men per boat.

There are only 8 vessels homeported in Harker's Island with federal permits (Table 5.1.3-160) and most of those hold coastal pelagic permits and snapper grouper class 1. This does not include shrimp vessels unless they have other permits. There are over 170 commercial vessels with state licenses according to Table 5.1.3-162, with 96 standard commercial licenses and 68 shellfish licenses. Most of the fishing related employment according to census zip code business patterns in Table 5.1.3-161 is in the boat building sector.

Harker's Island Census Demographics

Population

Table 5.1.3-151. Total Persons and Persons by Age category for Harker's Island, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	132	117	1588
Persons Age 0-5	.	351	193	17
Persons Age 6-15	.	73	50	165
Persons Age 16-17	.	240	213	52
Persons Age 18-24	.	270	256	126
Persons Age 25-34	.	263	258	160
Persons Age 35-44	.	194	270	258
Persons Age 45-54	.	171	219	256
Persons Age 55-64	.	181	180	237
Persons Age 65+	.	132	117	317

Housing Tenure

Table 5.1.3-152. Housing Tenure for Harker's Island, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Rent	**1990**	**2000**
	18.9	81.4
Percent Own	**1990**	**2000**
	81.1	16.6

Residence in 1985 and 1995

Table 5.1.3-153. Residence in 1985 and 1995 for Harker's Island, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	336	80
Same House	**1990**	**2000**
	1212	1227

Employment/Unemployment

Table 5.1.3-154. Employment and Unemployment for Harker's Island, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	53.6	47.1
Percent unemployed	2.5	2.9

Race

Table 5.1.3-155. Race for Harker's Island, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	0	0	0
Latino Black Persons	.	0	0	0
Latino Persons	.	0	0	2
White Persons	.	1868	1751	1502
Latino White Persons	.	0	0	1

Education

Table 5.1.3-156. Years of Education by Category for those 25 Years and Older for Harker's Island, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**

25+ w/ 0-8 years education	.	381	216	112
25+ w/ 9-11 years education	.	327	295	337
25+ w/ HS diploma	.	301	399	383
25+ w/ 13-15 years. education	.	50	157	246
25+ w/ College Degree	.	20	77	133
Drop outs	.	55	17	17

Income and Poverty

Table 5.1.3-157. Average Household Wage/Salary and Persons Below the Poverty Level for Harker's Island, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	.	$13099	$22808	$33125
Poverty Level				
Persons Below Poverty Level	.	381	345	245
Age 65+ Below Poverty Level	.	87	41	59
Households with Public Assistance	.	83	34	1

Industry

Table 5.1.3-158. Employment by Industry for Harker's Island, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	.	175	62	71
Construction	.	42	48	95
Business Services	.	9	25	17
Communication/Utilities	.	11	26	12
Manufacturing	.	78	111	71
Financial, Insurance & Real Estate	.	65	81	0
Services	.	0	5	255
Wholesale/Retail Trade	.	60	181	50
Transportation	.	67	192	23

Occupation

Table 5.1.3-159. Employment by Occupation for Harker's Island, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	.	16	54	-
Clerical	.	690	74	-
Craft	.	149	120	-
Exec/Managerial	.	46	50	-

Farm/Fish/Forest	.	174	73	61
Household Services	.	0	0	-
Laborer/Handler	.	20	44	-
Operative/Transport	.	17	82	-
Service, except Household	.	67	89	-
Technical	.	12	33	-

Harker's Island Fishing Demographics

Table 5.1.3-160. Number of Federal Permit by Type for Harker's Island, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	7	10	11	8
Commercial King Mackerel	6	9	10	7
Commercial Spanish Mackerel	7	7	6	5
Commercial Spiny Lobster	0	0	1	1
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	1	1	1
Snapper Grouper Class 1	5	7	6	5
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	1	0	1
Shark	0	1	0	1
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-161. Employment in Fishing Related Industry for Harker's Island, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	24
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	0
Marinas	713930	8
Total Fishing Employment		32

Table 5.1.3-162. Number of State Permit by Type for Harker's Island, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	179
Dealer License	12
Flounder License	2
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	1

Retired Standard Commercial Fishing License	31
Standard Commercial Fishing License	93
Shellfish License	68
Recreational Fishing Tournament to Sell License	0
Total	386

5.1.3.13 Hatteras (27959)

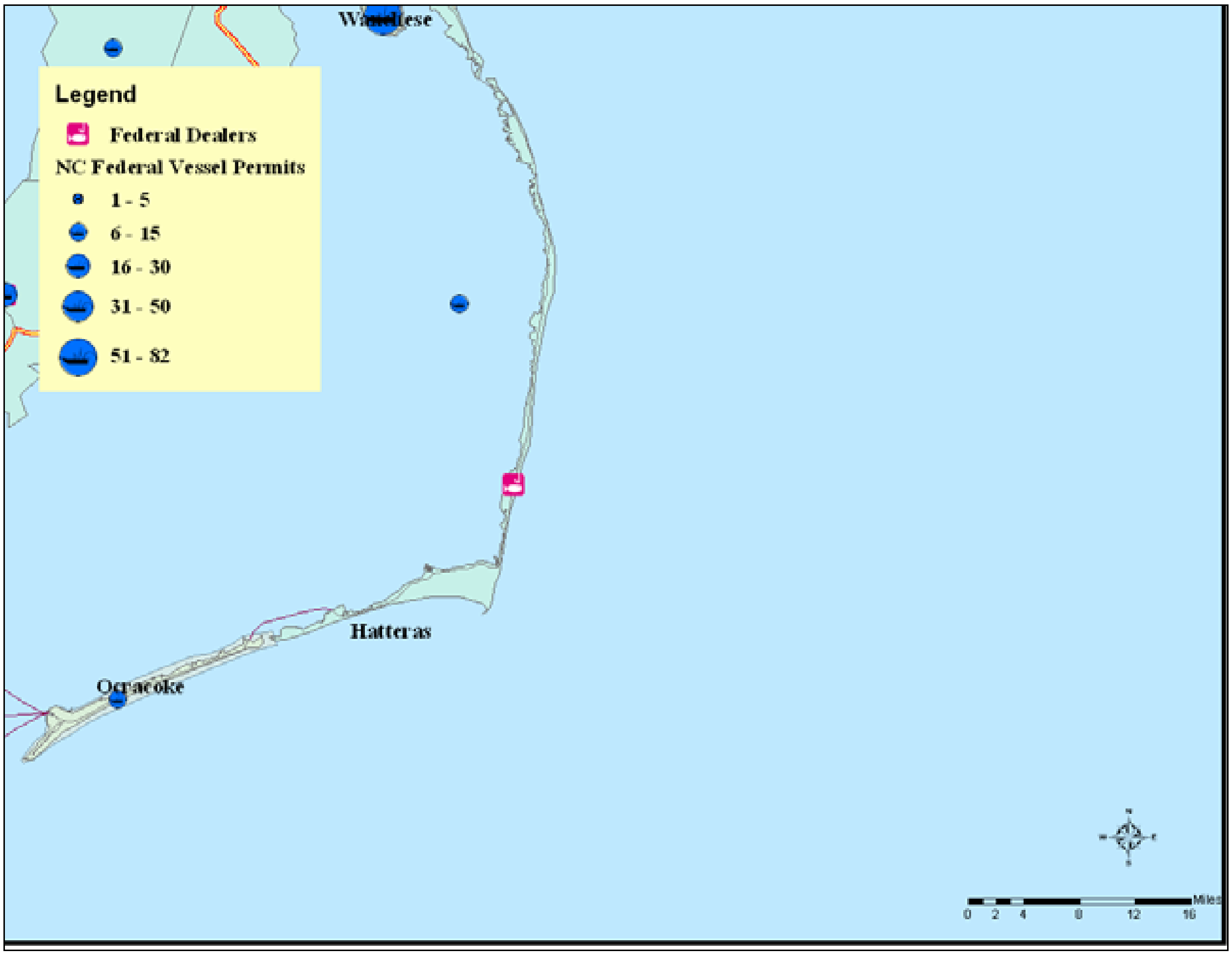


Figure 5.1.3-13. Hatteras, North Carolina.

Hatteras is located on the southern end of Hatteras Island on North Carolina's Outer Banks. The isolation of the community adds to the local character. Hatteras has historically been a seaport community with whaling an important part of the economy in its early history. Since World War II, the economy of the Hatteras community has depended on charter and commercial fishing. More recently, tourism has become an increasingly important economic activity (McCay and Cieri 2000).

The entire north end of Hatteras Island was once known as Chicamacomico, but in 1874, the postal service changed the name to Rodanthe. In earlier times, the Italian explorer Amerigo Vespucci landed in the area in the 16th Century. Centuries later, in 1858, the island became a popular fishing and shipping village and a post office was established. In 1861, Confederates troops landed on the northern end of the island to re-take Fort Hatteras and Fort Clark, which had fallen to the Union's first naval invasion of the South. After the Civil War, development began to increase on the island and the Durant's lifesaving station was built in 1878. By the turn of the century, a US weather station was established on the island and in the mid-1930s the Army Corps of Engineers had dredged a deep channel which allowed for better access from Pamlico Sound to Hatteras Inlet. Soon after, a sizable fishing fleet was established at Hatteras. During World War II, the area was known as "Torpedo Junction" due to more than 100 ships that were lost due to German submarines.

Hatteras Village is a small and quiet town surrounded by coast on either side. It is located next to a state park with a historic lighthouse. Hatteras is host to several prestigious fishing tournaments and is homeport for the island's famous charter fishing fleet. In addition, there are numerous restaurants that offer fresh caught seafood.

There were as many as 10 or 12 fish houses once and most recently, the largest fish house was sold for condominium development; there are four working fish houses left now. According to one individual, many fishermen are leaving the fishing business as tourism is dominating the economy for the area. This same individual further commented that water quality has changed and that there used to be more shellfish on the shoreline; now it is all gone due to development. He further suggested that the bridges that have recently been built have changed the currents of the inlet and have affected the local ecosystem.

Hatteras has 60 federally permitted vessels and most of those have commercial coastal pelagic permits. Almost half have charter permits for coastal pelagic or snapper grouper (Table 5.1.3-164). Most of the fishing related employment is in the marina sector (Table 5.1.3-165). There are 81 state registered commercial fishing vessels and 72 standard commercial fishing licenses in Hatteras. There are ten dealer licenses and 21 shellfish licenses in the community (Table 5.1.3-166).

The census demographic table that follows was compiled using census block data for the area. Long term census data from 1970 and 1980 were not available for Hatteras.

Hatteras Census Demographics

Table 5.1.3-163. Hatteras Census Demographics.

Factor	1990	2000
Total population	2675	2797
Gender Ratio M/F (Percent)	51.6/48.4	50.5/49.5
Age (Percent of total population)		
Under 18 years of age	23.9	20.0
18 to 64 years of age	65.0	64.2
65 years and over	11.1	15.1
Ethnicity or Race (Number)		
White	2644	2705
Black or African American	10	0
American Indian and Alaskan Native	0	0

Asian	21	0
Native Hawaiian and other Pacific Islander	0	0
Some other race	0	38
Two or more races	-	54
Hispanic or Latino (any race)	18	98
Educational Attainment (Population 25 and over)		
Percent with less than 9th grade	7.1	6.6
Percent high school graduate or higher	74.4	80.2
Percent with a Bachelor's degree or higher	20.6	17.2
Language Spoken at Home (Population 5 years and over)		
Percent who speak a language other than English at home	1.6	5.1
And Percent who speak English less than very well	0.0	2.6
Household income (Median $)	N/A[1]	N/A[1]
Poverty Status (Percent of population with income below poverty line)	6.0	10.0
Percent female headed household	9.0	6.2
Home Ownership (Percent)		
Owner occupied	72.3	78.1
Renter occupied	27.7	21.9
Value Owner-occupied Housing (Median $)	N/A[2]	N/A[2]
Monthly Contract Rent (Median $)	N/A[3]	N/A[3]
Employment Status (Population 16 yrs and over)		
Percent in the labor force	67.3	68.2
Percent of civilian labor force unemployed	4.2	8.9
Occupation (Percent)		
Management, professional, and related occupations	23.7	24.6
Service occupations	15.4	16.8
Sales and office occupations	17.3	20.4
Farming, fishing, and forestry occupations	6.4	7.8
Construction, extraction, and maintenance occupations	16.4	20.0
Production, transportation, and material moving occupations	13.9	10.5
Industry (Percent)		
Agriculture, forestry, fishing and hunting	11.3	8.4
Manufacturing	3.4	4.4
Percent government workers	21.0	19.3

1 Median Household Income is between $16,799-29,900 for 1990; $33,456-40,718 for 2000
2 Median Value Owner-occupied Housing is between $51,900-127,600 for 1990; $111,300-155,100 for 2000
3 Median Contract Rent is between $325-338 for 1990; $335-421 for 2000

Hatteras Fishing Demographics

Table 5.1.3-164. Number of Federal Permit by Type for Hatteras, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	58	64	60	60
Commercial King Mackerel	55	61	58	56
Commercial Spanish Mackerel	46	40	34	43
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	25	28	27	24
Charter/Headboat for Snapper Grouper	5	11	12	11
Snapper Grouper Class 1	7	9	8	5
Snapper Grouper Class 2	3	3	1	3

Swordfish	0	0	2	3
Shark	0	4	2	1
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-165. Employment in Fishing Related Industry for Hatteras, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	4
Marinas	713930	16
Total Fishing Employment		20

Table 5.1.3-166. Number of State Permit by Type for Hatteras, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	81
Dealer License	10
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	5
Standard Commercial Fishing License	73
Shellfish License	21
Recreational Fishing Tournament to Sell License	1
Total	190

5.1.3.14 Oriental (28571)

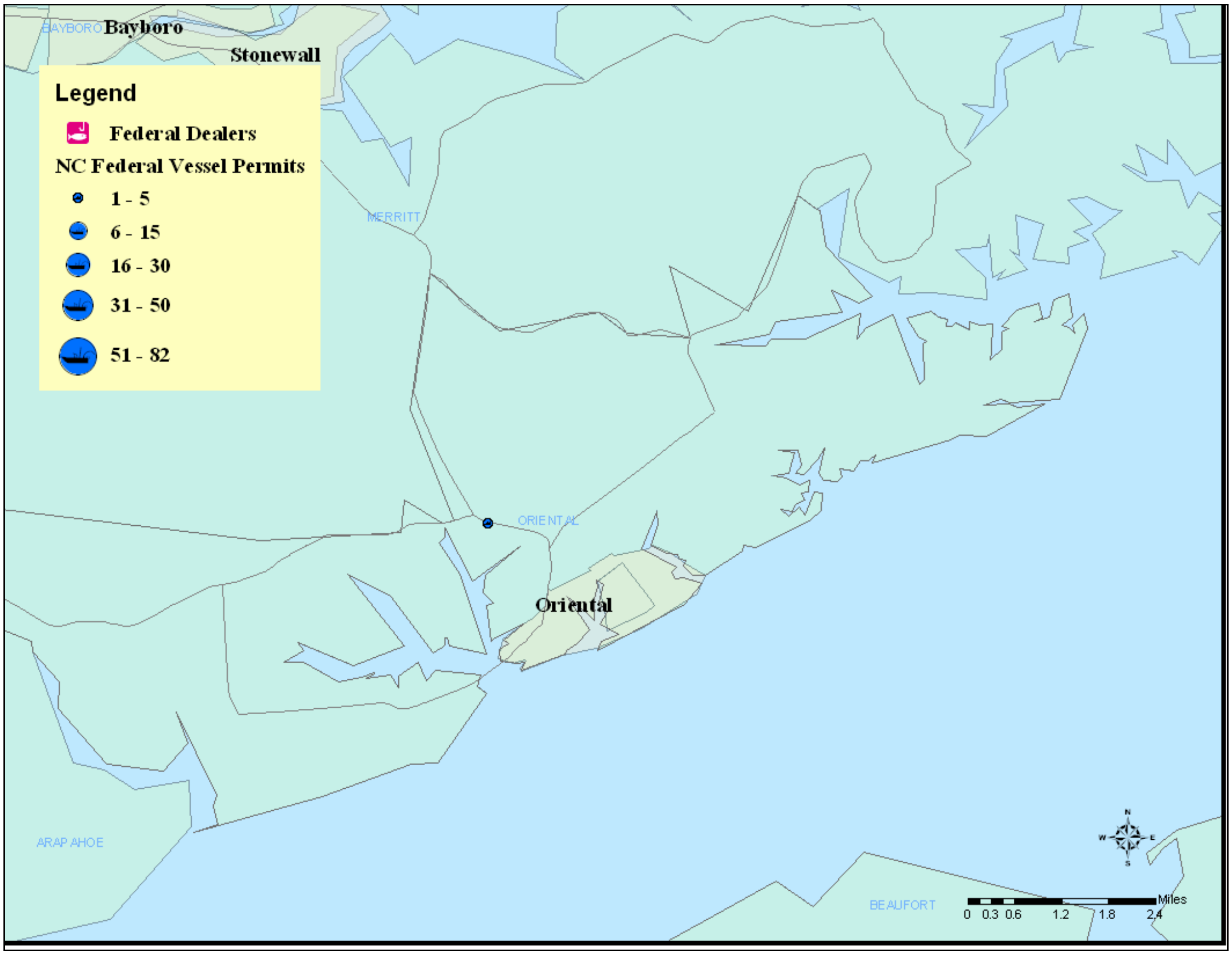


Figure 5.1.3-14. Oriental, North Carolina.

Oriental has seen little population growth over the past few decades and relatively little change in other census demographics. There has been a rise in unemployment from 1990 to 2000 but a drop in the number of individuals who are living below the poverty line for the same decade. There was little change in employment in farm, fish and forestry over that same time period. In fact, the number of federally permitted vessels has remained fairly constant at 7 (Table 5.1.3-176). There is considerable employment in fish and seafood with 72 people reported in that sector in Table 5.1.3-177. As far as state permits, there were 77 commercial vessels registered in Oriental and 62 standard commercial fishing licenses. There were also 13 dealer licenses issued within the community (Table 5.1.3-178).

Oriental Census Demographics

<u>Population</u>

Table 5.1.3-167. Total Persons and Persons by Age category for Oriental, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	535	804	878
Persons Age 0-5	.	35	66	24
Persons Age 6-15	.	51	57	57
Persons Age 16-17	.	13	14	11
Persons Age 18-24	.	43	44	34
Persons Age 25-34	.	62	74	48
Persons Age 35-44	.	42	100	84
Persons Age 45-54	.	67	83	142
Persons Age 55-64	.	91	149	161
Persons Age 65+	.	130	217	317

Housing Tenure

Table 5.1.3-168. Housing Tenure for Oriental, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	20.7	19.7
Percent Owner Occupied	**1990**	**2000**
	79.3	80.3

Residence in 1985 and 1995

Table 5.1.3-169. Residence in 1985 and 1995 for Oriental, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	127	40
Same House	**1990**	**2000**
	364	525

Employment/Unemployment

Table 5.1.3-170. Employment and Unemployment for Oriental, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	44.5	37.0
Percent unemployed	1.1	6.8

Race

Table 5.1.3-171. Race for Oriental, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	51	103	64
Latino Black Persons	.	3	0	0
Latino Persons	.	3	0	12
White Persons	.	477	701	792
Latino White Persons	.	0	0	2

Education

Table 5.1.3-172. Years of Education by Category for those 25 Years and Older for Oriental, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	68	27	11
25+ w/ 9-11 years education	.	84	57	69
25+ w/ HS diploma	.	69	155	158
25+ w/ 13-15 years. education	.	97	141	195
25+ w/ College Degree	.	74	192	317
Drop outs	.	4	2	2

Income and Poverty

Table 5.1.3-173. Average Household Wage/Salary and Persons Below the Poverty Level for Oriental, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$12303	$27660	$37794
Poverty Level				
Persons Below Poverty Level	.	87	138	74
Age 65+ Below Poverty Level	.	37	27	29
Households with Public Assistance	.	21	28	2

Industry

Table 5.1.3-174. Employment by Industry for Oriental, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	25	9	9
Construction	.	8	23	15
Business Services	.	3	6	19
Communication/Utilities	.	5	5	12
Manufacturing	.	12	46	32
Financial, Insurance & Real Estate	.	3	27	11

Services	.	10	16	100
Wholesale/Retail Trade	.	19	105	55
Transportation	.	86	69	2

Occupation

Table 5.1.3-175. Employment by Occupation for Oriental, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	25	37	-
Clerical	.	300	35	-
Craft	.	29	28	-
Exec/Managerial	.	28	54	-
Farm/Fish/Forest	.	10	9	7
Household Services	.	0	0	-
Laborer/Handler	.	9	15	-
Operative/Transport	.	8	20	-
Service, except Household	.	33	35	-
Technical	.	8	0	-

Oriental Fishing Demographics

Table 5.1.3-176. Number of Federal Permit by Type for Oriental, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	5	4	7	7
Commercial King Mackerel	0	0	1	1
Commercial Spanish Mackerel	0	0	1	1
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	1	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	1	1
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	4	4	6	6
Federal Dealers	0	0	0	0

Table 5.1.3-177. Employment in Fishing Related Industry for Oriental, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	4
Seafood Canning	311711	0
Seafood Processing	311712	4
Boat Building	336612	0
Fish and Seafoods	422460	72

Fish and Seafood Markets	445220	0
Marinas	713930	28
Total Fishing Employment		108

Table 5.1.3-178. Number of State Permit by Type for Oriental, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	77
Dealer License	13
Flounder License	9
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	5
Standard Commercial Fishing License	62
Shellfish License	3
Recreational Fishing Tournament to Sell License	0
Total	168

5.1.3.15 Vandemere/Mesic (28587)

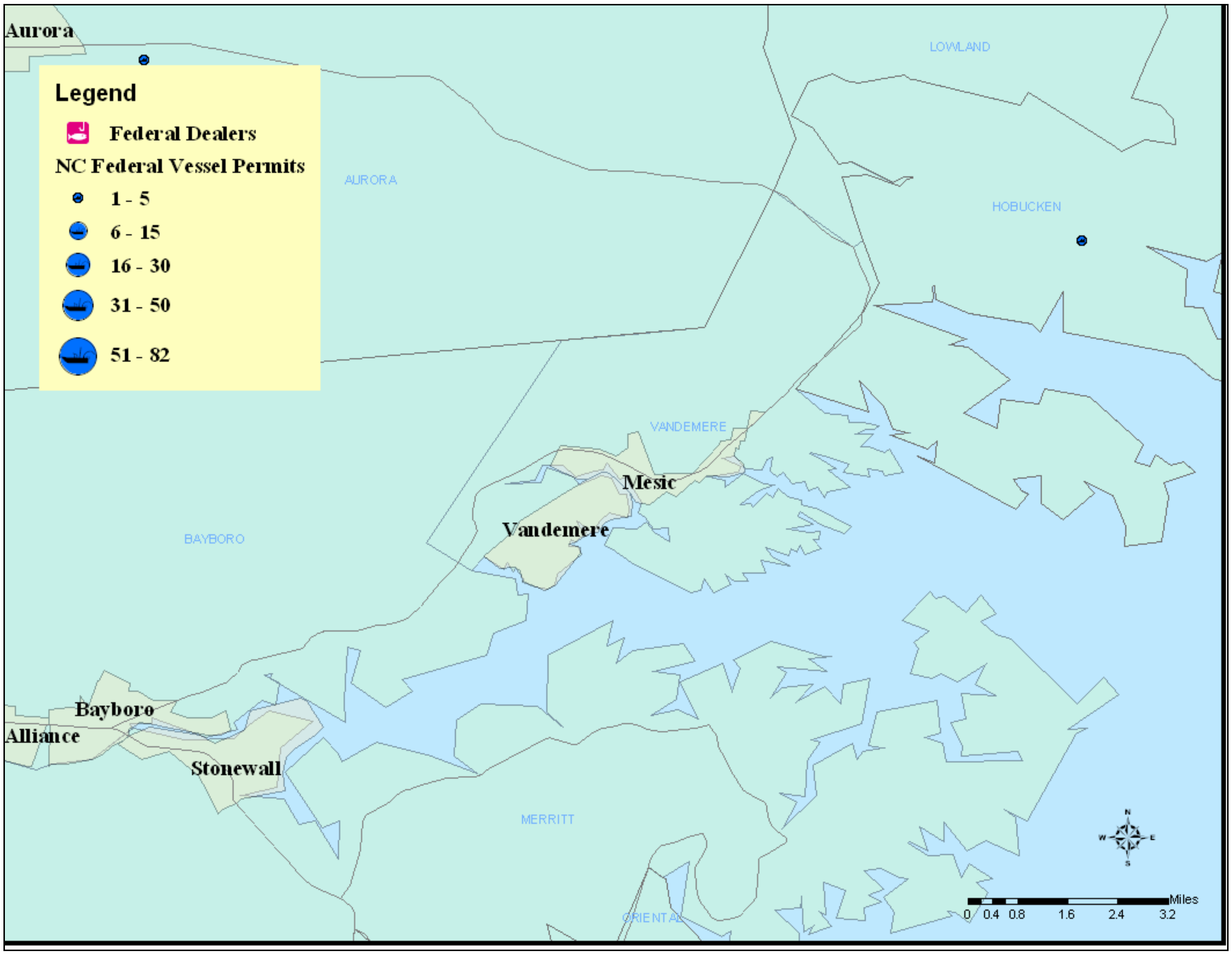


Figure 5.1.3-15. Vandemere/Mesic, North Carolina.

Vandemere and Mesic have both seen a slight population decline over the past decade. Both communities are predominately African American. Vandemere has about 60% of the population in the labor force while Mesic has 45%. Vandemere has seen a decrease in the percentage of unemployed to 9.4 percent while Mesic has seen an increase to 5.6 percent. Both communities have seen a reduction in the number of people who live below the poverty line and an increase in the average wage or salary. Both communities have also seen a steady decline in the number of people who work in farm, fishing and forestry for both occupation and industry. There are very few federal permits in Vandemere (Table 5.1.3-197) and none listed for Mesic. There are 36 people employed in seafood processing according to Table 5.1.3-198 and 4 in fishing and fish and seafood. A total of 19 commercial vessels are registered with the state according to Table 5.1.3-199 and 21 standard commercial fishing licenses.

Vandemere Census Demographics

<u>Population</u>

Table 5.1.3-179. Total Persons and Persons by Age category for Vandemere, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	354	338	320
Persons Age 0-5	.	19	38	26
Persons Age 6-15	.	61	19	47
Persons Age 16-17	.	17	16	8
Persons Age 18-24	.	51	44	22
Persons Age 25-34	.	34	46	29
Persons Age 35-44	.	43	32	53
Persons Age 45-54	.	35	42	40
Persons Age 55-64	.	36	44	41
Persons Age 65+	.	58	57	54

Housing Tenure

Table 5.1.3-180. Housing Tenure for Vandemere, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	25.5	15.5
Percent Owner Occupied	**1990**	**2000**
	75.0	85.5

Residence in 1985 and 1995

Table 5.1.3-181. Residence in 1985 and 1995 for Vandemere, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	49	20
Same House	**1990**	**2000**
	228	223

Employment/Unemployment

Table 5.1.3-182. Employment and Unemployment for Vandemere, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	63.4	60.3
Percent unemployed	11.8	9.4

Race

Table 5.1.3-183. Race for Vandemere, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	218	177	153
Latino Black Persons	.	0	0	0
Latino Persons	.	0	0	6
White Persons	.	136	161	128
Latino White Persons	.	0	0	6

Education

Table 5.1.3-184. Years of Education by Category for those 25 Years and Older for Vandemere, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	60	45	20
25+ w/ 9-11 years education	.	67	65	47
25+ w/ HS diploma	.	59	67	64
25+ w/ 13-15 years. education	.	14	25	48
25+ w/ College Degree	.	6	10	38
Drop outs	.	2	6	0

Income and Poverty

Table 5.1.3-185. Average Household Wage/Salary and Persons Below the Poverty Level for Vandemere, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$13,243	$19,713	$32,917
Poverty Level				
Persons Below Poverty Level	.	92	118	69
Age 65+ Below Poverty Level	.	24	26	19
Households with Public Assistance	.	27	16	2

Industry

Table 5.1.3-186. Employment by Industry for Vandemere, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	22	32	19
Construction	.	8	2	7
Business Services	.	0	11	5
Communication/Utilities	.	5	5	0
Manufacturing	.	35	33	27
Financial, Insurance & Real Estate	.	2	7	6

Services	.	5	5	30
Wholesale/Retail Trade	.	5	29	19
Transportation	.	32	20	13

Occupation

Table 5.1.3-187. Employment by Occupation for Vandemere, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	11	7	-
Clerical	.	180	14	-
Craft	.	12	14	-
Exec/Managerial	.	5	9	-
Farm/Fish/Forest	.	16	35	1
Household Services	.	3	0	-
Laborer/Handler	.	35	13	-
Operative/Transport	.	0	17	-
Service, except Household	.	15	16	-
Technical	.	0	2	-

Mesic Census Demographics

Population

Table 5.1.3-188. Total Persons and Persons by Age category for Mesic, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	400	297	251
Persons Age 0-5	.	33	12	10
Persons Age 6-15	.	64	48	45
Persons Age 16-17	.	23	6	13
Persons Age 18-24	.	66	30	5
Persons Age 25-34	.	39	41	13
Persons Age 35-44	.	29	29	32
Persons Age 45-54	.	58	39	34
Persons Age 55-64	.	51	39	32
Persons Age 65+	.	34	53	67

Housing Tenure

Table 5.1.3-189. Housing Tenure for Mesic, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	25.0	10.4

Percent Owner Occupied	1990	2000
	75.0	89.6

Residence in 1985 and 1995

Table 5.1.3-190. Residence in 1985 and 1995 for Mesic, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	35	18
Same House	**1990**	**2000**
	228	162

Employment/Unemployment

Table 5.1.3-191. Employment and Unemployment for Mesic, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	47.1	45.9
Percent unemployed	3.1	5.6

Race

Table 5.1.3-192. Race for Mesic, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	288	205	176
Latino Black Persons	.	3	0	0
Latino Persons	.	3	3	0
White Persons	.	112	90	76
Latino White Persons	.	0	1	0

Education

Table 5.1.3-193. Years of Education by Category for those 25 Years and Older for Mesic, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	60	40	23
25+ w/ 9-11 years education	.	70	46	55
25+ w/ HS diploma	.	60	64	52
25+ w/ 13-15 years. education	.	15	32	29
25+ w/ College Degree	.	6	15	15
Drop outs	.	5	0	4

Income and Poverty

Table 5.1.3-194. Average Household Wage/Salary and Persons Below the Poverty Level for Mesic, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	.	13536	16607	27188
Poverty Level				
Persons Below Poverty Level	.	90	77	68
Age 65+ Below Poverty Level	.	17	18	10
Households with Public Assistance	.	21	13	4

Industry

Table 5.1.3-195. Employment by Industry for Mesic, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	.	15	27	4
Construction	.	8	2	10
Business Services	.	3	0	0
Communication/Utilities	.	3	2	6
Manufacturing	.	42	10	5
Financial, Insurance & Real Estate	.	13	4	9
Services	.	0	2	35
Wholesale/Retail Trade	.	6	34	6
Transportation	.	19	18	7

Occupation

Table 5.1.3-196. Employment by Occupation for Mesic, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	.	6	2	-
Clerical	.	120	12	-
Craft	.	35	5	-
Exec/Managerial	.	2	2	-
Farm/Fish/Forest	.	15	32	0
Household Services	.	0	3	-
Laborer/Handler	.	32	7	-
Operative/Transport	.	6	9	-
Service, except Household	.	10	23	-
Technical	.	2	5	-

Vandemere Fishing Demographics

Table 5.1.3-197. Number of Federal Permit by Type for Vandemere, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	4	3	2	1
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	4	3	2	1
Federal Dealers	0	0	0	0

Table 5.1.3-198. Employment in Fishing Related Industry for Vandemere, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	4
Seafood Canning	311711	0
Seafood Processing	311712	36
Boat Building	336612	0
Fish and Seafoods	422460	4
Fish and Seafood Markets	445220	0
Marinas	713930	0
Total Fishing Employment		44

Table 5.1.3-199. Number of State Permit by Type for Vandemere, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	19
Dealer License	3
Flounder License	3
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	0
Standard Commercial Fishing License	21
Shellfish License	0
Recreational Fishing Tournament to Sell License	0
Total	46

5.1.3.16 Bath (27808)

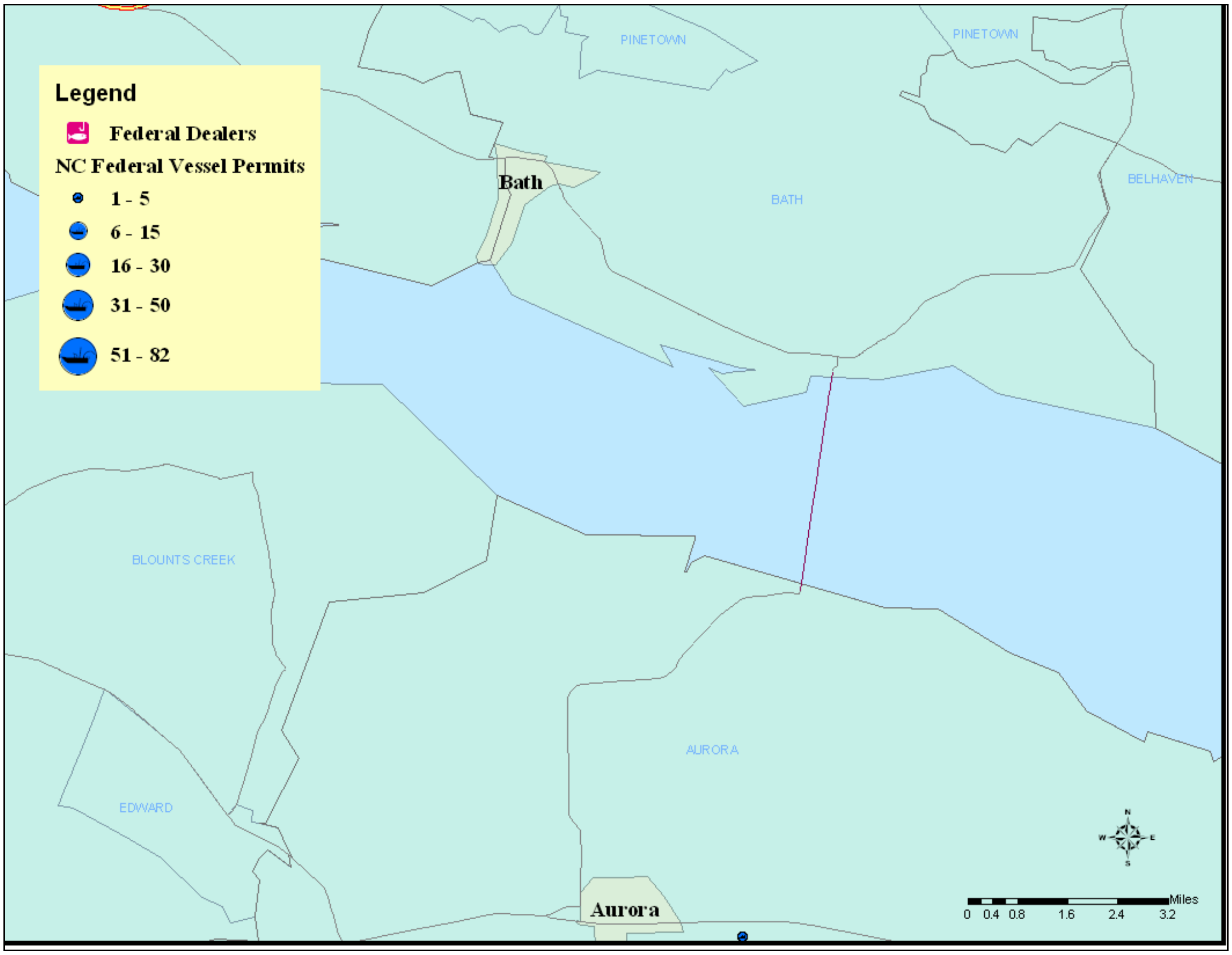


Figure 5.1.3-16. Bath, North Carolina.

There has been a slight population increase for Bath in the past ten years (Table 5.1.3-200) and an increase in the percentage of the population in the labor force (Table 5.1.3-203). Unemployment is 4.5% with a slight increase in the number of persons living below the poverty level (Table 5.1.3-206). There were very few people employed in the farm, fish and forestry category for either industry or occupation (Tables 5.1.3-207 and 5.1.3-208). According to Table 5.1.3-209 there is only one federally permitted vessel homeported in Bath. Employment in fishing related businesses reported in Table 5.1.3-210 shows only 4 people employed in fish and seafood. There are over 100 commercial vessels registered by the state in Bath and over 100 standard commercial fishing licenses according to Table 5.1.3-211.

Bath Census Demographics

<u>Population</u>

Table 5.1.3-200. Total Persons and Persons by Age category for Bath, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	**1970**	**1980**	**1990**	**2000**
Total Persons	.	213	138	268
Persons Age 0-5	.	6	9	12
Persons Age 6-15	.	17	4	51
Persons Age 16-17	.	6	0	2
Persons Age 18-24	.	15	7	5
Persons Age 25-34	.	17	20	26
Persons Age 35-44	.	12	7	20
Persons Age 45-54	.	12	14	66
Persons Age 55-64	.	37	34	24
Persons Age 65+	.	91	43	62

Housing Tenure

Table 5.1.3-201. Housing Tenure for Bath, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	26.7	11.0
Percent Owner Occupied	**1990**	**2000**
	73.3	89.0

Residence in 1985 and 1995

Table 5.1.3-202. Residence in 1985 and 1995 for Bath, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	29	29
Same House	**1990**	**2000**
	72	157

Employment/Unemployment

Table 5.1.3-203. Employment and Unemployment for Bath, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	42.6	56.1
Percent unemployed	0.0	4.5

Race

Table 5.1.3-204. Race for Bath, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	31	10	8
Latino Black Persons	.	0	0	0
Latino Persons	.	0	0	5
White Persons	.	182	128	259
Latino White Persons	.	0	0	4

Education

Table 5.1.3-205. Years of Education by Category for those 25 Years and Older for Bath, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	67	14	3
25+ w/ 9-11 years education	.	41	20	24
25+ w/ HS diploma	.	35	34	60
25+ w/ 13-15 years. education	.	11	21	45
25+ w/ College Degree	.	15	27	64
Drop outs	.	0	0	2

Income and Poverty

Table 5.1.3-206. Average Household Wage/Salary and Persons Below the Poverty Level for Bath, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	11844	18284	50625
Poverty Level				
Persons Below Poverty Level	.	68	19	22
Age 65+ Below Poverty Level	.	39	12	7
Households with Public Assistance	.	17	11	3

Industry

Table 5.1.3-207. Employment by Industry for Bath, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	8	3	5
Construction	.	5	0	5
Business Services	.	2	3	1
Communication/Utilities	.	0	0	4
Manufacturing	.	18	13	23
Financial, Insurance & Real Estate	.	5	8	6
Services	.	0	0	55
Wholesale/Retail Trade	.	2	29	9

Transportation	.	17	6	0

Occupation

Table 5.1.3-208. Employment by Occupation for Bath, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	5	3	-
Clerical	.	160	5	-
Craft	.	12	6	-
Exec/Managerial	.	11	8	-
Farm/Fish/Forest	.	5	3	3
Household Services	.	0	0	-
Laborer/Handler	.	0	0	-
Operative/Transport	.	13	8	-
Service, except Household	.	5	10	-
Technical	.	0	0	-

Bath Fishing Demographics

Table 5.1.3-209. Number of Federal Permit by Type for Bath, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	2	1	2	1
Commercial King Mackerel	2	0	0	0
Commercial Spanish Mackerel	2	1	1	1
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-210. Employment in Fishing Related Industry for Bath, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	4
Fish and Seafood Markets	445220	0
Marinas	713930	0

Total Fishing Employment	4

Table 5.1.3-211. Number of State Permit by Type for Bath, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	119
Dealer License	16
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	7
Standard Commercial Fishing License	112
Shellfish License	2
Recreational Fishing Tournament to Sell License	0
Total	256

5.1.3.17 Belhaven (27810)

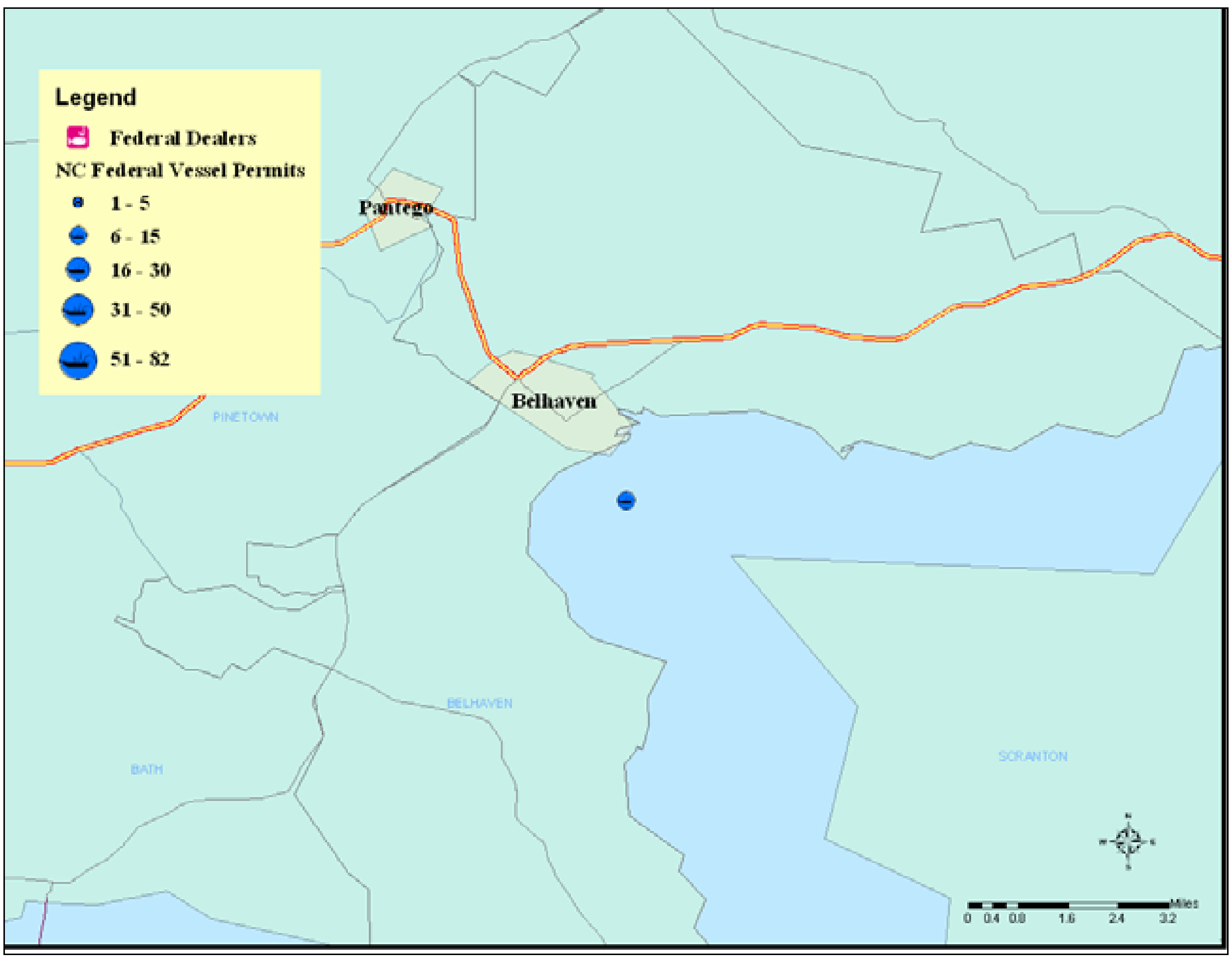


Figure 5.1.3-17. Bellhaven, North Carolina.

Belhaven is a predominantly African American community (Table 5.1.3-216) which has seen a decline in population over the past decade (Table 5.1.3-212). The community has also experienced an increase in the unemployment rate and a decrease in the percentage of the population that is in the labor force (Table 5.1.3-215). Average household wage and salary has decreased while there has been a decline in the number of people who live below the poverty line (Table 5.1.3-218). There has been a decrease in the number of people who work in farm, fishing and forestry sector for both industry and occupation (Tables 5.1.3-219 and 5.1.3-220). While there are very few federally permitted vessels homeported in Belhaven (Table 5.1.3-221) there were over 100 people employed in fishing related businesses according to Table 5.1.3-222. There were over 260 commercial fishing vessels registered with the state from Belhaven and 232 standard commercial fishing licenses (Table 5.1.3-223).

Belhaven Census Demographics

Population

Table 5.1.3-212. Total Persons and Persons by Age category for Belhaven, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	2430	2269	1951
Persons Age 0-5	.	214	228	161
Persons Age 6-15	.	465	374	313
Persons Age 16-17	.	97	72	41
Persons Age 18-24	.	279	211	125
Persons Age 25-34	.	318	334	262
Persons Age 35-44	.	214	295	266
Persons Age 45-54	.	214	178	229
Persons Age 55-64	.	230	228	200
Persons Age 65+	.	368	349	354

Housing Tenure

Table 5.1.3-213. Housing Tenure for Belhaven, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	31.3	38.0
Percent Owner Occupied	**1990**	**2000**
	68.7	62.0

Residence in 1985 and 1995

Table 5.1.3-214. Residence in 1985 and 1995 for Belhaven, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000

	548	122
Same House	**1990**	**2000**
	1305	1072

Employment/Unemployment

Table 5.1.3-215. Employment and Unemployment for Belhaven, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	57.1	45.1
Percent unemployed	5.6	10.1

Race

Table 5.1.3-216. Race for Belhaven, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	1429	1421	1192
Latino Black Persons	.	39	0	2
Latino Persons	.	39	0	53
White Persons	.	994	841	699
Latino White Persons	.	0	0	35

Education

Table 5.1.3-217. Years of Education by Category for those 25 Years and Older for Belhaven, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	473	292	130
25+ w/ 9-11 years education	.	253	343	283
25+ w/ HS diploma	.	361	438	536
25+ w/ 13-15 years. education	.	142	156	185
25+ w/ College Degree	.	115	89	148
Drop outs	.	17	24	29

Income and Poverty

Table 5.1.3-218. Average Household Wage/Salary and Persons Below the Poverty Level for Belhaven, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	11428	18331	16674

Poverty Level				
Persons Below Poverty Level	.	804	811	688
Age 65+ Below Poverty Level	.	151	103	130
Households with Public Assistance	.	152	168	45

Industry

Table 5.1.3-219. Employment by Industry for Belhaven, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	59	52	44
Construction	.	41	43	80
Business Services	.	14	18	30
Communication/Utilities	.	28	27	8
Manufacturing	.	244	188	74
Financial, Insurance & Real Estate	.	78	89	4
Services	.	29	13	212
Wholesale/Retail Trade	.	117	246	99
Transportation	.	240	175	10

Occupation

Table 5.1.3-220. Employment by Occupation for Belhaven, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	97	56	-
Clerical	.	920	89	-
Craft	.	124	90	-
Exec/Managerial	.	52	65	-
Farm/Fish/Forest	.	47	46	28
Household Services	.	11	9	-
Laborer/Handler	.	145	71	-
Operative/Transport	.	91	70	-
Service, except Household	.	121	147	-
Technical	.	6	12	-

Belhaven Fishing Demographics

Table 5.1.3-221. Number of Federal Permit by Type for Belhaven, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	3	3	4	4
Commercial King Mackerel	1	1	1	1
Commercial Spanish Mackerel	1	1	2	2
Commercial Spiny Lobster	0	0	0	0

Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	2	2	2	2
Federal Dealers	0	0	0	0

Table 5.1.3-222. Employment in Fishing Related Industry for Belhaven, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	88
Boat Building	336612	0
Fish and Seafoods	422460	12
Fish and Seafood Markets	445220	0
Marinas	713930	4
Total Fishing Employment		104

Table 5.1.3-223. Number of State Permit by Type for Belhaven, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	268
Dealer License	16
Flounder License	7
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	9
Standard Commercial Fishing License	232
Shellfish License	3
Recreational Fishing Tournament to Sell License	0
Total	535

5.1.3.18 Wanchese (27981)

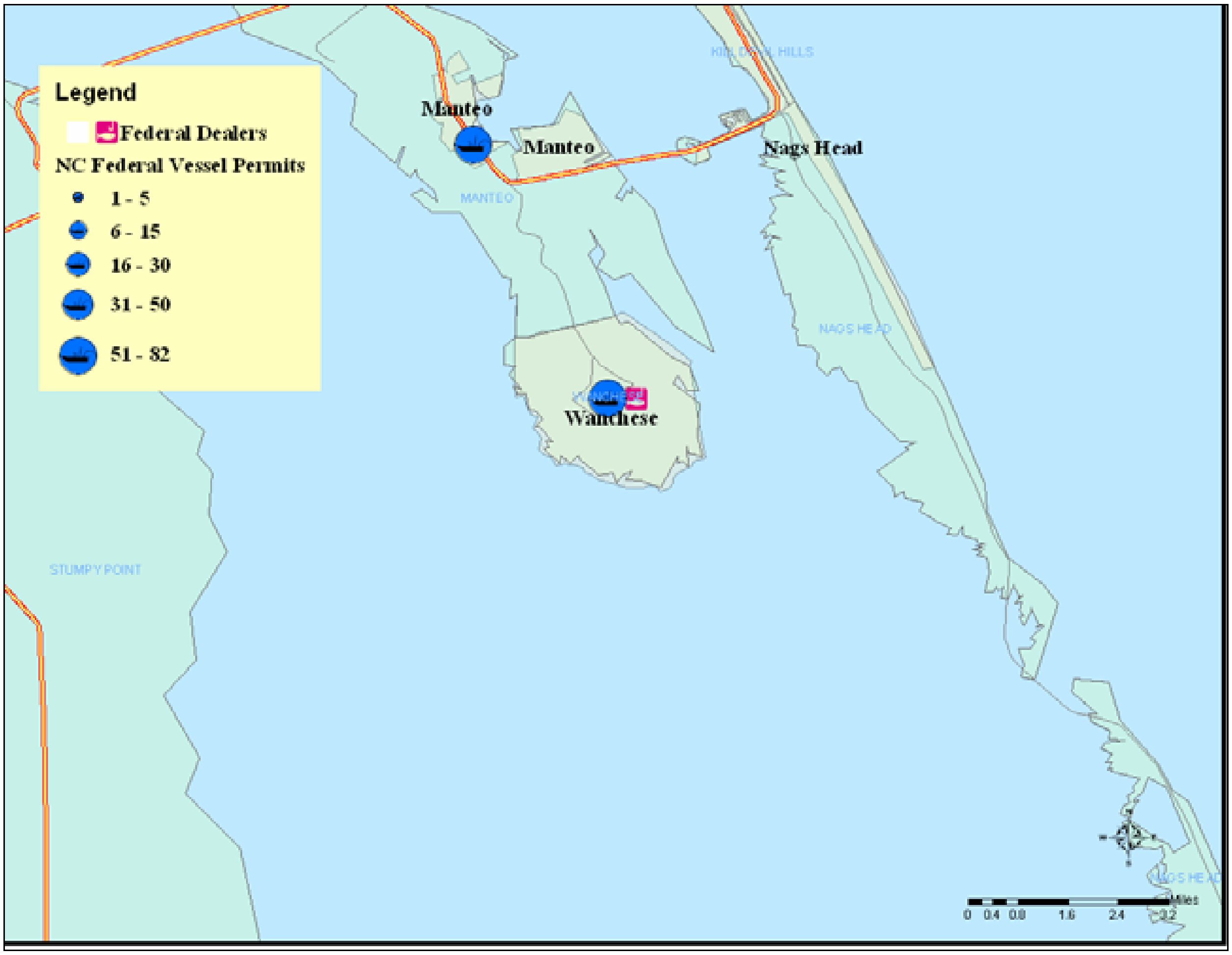


Figure 5.1.3-18. Wanchese, North Carolina.

Roanoke Island has a mix of tall, green, piney woods and miles of sheltered shoreline on the sound side providing a contrast to the open dunes of the outer islands. Wanchese, one of the island's two villages and is located at the southern end. It is a small, unincorporated fishing community with docks that provide services to many types of local and non-local commercial and recreational fishermen. Throughout the nineteenth century, the commercial industry was able to expanded owing in part to the first local postmaster, who owned or financed most of the commercial fishing boats in Wanchese. That individual established a system of credit for local fishermen at his store where debts were paid off when fishermen brought in their catches. It was said that at that time all residents were commercial fishermen (Wilson and McCay 1998).

Wanchese first fish house was established in 1936 by ER (Zeke) Daniels, the grandfather of the current generation of two fish house owners. Zeke’s son was the first to fish a trawler in Wanchese in the 1950s. He converted a 65’ wooden boat which was primarily used to fish for things like flounder during the winter time. As mentioned most of their fishing occurred in the Pamlico and Albemarle Sounds, however there was a certain amount beach fishing that occurred, targeting species such as sea mollusks, trout, croaker, spots, striped bass (rock fish) and blue fish. The sounds provided croakers, butterfish, Spanish mackerel, spots and pig fishes. At that time, sea bass was the primary species targeted in the ocean during the winter months of the year. Later a WWI subchaser was purchased and converted for scalloping (Wilson and McCay 1998).

The largest industrial area in Wanchese is centered round the Wanchese Seafood Industrial Park. The Park was built to enhance business opportunities in the seafood and marine trades. It encourages outside as well as local development in an effort to create a "new day for seafood and marine commerce." Between 1978 and 1985 it was reported that there were nine fish houses in operation in Wanchese. Today, there are six packing houses all operational and all dealing in many of the same species, with each house having a slightly different specialty. In the past all of the houses packed basically the same fish, with flounder being one of the most prominent species. However, overtime this has changed as each house has had to specialize in order to remain in business.

Charter boat fishing has become an increasing popular in Wanchese over the last 10 years. The number of charter boats has increased and facilities have been created to handle the increased presence of the for hire industry. Currently, there are 27 charter boats and 2 head boats working out of Wanchese. Many of these individuals are from outside the Wanchese area; however, there are a few local fishermen who have decided to try the recreational fishing instead of the commercial.

Wanchese has seen an increase in its population over the past decade (Table 5.1.3-224) but a reduction in the percentage of people in the labor force (Table 5.1.3-227). Percent of unemployed has dropped from 8.9 in 1990 to 2.8 in 2000. While average wage and salary has increased, number of persons below the poverty level has remained constant (Table 5.1.3-230). Yet the number of households with public assistance has gone from a high of 35 in 1990 to none in 2000 (Table 5.1.3-230). Employment in farm, fishing and forestry rose from 1980 to 1990 but has seen a decline in the year 2000 (Table 5.1.3-231 and 5.1.3-232). There have remained about 30 vessels with federal permits homeported in the community for the past four years (Table 5.1.3-233). Employment in fishing related activities reported in Table 5.1.3-234 indicates 120 people employed in several categories with 56 in fish and seafood, 40 in boatbuilding, 16 in fishing and 8 in seafood processing. There were 228 commercial vessels registered and over 200 standard commercial fishing licenses in the community according to Table 5.1.3-235. There were also 12 dealer licenses and 18 flounder licenses for Wanchese (Table 5.1.3-235).

Wanchese Census Demographics

<u>Population</u>

Table 5.1.3-224. Total Persons and Persons by Age category for Wanchese, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	1020	1374	1544

Persons Age 0-5	.	74	141	100
Persons Age 6-15	.	168	249	244
Persons Age 16-17	.	39	48	43
Persons Age 18-24	.	92	149	80
Persons Age 25-34	.	195	253	273
Persons Age 35-44	.	115	157	276
Persons Age 45-54	.	136	186	262
Persons Age 55-64	.	99	92	106
Persons Age 65+	.	73	99	160

Housing Tenure

Table 5.1.3-225. Housing Tenure for Wanchese, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	27.9	27.7
Percent Owner Occupied	**1990**	**2000**
	72.1	72.3

Residence in 1985 and 1995

Table 5.1.3-226. Residence in 1985 and 1995 for Wanchese, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	342	118
Same House	**1990**	**2000**
	672	1100

Employment/Unemployment

Table 5.1.3-227. Employment and Unemployment for Wanchese, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	78.1	66.6
Percent unemployed	8.9	2.8

Race

Table 5.1.3-228. Race for Wanchese, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	0	0	5
Latino Black Persons	.	0	0	0
Latino Persons	.	0	0	28
White Persons	.	1020	1354	1477

Latino White Persons	.	0	0	21

Education

Table 5.1.3-229. Years of Education by Category for those 25 Years and Older for Wanchese, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	120	85	48
25+ w/ 9-11 years education	.	168	172	205
25+ w/ HS diploma	.	205	259	388
25+ w/ 13-15 years. education	.	94	170	221
25+ w/ College Degree	.	31	61	215
Drop outs	.	13	14	0

Income and Poverty

Table 5.1.3-230. Average Household Wage/Salary and Persons Below the Poverty Level for Wanchese, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	13702	25574	39250
Poverty Level				
Persons Below Poverty Level	.	135	127	125
Age 65+ Below Poverty Level	.	13	12	26
Households with Public Assistance	.	18	35	0

Industry

Table 5.1.3-231. Employment by Industry for Wanchese, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	86	137	64
Construction	.	41	35	77
Business Services	.	0	25	8
Communication/Utilities	.	21	9	10
Manufacturing	.	26	66	102
Financial, Insurance & Real Estate	.	16	57	15
Services	.	10	23	302
Wholesale/Retail Trade	.	32	184	143
Transportation	.	134	179	26

Occupation

Table 5.1.3-232. Employment by Occupation for Wanchese, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	62	82	-
Clerical	.	670	70	-
Craft	.	48	88	-
Exec/Managerial	.	41	65	-
Farm/Fish/Forest	.	80	131	74
Household Services	.	0	0	-
Laborer/Handler	.	24	23	-
Operative/Transport	.	0	35	-
Service, except Household	.	54	97	-
Technical	.	7	19	-

Wanchese Fishing Demographics

Table 5.1.3-233. Number of Federal Permit by Type for Wanchese, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	36	32	32	30
Commercial King Mackerel	29	23	24	22
Commercial Spanish Mackerel	30	27	25	29
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	10	5	4	4
Charter/Headboat for Snapper Grouper	1	2	2	2
Snapper Grouper Class 1	4	7	7	9
Snapper Grouper Class 2	4	3	3	2
Swordfish	1	8	7	9
Shark	0	14	8	14
Rock Shrimp	1	1	1	1
Federal Dealers	4	3	5	4

Table 5.1.3-234. Employment in Fishing Related Industry for Wanchese, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	16
Seafood Canning	311711	0
Seafood Processing	311712	8
Boat Building	336612	40
Fish and Seafoods	422460	56
Fish and Seafood Markets	445220	0
Marinas	713930	0
Total Fishing Employment		120

Table 5.1.3-235. Number of State Permit by Type for Wanchese, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	228
Dealer License	12
Flounder License	18
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	13
Standard Commercial Fishing License	201
Shellfish License	2
Recreational Fishing Tournament to Sell License	0
Total	474

5.1.3.19 Manteo (27954)

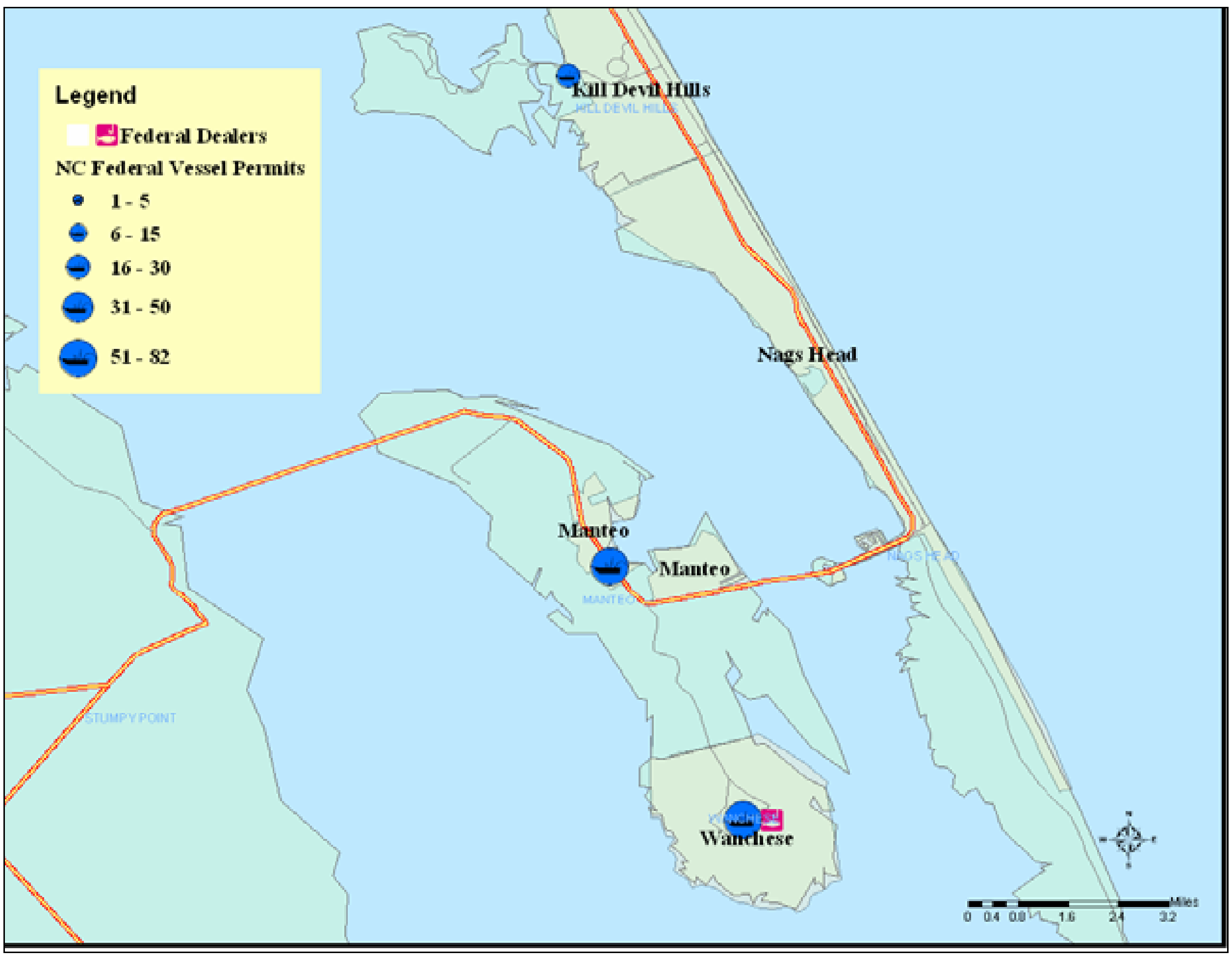


Figure 5.1.3-19. Manteo, North Carolina.

Manteo has seen steady population growth (Table 5.1.3- 236) with a decline in its African American population (Table 5.1.3-240). The percent of the population that is unemployed has risen over the past ten years while the percent of people in the labor force has also declined slightly (Table 5.1.3-239). Average wage and salary has raised some but, the number of persons living below the poverty line has increased (Table 5.1.3-242). There has been a steady decline in the number of individuals working in the farm, fish and forestry sectors also over the past three decades (Tables 5.1.3-243 and 5.1.3-244). There are only 13 vessels with federal permits homeported in Wanchese and most of them have coastal pelagic permits (Table 5.1.3-245). Fishing related employment is highest among the fish and seafood sector according to Table 5.1.3-246 with 176 persons employed in that sector and 16 in marinas. The state reports over 170 commercially registered vessels and 142 standard commercial fishing licenses for Wanchese (Table 5.1.3-247).

Manteo Census Demographics

Population

Table 5.1.3-236. Total Persons and Persons by Age category for Manteo, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	951	997	1045
Persons Age 0-5	.	51	73	104
Persons Age 6-15	.	128	88	123
Persons Age 16-17	.	24	10	23
Persons Age 18-24	.	132	76	66
Persons Age 25-34	.	147	215	478
Persons Age 35-44	.	75	137	924
Persons Age 45-54	.	86	88	125
Persons Age 55-64	.	75	94	128
Persons Age 65+	.	222	216	184

Housing Tenure

Table 5.1.3-237. Housing Tenure for Manteo, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	39.6	46.4
Percent Owner Occupied	**1990**	**2000**
	60.4	53.6

Residence in 1985 and 1995

Table 5.1.3-238. Residence in 1985 and 1995 for Manteo, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	153	115
Same House	**1990**	**2000**
	493	422

Employment/Unemployment

Table 5.1.3-239. Employment and Unemployment for Manteo, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	64.6	61.0
Percent unemployed	2.4	5.5

Race

Table 5.1.3-240. Race for Manteo, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	221	133	106
Latino Black Persons	.	0	0	0
Latino Persons	.	1	10	27
White Persons	.	730	854	899
Latino White Persons	.	1	0	9

Education

Table 5.1.3-241. Years of Education by Category for those 25 Years and Older for Manteo, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	142	52	25
25+ w/ 9-11 years education	.	112	127	55
25+ w/ HS diploma	.	181	200	217
25+ w/ 13-15 years. education	.	83	200	225
25+ w/ College Degree	.	87	119	207
Drop outs	.	4	10	0

Income and Poverty

Table 5.1.3-242. Average Household Wage/Salary and Persons Below the Poverty Level for Manteo, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000

Average Household Wage/Salary Income (dollars)	.	$14919	$25666	$29803
Poverty Level				
Persons Below Poverty Level	.	103	104	202
Age 65+ Below Poverty Level	.	34	26	0
Households with Public Assistance	.	55	17	2

Industry

Table 5.1.3-243. Employment by Industry for Manteo, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	25	20	14
Construction	.	35	48	14
Business Services	.	9	27	0
Communication/Utilities	.	4	21	42
Manufacturing	.	18	36	32
Financial, Insurance & Real Estate	.	17	15	7
Services	.	28	26	58
Wholesale/Retail Trade	.	55	195	14
Transportation	.	75	139	10

Occupation

Table 5.1.3-244. Employment by Occupation for Manteo, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	43	73	-
Clerical	.	560	71	-
Craft	.	39	59	-
Exec/Managerial	.	28	71	-
Farm/Fish/Forest	.	27	21	17
Household Services	.	7	2	-
Laborer/Handler	.	16	23	-
Operative/Transport	.	19	14	-
Service, except Household	.	57	90	-
Technical	.	12	4	-

Manteo Fishing Demographics

Table 5.1.3-245. Number of Federal Permit by Type for Manteo, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	23	15	16	13
Commercial King Mackerel	18	13	15	13

Commercial Spanish Mackerel	14	10	8	9
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	13	7	9	9
Charter/Headboat for Snapper Grouper	6	3	4	4
Snapper Grouper Class 1	3	2	2	1
Snapper Grouper Class 2	0	1	1	1
Swordfish	0	3	2	2
Shark	0	4	2	3
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-246. Employment in Fishing Related Industry for Manteo, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	8
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	176
Fish and Seafood Markets	445220	0
Marinas	713930	16
Total Fishing Employment		200

Table 5.1.3-247. Number of State Permit by Type for Manteo, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	171
Dealer License	9
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	3
Standard Commercial Fishing License	142
Shellfish License	4
Recreational Fishing Tournament to Sell License	0
Total	329

5.1.3.20 Ocracoke (27960)

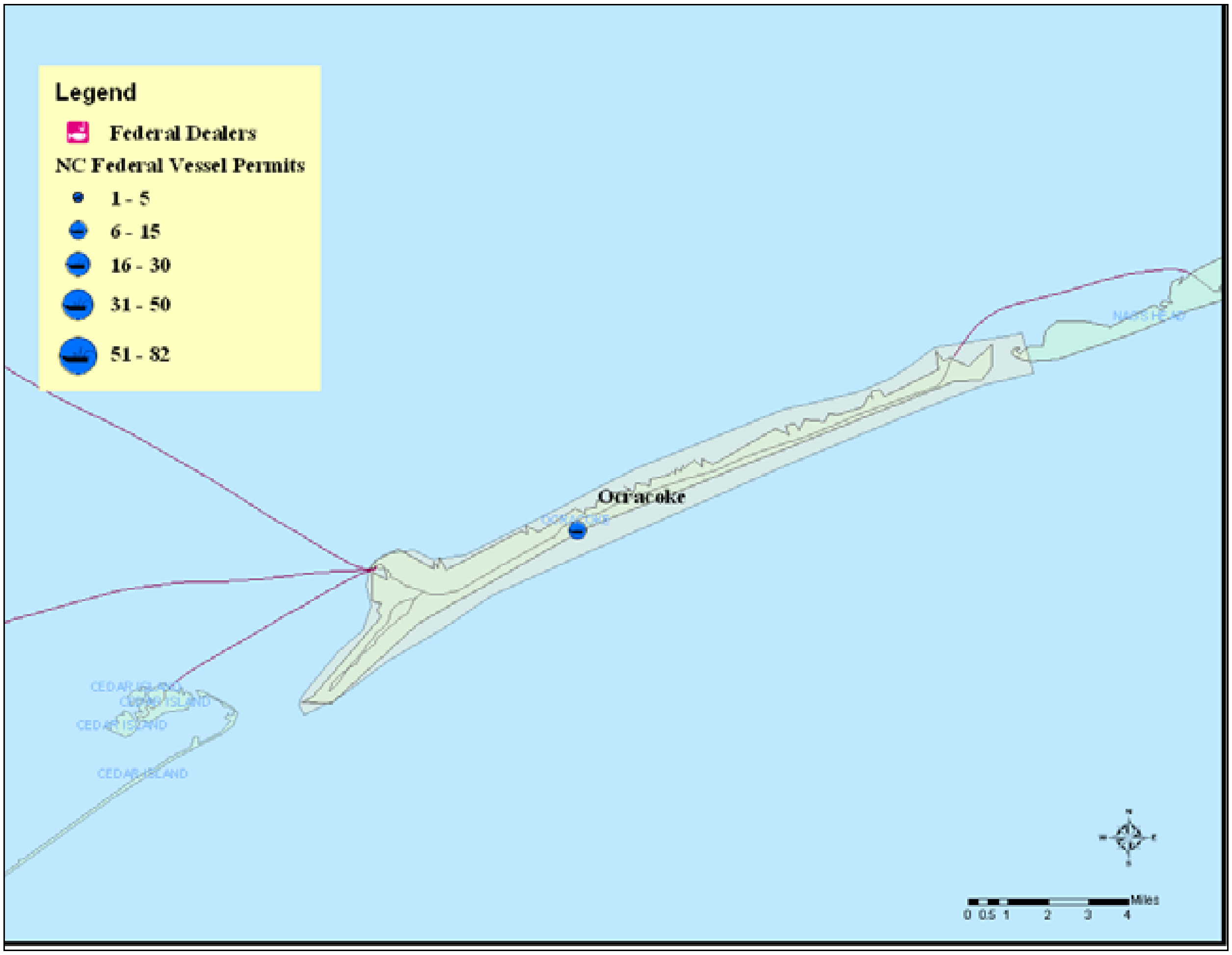


Figure 5.1.3-19. Ocracoke, North Carolina.

Ocracoke is the first island on the southern part of the outer banks. It is only accessible by ferry. Despite its being so isolated, it is rather progressive according to some, yet mostly undeveloped; much of the island consists of the state park. Most residents are year-round and there seems to be a strong sense of community among the locals. The commercial fishing industry has disappeared, though there is one small fish house with two inshore and one off-shore fisherman working there. Tourism has been growing, as has the charter industry. There are three to four offshore charter boats, four or five inshore charters and one head boat. About three offshore commercial boats homeport there, with about 20 people claiming to be commercial fishermen on the island; although many of the fishermen have two or three different jobs. The major development boom started about six years ago and since then property values have skyrocketed. There are 12 to 15 seafood restaurants in and around the community.

Many individuals in this region and along the sound fish on the beach with nets or harvest shellfish; there is one shrimp trawler on the island. Ocracoke was never considered a full-fledged commercial fishing community according to some. There was no way to get the harvest off the island other than making the long trip to the mainland. The island has always been mostly tourist oriented.

Cedar Island has historically been a fishing community according those interviewed. There are three small fish houses in the community and most vessels are small as most fish inshore primarily for shrimp, crab and flounder. Pound netting is a historic method of fishing that is still practiced here. Territory now leased from the state was once claimed by local families who would fish specific locations. Today, many fishermen also work on the ferry or dredges to supplement their income.

Ocracoke was only recently designated a census place so comparison of previous census data cannot be made. There are only 4 vessels that claim Ocracoke as homeport with federal permits (Table 5.1.3-257). Fishing related employment is also very sparse as only 12 persons are reported as working in various sectors of fishing, fish and seafood, and marinas according to 5.1.3-258. There were however 107 commercial vessels registered by the state on the island and 74 standard commercial fishing licenses (Table 5.1.3-259).

Ocracoke Census Demographics

Population

Table 5.1.3-248. Total Persons and Persons by Age category for Ocracoke, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	.		730
Persons Age 0-5	.	.		26
Persons Age 6-15	.	.		49
Persons Age 16-17	.	.		12
Persons Age 18-24	.	.		58
Persons Age 25-34	.	.		73
Persons Age 35-44	.	.		122
Persons Age 45-54	.	.		122
Persons Age 55-64	.	.		134
Persons Age 65+	.	.		134

Housing Tenure

Table 5.1.3-249. Housing Tenure for Ocracoke, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	-	18.1
Percent Owner Occupied	**1990**	**2000**
	-	81.9

Residence in 1985 and 1995

Table 5.1.3-250. Residence in 1985 and 1995 for Ocracoke, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	-	18
Same House	**1990**	**2000**
	-	492

Employment/Unemployment

Table 5.1.3-251. Employment and Unemployment for Ocracoke, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	-	54.7
Percent unemployed	-	2.0

Race

Table 5.1.3-252. Race for Ocracoke, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	.		13
Latino Black Persons	.	.		0
Latino Persons	.	.		15
White Persons	.	.		732
Latino White Persons	.	.		7

Education

Table 5.1.3-253. Years of Education by Category for those 25 Years and Older for Ocracoke, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	.	.		21
25+ w/ 9-11 years education	.	.		62
25+ w/ HS diploma	.	.		208
25+ w/ 13-15 years. education	.	.		108
25+ w/ College Degree	.	.		186
Drop outs	.	.		0

Income and Poverty

Table 5.1.3-254. Average Household Wage/Salary and Persons Below the Poverty Level for Ocracoke, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN

Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	.		34315
Poverty Level				
Persons Below Poverty Level	.	.		68
Age 65+ Below Poverty Level	.	.		14
Households with Public Assistance	.	.		20

Industry

Table 5.1.3-255. Employment by Industry for Ocracoke, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	.		13
Construction	.	.		14
Business Services	.	.		16
Communication/Utilities	.	.		7
Manufacturing	.	.		33
Financial, Insurance & Real Estate	.	.		10
Services	.	.		102
Wholesale/Retail Trade	.	.		116
Transportation		.		37

Occupation

Table 5.1.3-256. Employment by Occupation for Ocracoke, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	.		-
Clerical	.	.		-
Craft	.	.		-
Exec/Managerial	.	.		-
Farm/Fish/Forest	.	.		13
Household Services	.	.		-
Laborer/Handler	.	.		-
Operative/Transport	.	.		-
Service, except Household	.	.		-
Technical	.	.		-

Ocracoke Fishing Demographics

Table 5.1.3-257. Number of Federal Permit by Type for Ocracoke, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	8	7	4	4
Commercial King Mackerel	7	6	4	4
Commercial Spanish Mackerel	8	6	2	1
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	7	6	4	4
Charter/Headboat for Snapper Grouper	4	4	2	2
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	1	1	0	1
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	1	0	0	0

Table 5.1.3-258. Employment in Fishing Related Industry for Ocracoke, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	4
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	4
Fish and Seafood Markets	445220	0
Marinas	713930	4
Total Fishing Employment		12

Table 5.1.3-259. Number of State Permit by Type for Ocracoke, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	107
Dealer License	14
Flounder License	1
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	3
Standard Commercial Fishing License	74
Shellfish License	12
Recreational Fishing Tournament to Sell License	0
Total	211

5.1.3.21 Elizabeth City (27909)

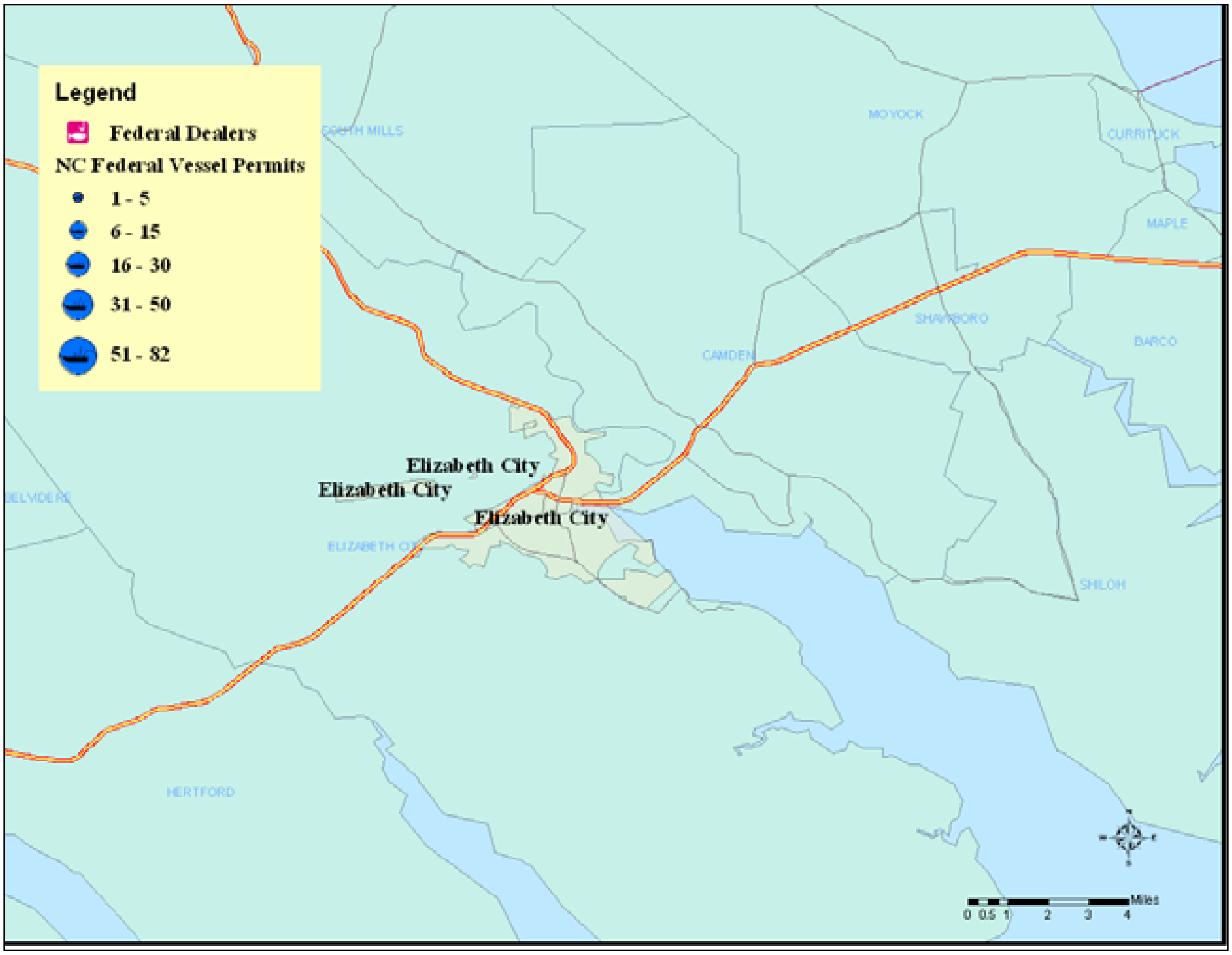


Figure 5.1.3-20. Elizabeth City, North Carolina.

Elizabeth City has seen substantial population growth in the past decade (Table 5.1.3-260) with most of the growth among African Americans (Table 5.1.3-264), but has also experienced a significant rise in unemployment (Table 5.1.3-263). The percentage of population in the work force has risen slightly as has the number of people living below the poverty line (Table 5.1.3-266). There are no federally permitted vessels that claim Elizabeth City as homeport (Table 5.1.3-269). However, there are 56 persons employed in the fish and seafood sector of fishing related employment reported in Table 5.1.3-270. There were 135 commercial vessels registered with the state and 114 standard commercial licenses reported in Table 5.1.3-271.

Elizabeth City Census Demographics

<u>Population</u>

Table 5.1.3-260. Total Persons and Persons by Age category for Elizabeth City, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	13903	14004	14279	17285
Persons Age 0-5	967	880	1316	1428
Persons Age 6-15	2769	1880	1919	2474
Persons Age 16-17	608	417	416	513
Persons Age 18-24	1488	2628	2056	2739
Persons Age 25-34	1314	1891	2165	2049
Persons Age 35-44	1451	1141	1622	2371
Persons Age 45-54	1776	1362	1082	1761
Persons Age 55-64	1505	1484	1196	1287
Persons Age 65+	1786	2131	2507	2663

Housing Tenure

Table 5.1.3-261. Housing Tenure for Elizabeth City, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	50.5	50.3
Percent Owner Occupied	**1990**	**2000**
	49.5	49.7

Residence in 1985 and 1995

Table 5.1.3-262. Residence in 1985 and 1995 for Elizabeth City, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	3021	842
Same House	**1990**	**2000**
	6487	7755

Employment/Unemployment

Table 5.1.3-263. Employment and Unemployment for Elizabeth City, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	53.0	58.2
Percent unemployed	2.9	15.4

Race

Table 5.1.3-264. Race for Elizabeth City, North Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	5274	6446	7500	9692
Latino Black Persons	21	95	5	37

Latino Persons	21	144	71	258
White Persons	8546	7448	6739	6813
Latino White Persons	0	41	61	104

Education

Table 5.1.3-265. Years of Education by Category for those 25 Years and Older for Elizabeth City, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	2919	2301	1534	896
25+ w/ 9-11 years education	1896	1555	1541	1568
25+ w/ HS diploma	1348	1634	2109	2877
25+ w/ 13-15 years. education	760	1208	1645	2240
25+ w/ College Degree	909	1311	1273	2388
Drop outs	246	142	94	162

Income and Poverty

Table 5.1.3-266. Average Household Wage/Salary and Persons Below the Poverty Level for Elizabeth City, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	$6494	$13816	$21638	$24193
Poverty Level				
Persons Below Poverty Level	3600	2721	3643	4318
Age 65+ Below Poverty Level	681	505	484	570
Households with Public Assistance	273	536	777	559

Industry

Table 5.1.3-267. Employment by Industry for Elizabeth City, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	81	88	96	136
Construction	261	351	353	425
Business Services	71	105	134	251
Communication/Utilities	197	218	155	222
Manufacturing	892	655	616	579
Financial, Insurance & Real Estate	498	455	347	229
Services	140	196	190	3085
Wholesale/Retail Trade	1821	869	1880	1294
Transportation	1148	1046	1229	141

Occupation

Table 5.1.3-268. Employment by Occupation for Elizabeth City, North Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	402	432	611	-
Clerical	656	6650	614	-
Craft	731	629	675	-
Exec/Managerial	333	518	466	-
Farm/Fish/Forest	54	95	73	65
Household Services	321	69	43	-
Laborer/Handler	270	376	294	-
Operative/Transport	644	328	302	-
Service, except Household	967	920	962	-
Technical	44	117	143	-

Elizabeth City Fishing Demographics

Table 5.1.3-269. Number of Federal Permit by Type for Elizabeth City, North Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	0	0	0	0
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.3-270. Employment in Fishing Related Industry for Elizabeth City, North Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	8
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	56
Fish and Seafood Markets	445220	0
Marinas	713930	8
Total Fishing Employment		72

Table 5.1.3-271. Number of State Permit by Type for Elizabeth City, North Carolina (Source: NCDMF 2002).

Type	Permits
Commercial Fishing Vessel Registration	135
Dealer License	13
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	6
Standard Commercial Fishing License	114
Shellfish License	3
Recreational Fishing Tournament to Sell License	0
Total	271

5.1.3.22 North Carolina Fishing Infrastructure and Community Characterization

The following tables provide a general view of the presence or absence of fishing infrastructure located within the coastal communities of North Carolina with substantial fishing activity. It should be noted that there are many other attributes that might have been included in this table, however, because of inconsistency in rapid appraisal for all communities, these items were selected as the most consistently reported or had secondary data available to determine presence or absence. It should also be noted that in some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. Table 5.1.3-272 offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 5.1.3-272. Fishing Infrastructure Table for North Carolina Potential Fishing Communities.

Community	Federal Commercial Permits (5+)	State Commercial Licenses (10+)	Federal Charter Permits (5+)	Seafood Landings	Seafood retail markets	Fish processors, Wholesale fish house	Recreational docks / marinas	Recreational Fishing Tournaments	Total
Varnamtown	-	-	-	-	+	+	+	-	3
Southport	+	+	+	+	+	+	+	+	8
Bald Head Island	-	-	-	-	-	-	+	+	2
Carolina Beach	+	+	+	+	+	-	+	+	7
Wilmington	+	+	-	+	+	+	+	+	7
Wrightsville Beach	+	+	-	+	+	+	+	+	7
Topsail Beach/Surf City	-	-	-	+	-	-	+	+	3

Sneads Ferry	+	+	-	+	+	+	+	+	7
Swansboro	+	+	+	+	+	-	+	+	7
Atlantic Beach	+	+	-	-	-	-	+	+	4
Morehead City	+	+	+	+	+	+	+	+	8
Beaufort	+	+	+	+	+	+	+	+	8
Harker's Island	+	+	-	-	-	-	+	-	3
Hatteras	+	+	+	+	+	-	+	+	7
Oriental	+	+	-	+	-	-	+	+	5
Vandemere/Mesic	-	+	-	-	+	+	+	-	4
Bath	-	+	-	-	-	-	+	-	2
Belhaven	-	+	-	-	-	+	+	-	3
Wanchese	+	+	-	+	+	+	+	-	6
Manteo	+	+	+	+	+	+	+	+	8
Ocracoke	-	+	-	-	+	+	+	-	4
Elizabeth City	-	+	-	-	+	+	+	-	4

In providing a preliminary characterization of potential fishing communities in Table 5.1.3-273 we have provided a grouping of communities that seem to have more involvement in various fishing enterprises and therefore are classified as primarily involved. These communities seem to have considerable fishing infrastructure, but also appear to have a history and culture surrounding both commercial and recreational fishing that contributes to an appearance and perception of being a fishing community in the mind of residents and others. The communities of Wilmington and Wrightsville Beach, which have considerable fishing infrastructure but are listed in secondarily involved are placed in that category largely because these two communities are located in a more metropolitan area that has a very diversified economy and while there seems to be an emphasis upon fishing, it is most likely that fishing has a small role in the overall economy and culture of the area. Others like Elizabeth City has a large processor located in the community, but may lack other components that are considered part of fishing culture or history. Many of these communities are in transition due to various social and demographic changes from coastal development, growing populations, changing regulations, etc. This preliminary characterization is just that and should not be considered a definite designation as fishing community, but a general guide for locating communities that may warrant consideration as a potential fishing community. Furthermore communities are not ranked in any particular order, this is merely a categorization.

Table 5.1.3-273. Preliminary Characterization of Potential Fishing Communities in North Carolina.

Primarily-Involved	Secondarily-Involved
Southport	Varnamtown
Carolina Beach	Bald Head Island
Sneads Ferry	Wilmington
Swansboro	Wrightsville Beach
Morehead City	Topsail Beach/Surf City
Beaufort	Atlantic Beach
Hatteras	Oriental
Wanchese	Vandemere/Mesic
Manteo	Bath

Harker's Island	Belhaven
	Ocracoke
	Elizabeth City

5.1.4 South Carolina Communities with Substantial Fishing Activity

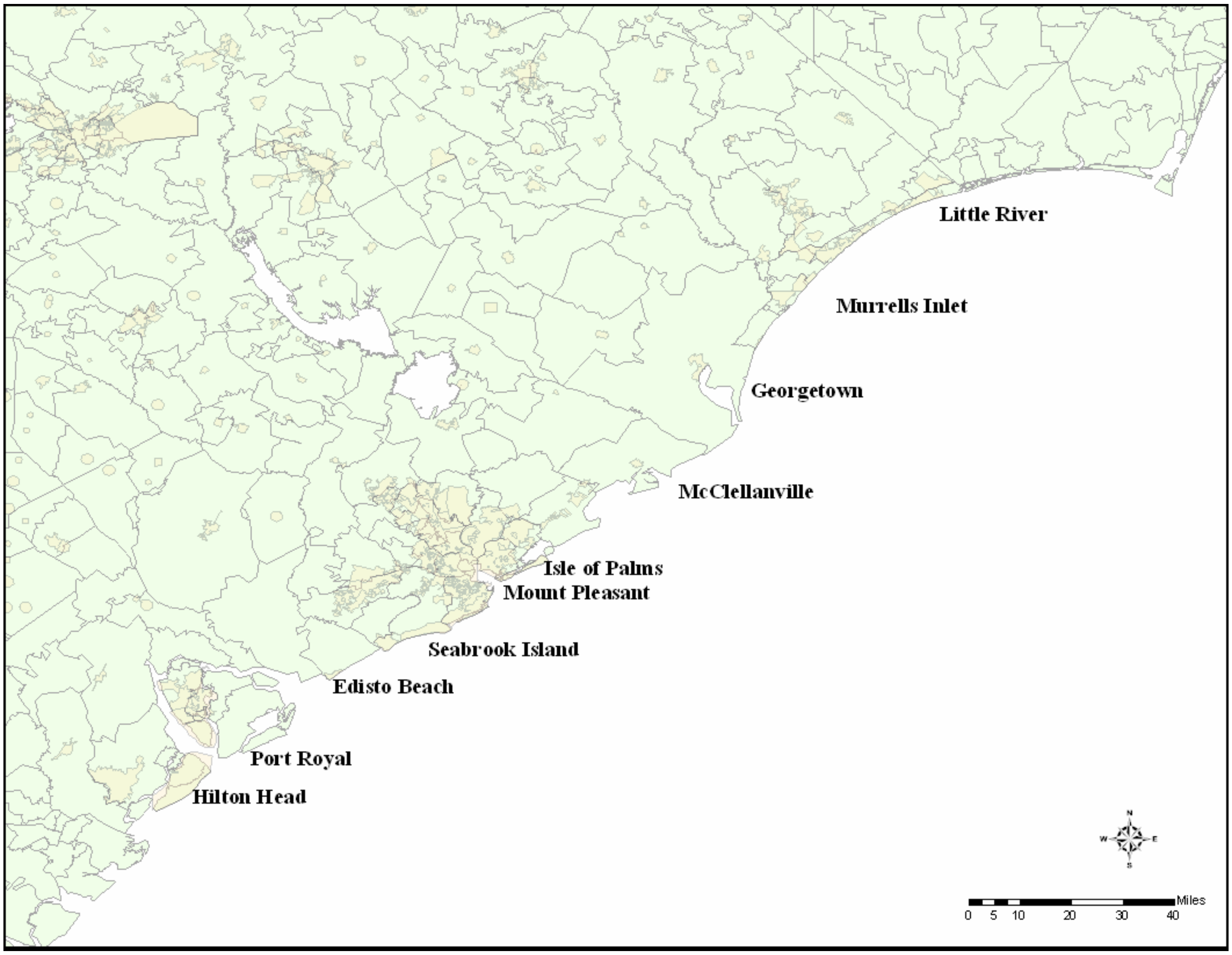


Figure 5.1.4-1. Potential Fishing Communities of South Carolina.

South Carolina landed over 14 and over 13 million pounds of seafood in 2001 and 2002 respectively. The value of those landings was over 23 million dollars in 2001 and over 20 million dollars in 2002. No South Carolina port was listed in the top 50 U.S. ports in terms of pounds landed or in terms of value of landings. According to NMFS (2002) South Carolina recreational fishermen landed over 3 million pounds of finfish in 2001 and in 2002 that number dropped to just less than 2 million pounds. There were three processors in South Carolina for 2001 with a total of 28 employees. The number of wholesale dealers was not listed in the report under South Carolina, but was combined under Inland States. In the years 2001 and 2002, South Carolina did have approximately 520 and 556 registered vessels respectively.

Since 1998, South Carolina has had a high of 132 vessels with federal permits, now down to 113 in 2001 (Table 5.1.4-1). Most vessels with federal permits had either king or Spanish mackerel with snapper grouper class 1 permits being the next most common.

Table 5.1.4-1. Number of Federal Permit by Type for South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	127	132	121	113
Commercial King Mackerel	60	68	64	65
Commercial Spanish Mackerel	47	36	15	19
Commercial Spiny Lobster	4	3	4	2
Charter/Headboat for Coastal Pelagics	36	36	33	37
Charter/Headboat for Snapper Grouper	41	41	36	44
Snapper Grouper Class 1	66	89	72	86
Snapper Grouper Class 2	11	14	8	9
Swordfish	7	3	3	2
Shark	65	21	15	19
Rock Shrimp	12	12	12	14

South Carolina requires licenses for both recreational and commercial fishing, including the sale of seafood and other marine products. The table below lists commercial licenses only (Table 5.1.4-2). The majority of South Carolina state permits are saltwater licenses and trawler licenses. The next most common are crab pots, bait dealer and shellfish licenses.

Table 5.1.4-2. Number of State Permits by Type for South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	42
Channel Net	8
Crab Pots	73
Drag Dredge	5
Gill Net	14
Hand Held Equipment	45
Herring Net	26
Mechanical Equipment	5
Miscellaneous Pots/Traps	5
Other Equipment	17
Peeler Crab Permit	19
Saltwater License	187
Seine Net	6
Shad Net	34
Shellfish Dealer	21
Shellfish License	40
Trawler License	167
Trotlines	15
Wholesale Dealer	58

Total	787

Figure 5.1.4-1 shows potential fishing communities in South Carolina. A map for each community is provided which displays federal dealers and a symbol indicating the number of federal permits by zipcode. The zipcode area name is displayed in light blue while the CDP name is in black. The symbol for permits is centered within the zipcode area and does not represent the precise location of any permit holder. Dealer permits are displayed near their physical location.

5.1.4.1 Hilton Head Island (29926, 29928)

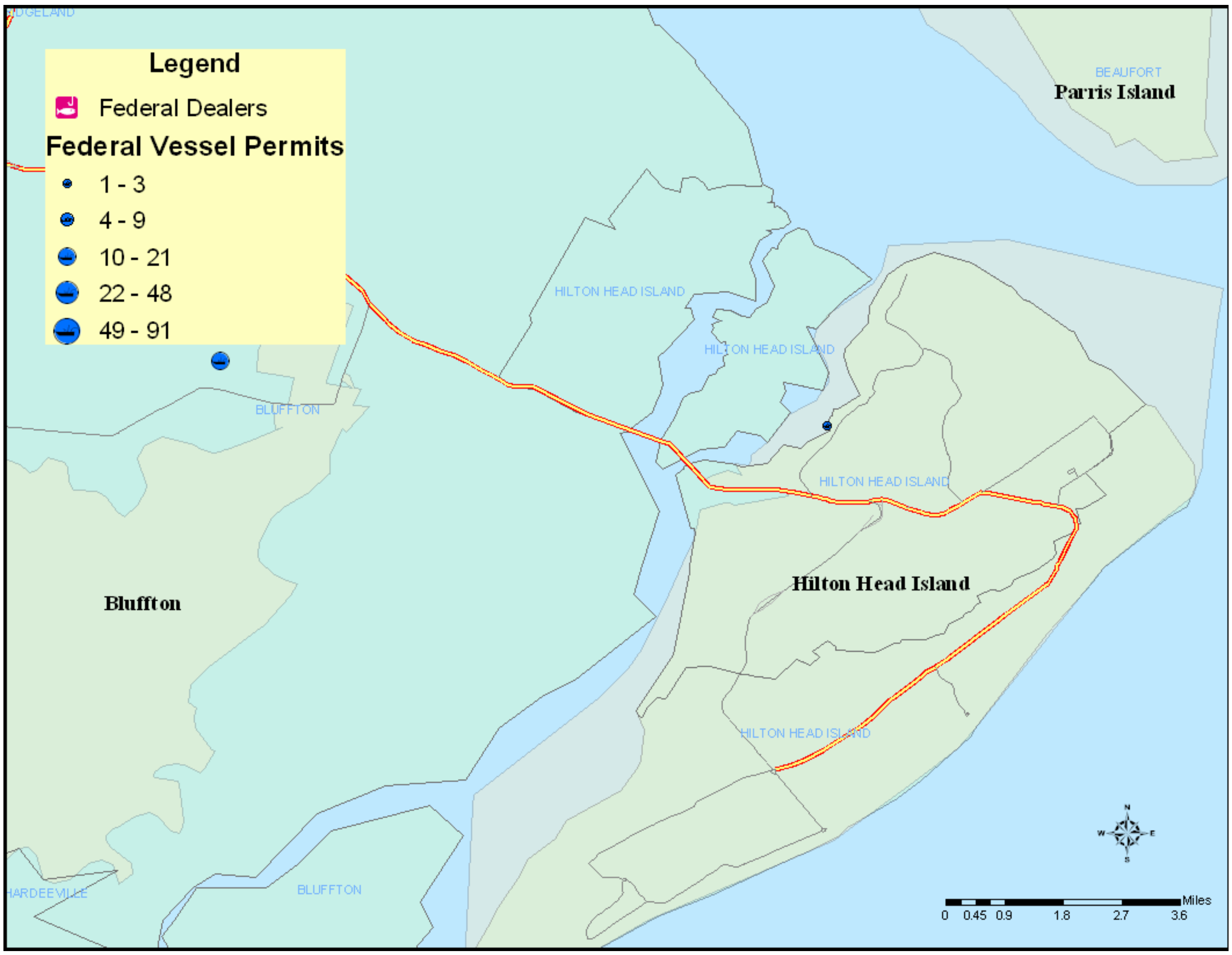


Figure 5.1.4-2. Hilton Head Island, South Carolina.

Hilton Head has seen steady population growth since 1980 and has tripled in size in 2000 (Table 5.1.4-3). While average wage and salary have also tripled over that time period and unemployment has remained low (Table 5.1.4-6), the number of people living under the poverty level has also risen noticeably (Table 5.1.4-9). There were at one time hundreds of persons employed in the farm, fish and forestry categories for occupation and industry. Recently, however, those numbers have dropped significantly (Tables 5.1.4-10 amd 5.1.3-11). There are relatively few federally permitted vessels homeported at Hilton Head (Table 5.1.4-12) and most employment in fishing related business is in marinas sector according to Table 5.1.4-13. There were 46 total state permits for Hilton Head and 22 of those were Saltwater licenses and 12 trawler licenses (Table 5.1.4-13). Nearby Bluffton had 68 state permits with 26 of those being saltwater licenses and 20 trawler licenses and 6 wholesale dealers (Table 5.1.4-15).

Hilton Head Census Demographics

Population

Table 5.1.4-3. Total Persons and Persons by Age category for Hilton Head Island, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	11344	23694	33,775
Persons Age 0-5	.	619	1636	1843
Persons Age 6-15	.	1287	2191	3328
Persons Age 16-17	.	323	419	595
Persons Age 18-24	.	1191	1845	2370
Persons Age 25-34	.	1968	4032	3986
Persons Age 35-44	.	1209	3288	2231
Persons Age 45-54	.	962	2428	4540
Persons Age 55-64	.	1885	3061	4558
Persons Age 65+	.	1782	4794	8098

Housing Tenure

Table 5.1.4-4. Housing Tenure for Hilton Head, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	35.3	22.3
Percent Owner Occupied	**1990**	**2000**
	64.7	77.7

Residence in 1985 and 1995

Table 5.1.4-5. Residence in 1985 and 1995 for Hilton Head, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	4996	5864
Same House	**1990**	**2000**
	7662	14712

Employment/Unemployment

Table 5.1.4-6. Employment and Unemployment for Hilton Head, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	61.0	55.5
Percent unemployed	2.8	1.8

Race

Table 5.1.4-7. Race for Hilton Head Island, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	1647	2318	2758
Latino Black Persons	.	10	11	39
Latino Persons	.	86	246	3886
White Persons	.	9659	21207	26752
Latino White Persons	.	76	174	2141

Education

Table 5.1.4-8. Years of Education by Category for those 25 Years and Older for Hilton Head Island, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	441	291	594
25+ w/ 9-11 years education	.	361	792	1252
25+ w/ HS diploma	.	1855	3394	4651
25+ w/ 13-15 years. education	.	1815	4533	5590
25+ w/ College Degree	.	3334	7485	13464
Drop outs	.	60	78	88

Income and Poverty

Table 5.1.4-9. Average Household Wage/Salary and Persons Below the Poverty Level for Hilton Head Island, 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$20858	$42896	$60438
Poverty Level				
Persons Below Poverty Level	.	758	1662	2442
Age 65+ Below Poverty Level	.	79	279	215
Households with Public Assistance	.	165	228	176

Industry

Table 5.1.4-10. Employment by Industry for Hilton Head Island, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	.	158	216	41
Construction	.	607	923	2459
Business Services	.	293	644	994
Communication/Utilities	.	104	236	548
Manufacturing	.	290	621	593
Financial, Insurance & Real Estate	.	85	240	1606
Services	.	681	1693	5914
Wholesale/Retail Trade	.	1139	4676	4309
Transportation	.	1335	2993	226

Occupation

Table 5.1.4-11. Employment by Occupation for Hilton Head Island, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	.	728	2477	-
Clerical	.	7870	1366	-
Craft	.	462	1076	-
Exec/Managerial	.	965	2148	-
Farm/Fish/Forest	.	114	165	58
Household Services	.	59	70	-
Laborer/Handler	.	174	216	-
Operative/Transport	.	49	200	-
Service, except Household	.	947	1921	-
Technical	.	119	295	-

Hilton Head Fishing Demographics

Table 5.1.4-12. Number of Federal Permit by Type for Hilton Head Island, South Carolina (Source: NMFS 2002).

Type of Permit	**1998**	**1999**	**2000**	**2001**
Total permitted vessels	2	2	2	3
Commercial King Mackerel	1	1	1	2
Commercial Spanish Mackerel	1	1	1	2
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	1	1	1	1
Charter/Headboat for Snapper Grouper	1	1	1	1
Snapper Grouper Class 1	1	1	1	2
Snapper Grouper Class 2	1	1	1	1
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.4-13. Employment in Fishing Related Industry for Hilton Head Island, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	3
Fish and Seafoods	422460	3
Fish and Seafood Markets	445220	0
Marinas	713930	13
Total Fishing Employment		19

Table 5.1.4-14. Number of State Permits by Type for Hilton Head, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	0
Channel Net	0
Crab Pots	5
Drag Dredge	0
Gill Net	0
Hand Held Equipment	2
Herring Net	0
Mechanical Equipment	0
Miscellaneous Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	0
Saltwater License	22
Seine Net	0
Shad Net	0
Shellfish Dealer	0
Shellfish License	1
Trawler License	12
Trotlines	0
Wholesale Dealer	4
Total	46

Table 5.1.4-15. Number of State Permits by Type for Bluffton, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	0
Channel Net	0
Crab Pots	6
Drag Dredge	0
Gill Net	0
Hand Held Equipment	4
Herring Net	0

Mechanical Equipment	0
Miscellaneous Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	0
Saltwater License	26
Seine Net	0
Shad Net	1
Shellfish Dealer	2
Shellfish License	0
Trawler License	20
Trotlines	0
Wholesale Dealer	6
Total	68

5.1.4.2 Beaufort/Port Royal (29935)

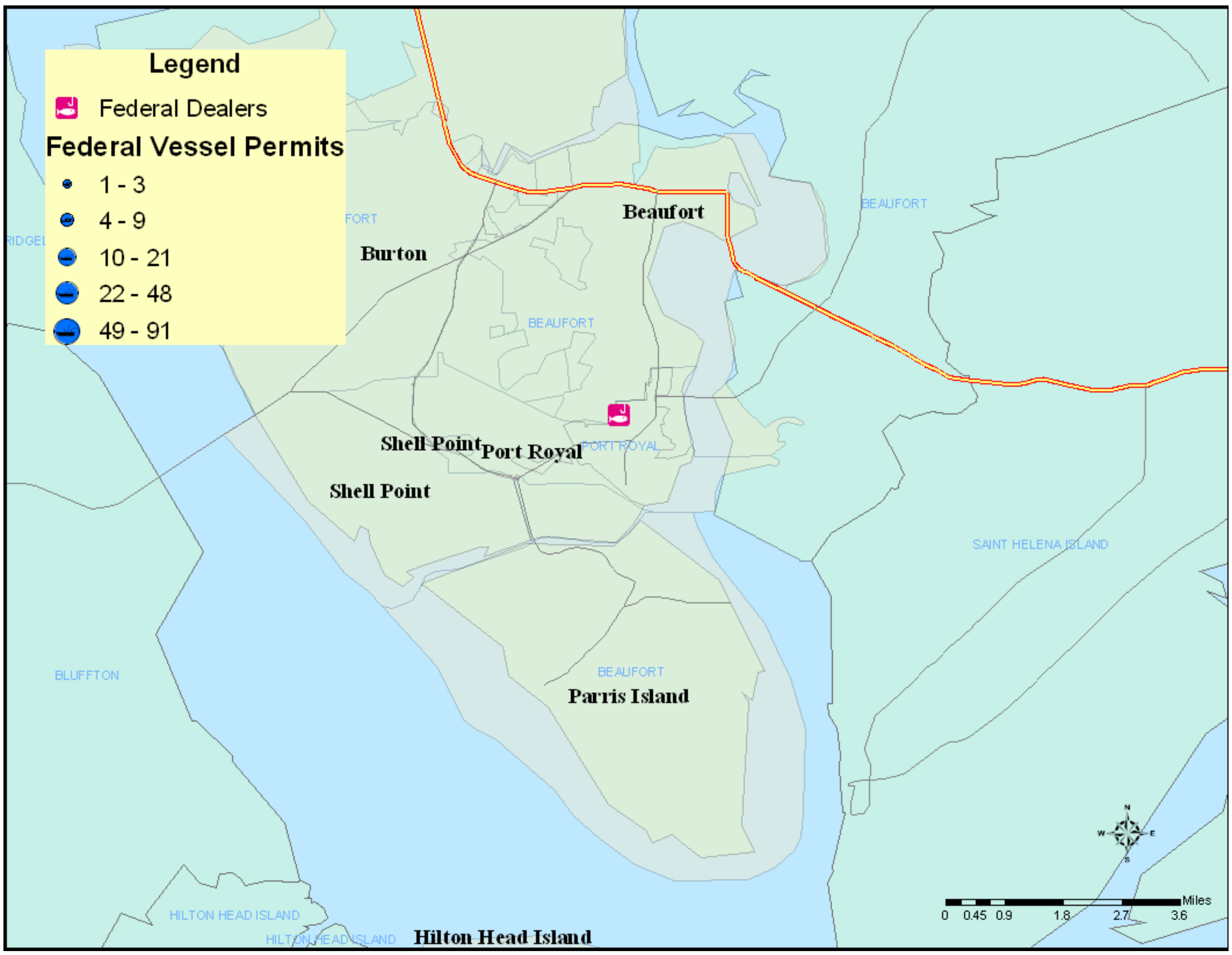


Figure 5.1.4-3. Beaufort/Port Royal, South Carolina.

Beaufort

The town of Beaufort was incorporated in 1711 and is the second oldest town in South Carolina. Both Beaufort County and the town of Beaufort were named for Henry Somerset, Duke of Beaufort (1684-1714), who was one of the Lords Proprietors of Carolina. Beaufort County was incorporated in 1785 and about 1800, it began to enter more prosperous times when rice, cotton and indigo plantations were abundant. Beaufort is the county seat and located on Port Royal Island. In 1874, the town of Port Royal was incorporated and is one of the large Sea Islands along the southeast Atlantic coast of the United States. The seaport of Beaufort is located at the head of one of the largest natural harbors on the Atlantic coast. Shrimping, fishing and crabbing are of major importance to these areas. They have been a part of their history since their settlement and the local economies continue to be dependent on them. Today, the entire area of downtown Beaufort is designated as a historic district. Every October in Port Royal there is an annual Shrimp Festival where the local maritime history is intertwined with the tourism industry. Local shrimpers share their history and recipes with tourists.

Port Royal

Port Royal has seen its population fluctuate over the past three decades and is at a high of 4,022 in 2000 (Table 5.1.4-16). The percent of unemployed persons had risen in the last decade to 9.0% (Table 5.1.4-19). Average wage and salary have also grown but persons below the poverty level has remained about the same (Table 5.1.4-22). Persons employed in farm, fish and forestry has also fluctuated over the years. Port Royal has no federally permitted vessels claiming it as homeport (Table 5.1.4-25). There are a 15 persons employed in the fish and seafood sector according to Table 5.1.4-26. There are only 7 state permits in Port Royal (Table 5.1.4-27), while in nearby St. Helena there are over 200 with 78 saltwater licenses, 46 trawler licenses and 9 wholesale dealers (Table 5.1.4-28). Beaufort which is also nearby had 156 total state licenses with 58 saltwater licenses and 28 trawler licenses (Table 5.1.5-29).

Port Royal Census Demographics

Population

Table 5.1.4-16. Total Persons and Persons by Age category for Port Royal, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	2865	3004	2985	4022
Persons Age 0-5	333	270	369	452
Persons Age 6-15	582	431	394	487
Persons Age 16-17	122	102	107	71
Persons Age 18-24	625	686	423	684
Persons Age 25-34	428	651	696	840
Persons Age 35-44	233	228	390	243
Persons Age 45-54	230	196	164	399
Persons Age 55-64	154	224	170	249
Persons Age 65+	143	185	272	370

Housing Tenure

Table 5.1.4-17. Housing Tenure for Port Royal, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	58.3	54.5
Percent Owner Occupied	**1990**	**2000**
	41.7	45.5

Residence in 1985 and 1995

Table 5.1.4-18. Residence in 1985 and 1995 for Port Royal, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	485	794
Same House	**1990**	**2000**
	968	1,285

Employment/Unemployment

Table 5.1.4-19. Employment and Unemployment for Port Royal, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	70.6	73.1
Percent unemployed	6.6	9.0

Race

Table 5.1.4-20. Race for Port Royal, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	611	860	1012	1140
Latino Black Persons	0	0	33	12
Latino Persons	21	48	111	169
White Persons	2229	2055	1899	2475
Latino White Persons	21	44	66	60

Education

Table 5.1.4-21. Years of Education by Category for those 25 Years and Older for Port Royal, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000

25+ w/ 0-8 years education	328	215	114	120
25+ w/ 9-11 years education	306	153	237	152
25+ w/ HS diploma	353	540	594	606
25+ w/ 13-15 years. education	97	249	335	679
25+ w/ College Degree	104	327	272	736
Drop outs	114	22	38	35

Income and Poverty

Table 5.1.4-22. Average Household Wage/Salary and Persons Below the Poverty Level for Port Royal, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	6132	13607	26346	36599
Poverty Level				
Persons Below Poverty Level	568	396	402	391
Age 65+ Below Poverty Level	46	54	31	69
Households with Public Assistance	20	52	123	6

Industry

Table 5.1.4-23. Employment by Industry for Port Royal, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	26	35	18	31
Construction	21	113	64	189
Business Services	39	9	48	73
Communication/Utilities	9	39	35	50
Manufacturing	84	57	123	60
Financial, Insurance & Real Estate	18	12	76	159
Services	23	71	84	865
Wholesale/Retail Trade	234	125	414	402
Transportation	182	188	321	13

Occupation

Table 5.1.4-24. Employment by Occupation for Port Royal, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	33	106	122	-
Clerical	113	1710	161	-
Craft	114	137	162	-
Exec/Managerial	60	95	161	-

Farm/Fish/Forest	0	33	10	24
Household Services	34	0	0	-
Laborer/Handler	57	45	45	-
Operative/Transport	124	14	50	-
Service, except Household	124	161	261	-
Technical	0	12	39	-

Port Royal Fishing Demographics

Table 5.1.3-25. Number of Federal Permit by Type for Port Royal, South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	1	1	0	0
Commercial King Mackerel	1	1	0	0
Commercial Spanish Mackerel	1	1	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	1	1	1	1

Table 5.1.4-26. Employment in Fishing Related Industry for Port Royal, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	15
Fish and Seafood Markets	445220	0
Marinas	713930	3
Total Fishing Employment		18

Table 5.1.4-27. Number of State Permits by Type for Port Royal, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	0
Channel Net	0
Crab Pots	1
Drag Dredge	0
Gill Net	0
Hand Held Equipment	0
Herring Net	0
Mechanical Equipment	0

Misc Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	0
Saltwater License	3
Seine Net	0
Shad Net	0
Shellfish Dealer	0
Shellfish License	0
Trawler License	3
Trotlines	0
Wholesale Dealer	0
Total	7

Table 5.1.4-28. Number of State Permits by Type for St. Helena Island, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	2
Channel Net	0
Crab Pots	33
Drag Dredge	0
Gill Net	3
Hand Held Equipment	18
Herring Net	0
Mechanical Equipment	0
Misc Pots/Traps	0
Other Equipment	1
Peeler Crab Permit	2
Saltwater License	78
Seine Net	0
Shad Net	0
Shellfish Dealer	2
Shellfish License	14
Trawler License	46
Trotlines	0
Wholesale Dealer	9
Total	208

Table 5.1.4-29. Number of State Permits by Type for Beaufort, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	4
Channel Net	0
Crab Pots	30
Drag Dredge	0
Gill Net	0
Hand Held Equipment	12
Herring Net	0
Mechanical Equipment	0
Miscellaneous Pots/Traps	0

Other Equipment	6
Peeler Crab Permit	1
Saltwater License	58
Seine Net	0
Shad Net	0
Shellfish Dealer	2
Shellfish License	7
Trawler License	28
Trotlines	2
Wholesale Dealer	6
Total	156

5.1.4.3 Edisto Beach (29438)

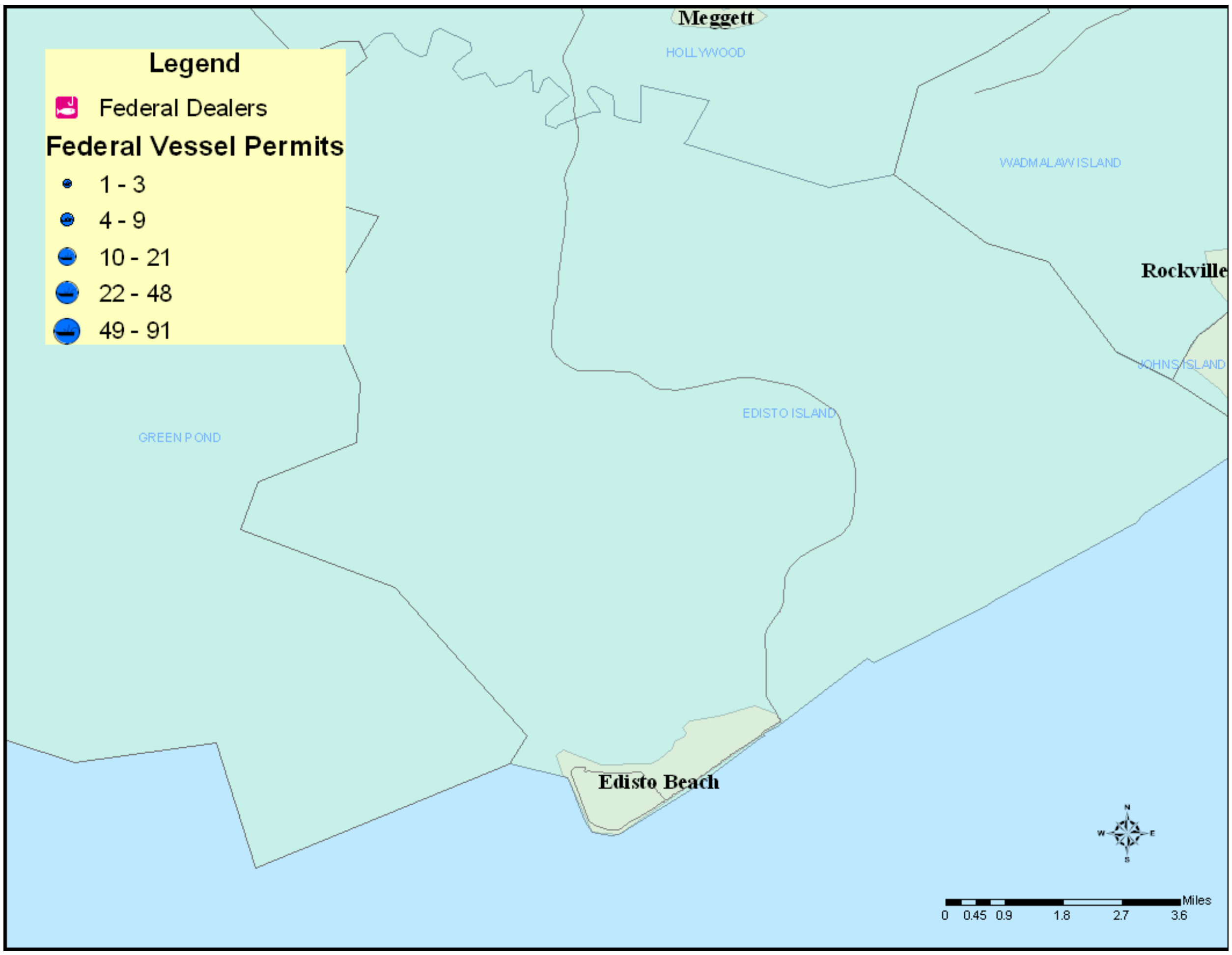


Figure 5.1.4-4. Edisto Beach, South Carolina.

Edisto Beach is a small beach community that has seen steady population growth over the past thirty years (Table 5.1.4-30). It has only about half of its population in the work force and unemployment has been and remains low (Table 5.1.4-33). Average wage and salary have jumped significantly in the last decade and the number of persons below the poverty level has risen only slightly. The number of persons employed in farm, fish and forestry has been few, but fluctuates over time. There are no federally permitted vessels homeported in Edisto Beach (Table 5.1.4-39) and only 3 persons employed in fish and seafood according to Table 5.1.3-40. There are 52 state permits in the community with 18 of those being saltwater licenses and 10 trawler licenses (Table 5.1.4-51).

Edisto Beach Census Demographics

Population

Table 5.1.4-30. Total Persons and Persons by Age category for Edisto Beach, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	182	342	649
Persons Age 0-5	.	0	4	8
Persons Age 6-15	.	17	25	28
Persons Age 16-17	.	7	3	3
Persons Age 18-24	.	16	10	38
Persons Age 25-34	.	23	26	44
Persons Age 35-44	.	20	33	28
Persons Age 45-54	.	18	27	123
Persons Age 55-64	.	39	91	144
Persons Age 65+	.	42	123	214

Housing Tenure

Table 5.1.4-31. Housing Tenure for Edisto Beach, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	15.5	14.9
Percent Owner Occupied	**1990**	**2000**
	84.5	85.1

Residence in 1985 and 1995

Table 5.1.4-32. Residence in 1985 and 1995 for Edisto Beach, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	9	67
Same House	**1990**	**2000**
	190	290

Employment/Unemployment

Table 5.1.4-33. Employment and Unemployment for Edisto Beach, North Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	40.3	47.5
Percent unemployed	0.0	2.4

Race

Table 5.1.4-34. Race for Edisto Beach, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	0	0	17
Latino Black Persons	.	0	0	1
Latino Persons	.	0	0	2
White Persons	.	182	342	613
Latino White Persons	.	0	0	0

Education

Table 5.1.4-35. Years of Education by Category for those 25 Years and Older for Edisto Beach, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	6	0	15
25+ w/ 9-11 years education	.	17	33	24
25+ w/ HS diploma	.	37	79	118
25+ w/ 13-15 years. education	.	40	67	122
25+ w/ College Degree	.	42	102	293
Drop outs	.	0	0	0

Income and Poverty

Table 5.1.4-36. Average Household Wage/Salary and Persons Below the Poverty Level for Edisto Beach, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$25443	$27617	$54444
Poverty Level				
Persons Below Poverty Level	.	0	15	23
Age 65+ Below Poverty Level	.	0	3	6
Households with Public Assistance	.	3	3	1

Industry

Table 5.1.4-37. Employment by Industry for Edisto Beach, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	.	8	2	4
Construction	.	3	4	13
Business Services	.	13	5	13
Communication/Utilities	.	3	0	6
Manufacturing	.	5	3	21
Financial, Insurance & Real Estate	.	5	0	39
Services	.	25	18	132
Wholesale/Retail Trade	.	30	51	64
Transportation	.	11	33	12

Occupation

Table 5.1.4-38. Employment by Occupation for Edisto Island, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	.	33	30	-
Clerical	.	190	23	-
Craft	.	11	10	-
Exec/Managerial	.	8	31	-
Farm/Fish/Forest	.	3	0	9
Household Services	.	0	0	-
Laborer/Handler	.	3	0	-
Operative/Transport	.	0	3	-
Service, except Household	.	11	9	-
Technical	.	0	4	-

Edisto Island Fishing Demographics

Table 5.1.4-39. Number of Federal Permit by Type for Edisto Island, South Carolina (Source: NMFS 2002).

Type of Permit	**1998**	**1999**	**2000**	**2001**
Total permitted vessels	1	0	0	0
Commercial King Mackerel	1	0	0	0
Commercial Spanish Mackerel	1	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	1	0	0	0
Charter/Headboat for Snapper Grouper	1	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0

Federal Dealers	0	0	0	0

Table 5.1.4-40. Employment in Fishing Related Industry for Edisto Island, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	3
Fish and Seafood Markets	445220	0
Marinas	713930	0
Total Fishing Employment		3

Table 5.1.4-41. Number of State Permits by Type for Edisto Island, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	1
Channel Net	0
Crab Pots	7
Drag Dredge	0
Gill Net	0
Hand Held Equipment	6
Herring Net	0
Mechanical Equipment	0
Misc Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	0
Saltwater License	18
Seine Net	0
Shad Net	0
Shellfish Dealer	2
Shellfish License	2
Trawler License	10
Trotlines	0
Wholesale Dealer	6
Total	52

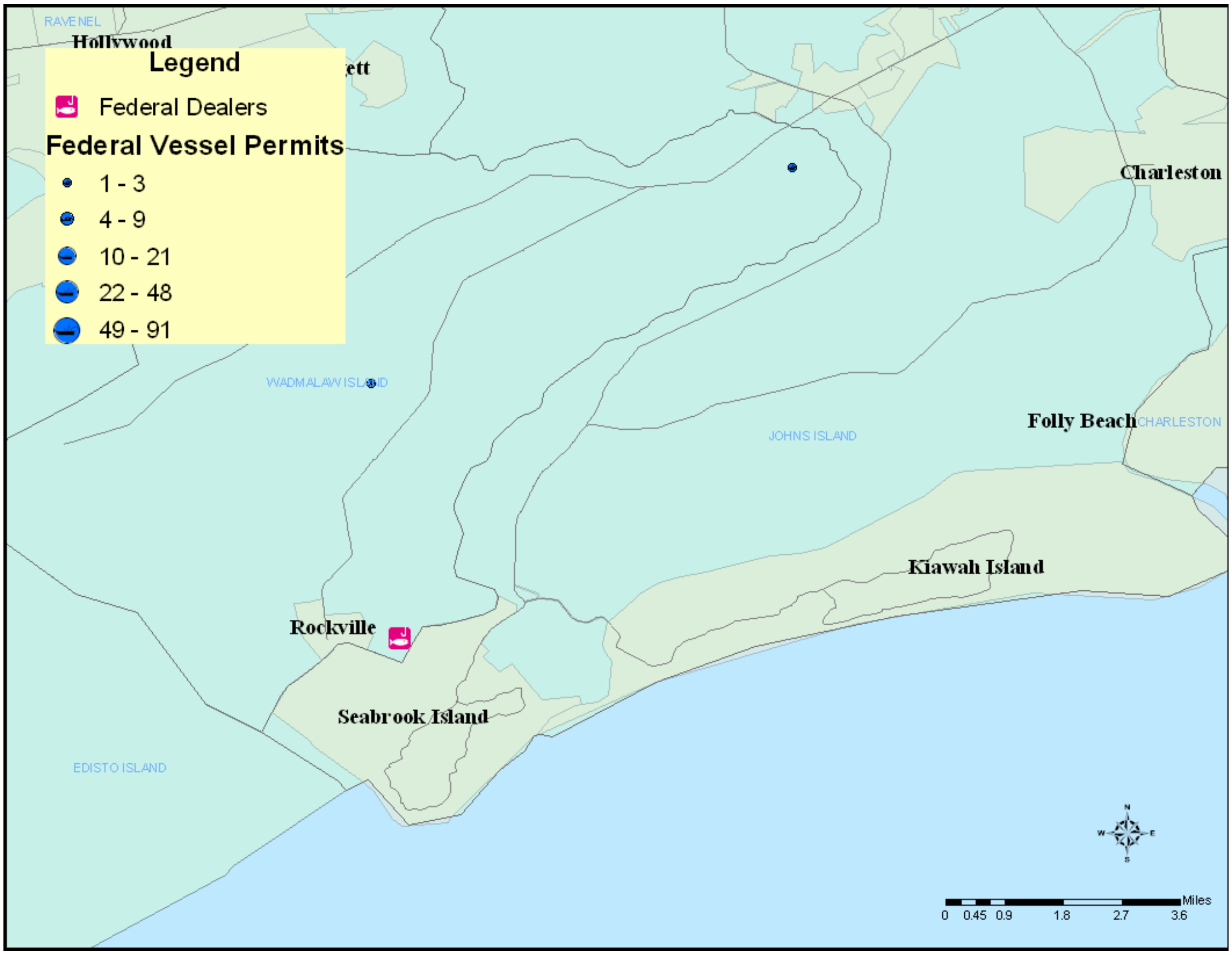


Figure 5.1.4-5. Seabrook Island, South Carolina.

Seabrook has seen some population growth since 1990 with a total population of 1203 in 2000. Most of households are owner occupied which has increased over the past ten years. Unemployment has decreased to 2.3 percent in 200 while the percent of the population in the labor force has dropped from 46.9 percent in 1990 to 40.6 percent in 2000. Average wage and salary has risen slightly while number of persons living under the poverty line has decreased. Employment in farm, fish and forestry occupation and industry has dropped over the past ten years to only 3 persons in the industry category. There is only one federally permitted vessel that claims Seabrook as a homeport (Table 5.1.4-51). All of the employment in fishing related sectors is in marinas according to (Table 5.1.4-52). There were no state permits for the community of Seabrook, but the nearby community of Wadmalaw Island did have 21 permits with 10 being saltwater licenses and 2 wholesale dealers (Table 5.1.4-53).

Seabrook Census Demographics

Population

Table 5.1.4-42. Total Persons and Persons by Age category for Seabrook Island, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	.	931	1203
Persons Age 0-5	.	.	26	24
Persons Age 6-15	.	.	77	20
Persons Age 16-17	.	.	23	13
Persons Age 18-24	.	.	43	36
Persons Age 25-34	.	.	42	80
Persons Age 35-44	.	.	79	48
Persons Age 45-54	.	.	132	197
Persons Age 55-64	.	.	189	310
Persons Age 65+	.	.	320	437

Housing Tenure

Table 5.1.4-43. Housing Tenure for Seabrook Island, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	21.5	7.9
Percent Owner Occupied	**1990**	**2000**
	78.5	92.1

Residence in 1985 and 1995

Table 5.1.4-44. Residence in 1985 and 1995 for Seabrook Island, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	112	224
Same House	**1990**	**2000**
	307	472

Employment/Unemployment

Table 5.1.4-45. Employment and Unemployment for Seabrook Island, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	46.9	40.6
Percent unemployed	6.2	2.3

Race

Table 5.1.4-46. Race for Seabrook Island, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	.	0	18
Latino Black Persons	.	.	0	0
Latino Persons	.	.	2	11
White Persons	.	.	928	1203
Latino White Persons	.	.	2	10

Education

Table 5.1.4-47. Years of Education by Category for those 25 Years and Older for Seabrook Island, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	.	8	0
25+ w/ 9-11 years education	.	.	5	6
25+ w/ HS diploma	.	.	91	137
25+ w/ 13-15 years. education	.	.	159	153
25+ w/ College Degree	.	.	432	810
Drop outs	.	.	0	4

Income and Poverty

Table 5.1.4-48. Average Household Wage/Salary and Persons Below the Poverty Level for Seabrook Island, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	.	62628	66548
Poverty Level				
Persons Below Poverty Level	.	.	31	46
Age 65+ Below Poverty Level	.	.	6	20
Households with Public Assistance	.	.	6	0

Industry

Table 5.1.4-49. Employment by Industry for Seabrook Island, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	.	9	3
Construction	.	.	16	21
Business Services	.	.	13	55
Communication/Utilities	.	.	6	10
Manufacturing	.	.	14	6
Financial, Insurance & Real Estate	.	.	7	80

Services	.	.	78	209
Wholesale/Retail Trade	.	.	107	129
Transportation	.	.	70	7

Occupation

Table 5.1.4-50. Employment by Occupation for Seabrook Island, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	.	90	-
Clerical	.	.	43	-
Craft	.	.	8	-
Exec/Managerial	.	.	99	-
Farm/Fish/Forest	.	.	14	0
Household Services	.	.	0	-
Laborer/Handler	.	.	0	-
Operative/Transport	.	.	0	-
Service, except Household	.	.	21	-
Technical	.	.	5	-

Seabrook Fishing Demographics

Table 5.1.4-51. Number of Federal Permit by Type for Seabrook Island, South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	2	1	2	1
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	2	1	2	1
Snapper Grouper Class 2	0	0	0	0
Swordfish	1	1	1	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.4-52. Employment in Fishing Related Industry for Seabrook Island, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	0

Marinas	713930	31
Total Fishing Employment		31

Table 5.1.4-53. Number of State Permits by Type for Wadmalaw Island, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	0
Channel Net	0
Crab Pots	4
Drag Dredge	0
Gill Net	0
Hand Held Equipment	0
Herring Net	0
Mechanical Equipment	0
Miscellaneous Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	0
Saltwater License	10
Seine Net	0
Shad Net	0
Shellfish Dealer	0
Shellfish License	0
Trawler License	5
Trotlines	0
Wholesale Dealer	2
Total	21

5.1.4.5 Mt. Pleasant (29464)

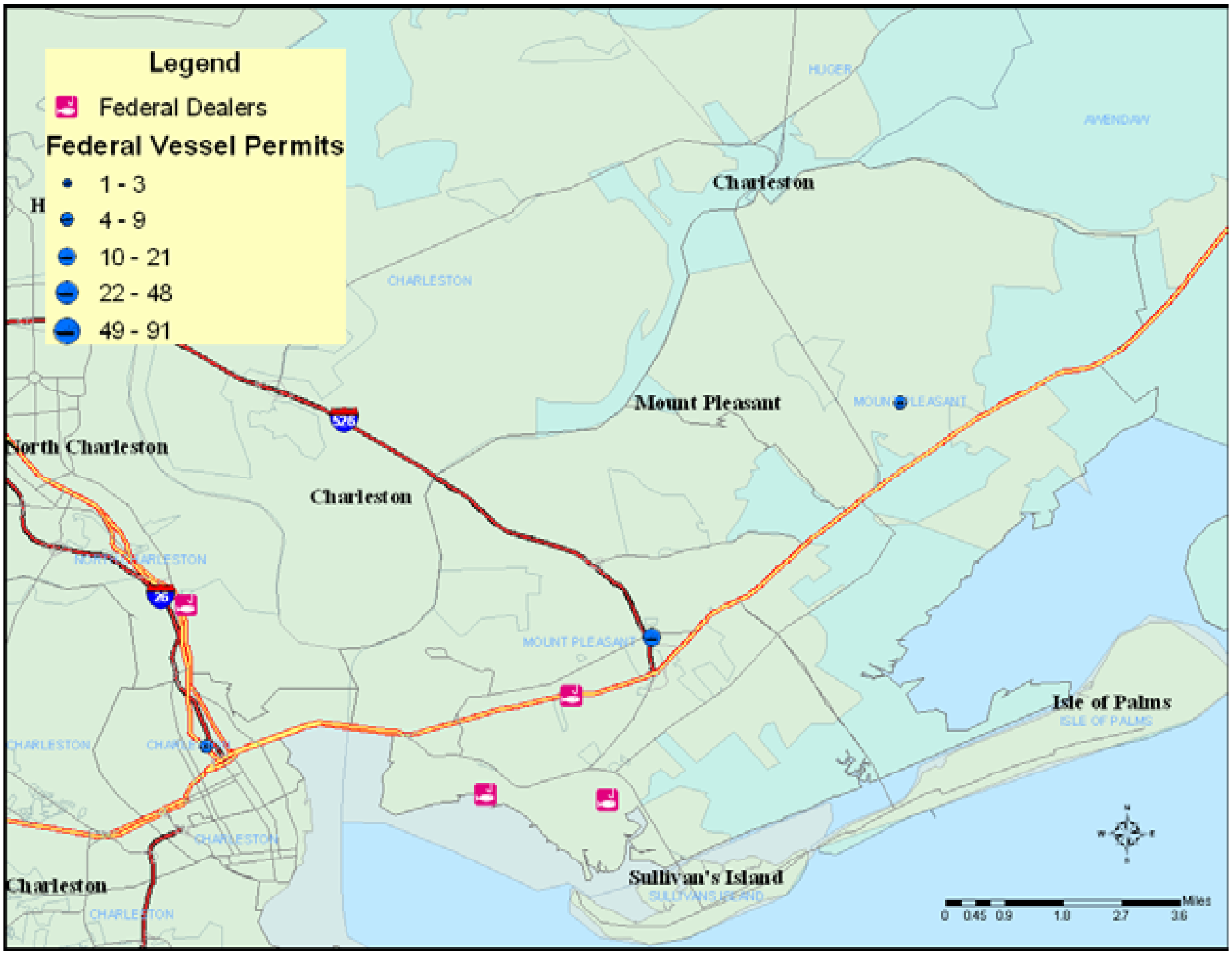


Figure 5.1.4-6. Mt. Pleasant, South Carolina.

The first inhabitants of the Mount Pleasant area were the Sewee Indians. The first English settlers arrived around 1680 under the leadership of Captain Florentia O' Sullivan. He had been granted 2,340 acres and each time a new family arrived, they were allotted several hundred acres. The first small settlement of the area was the village of Greenwich, which was adjacent to Jacob Motte's "Mount Pleasant" estate. Motte's estate was purchased in 1803 and divided into 35 large lots. In 1837, the village of Greenwich was merged with Mount Pleasant. Many of the families in this area had timber concerns and some maintained the ferries.

Mount Pleasant also played a leading role in the first major military engagement of the Revolutionary War in 1775. After the war, the area was known as a resort town with many stores and rentals available. The area is still widely known as a vacation area and "model town" in South Carolina.

Mount Pleasant has seen its population double every ten years from 1970 to 1990 and now has reached a high of 47,386 in 2000. The number of persons in the labor force has dropped slightly to 69.9 percent while percent unemployed has remained fairly low at 2.2

percent. Average wage and salary has risen substantially but so has the number of persons living below the poverty level. While there was a significant jump in the number of persons working in farm, fish and forestry in 1990, that number dropped significantly in 2000. While there are only 6 vessels with federal permits homeported in Mount Pleasant (Table 5.1.4-63), there are 12 persons listed as fishing and 28 persons employed in fish and seafood and markets (Table 5.1.4-64). There are 170 state permits in Mt. Pleasant with 57 saltwater licenses (Table 5.1.4-65). There were 23 trawler licenses and 11 wholesale dealer licenses.

Mount Pleasant Census Demographics

Population

Table 5.1.4-54. Total Persons and Persons by Age category for Mount Pleasant, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	6172	13838	30108	47386
Persons Age 0-5	513	1089	2706	4309
Persons Age 6-15	1473	2183	4060	6499
Persons Age 16-17	266	489	571	1061
Persons Age 18-24	594	1479	2704	3087
Persons Age 25-34	809	3267	6690	7757
Persons Age 35-44	805	1862	5872	4676
Persons Age 45-54	771	1179	2690	7122
Persons Age 55-64	447	1241	2039	3935
Persons Age 65+	384	861	2776	4773

Housing Tenure

Table 5.1.4-55. Housing Tenure for Mount Pleasant, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	37.9	26.0
Percent Owner Occupied	**1990**	**2000**
	62.1	74.0

Residence in 1985 and 1995

Table 5.1.4-56. Residence in 1985 and 1995 for Mount Pleasant, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	8729	11501
Same House	**1990**	**2000**
	10092	18087

Employment/Unemployment

Table 5.1.4-57. Employment and Unemployment for Mount Pleasant, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	74.5	69.9
Percent unemployed	2.0	2.2

Race

Table 5.1.4-58. Race for Mount Pleasant, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	779	991	2754	3445
Latino Black Persons	0	0	17	8
Latino Persons	40	124	373	635
White Persons	5389	12723	27096	42515
Latino White Persons	40	124	335	413

Education

Table 5.1.4-59. Years of Education by Category for those 25 Years and Older for Mount Pleasant, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	494	611	630	453
25+ w/ 9-11 years education	555	865	1325	1408
25+ w/ HS diploma	1181	2037	3549	4571
25+ w/ 13-15 years. education	545	1923	4596	6386
25+ w/ College Degree	441	2974	8378	19537
Drop outs	98	60	69	75

Income and Poverty

Table 5.1.4-60. Average Household Wage/Salary and Persons Below the Poverty Level for Mount Pleasant, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$10501	$22344	$41109	$61054
Poverty Level				
Persons Below Poverty Level	660	925	1724	2335
Age 65+ Below Poverty Level	73	116	207	277
Households with Public Assistance	66	143	330	154

Industry

Table 5.1.4-61. Employment by Industry for Mount Pleasant, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	14	60	245	81
Construction	187	418	1400	1565
Business Services	21	187	607	2189
Communication/Utilities	159	244	394	681
Manufacturing	468	933	1549	1816
Financial, Insurance & Real Estate	372	569	932	2025
Services	138	507	1436	15121
Wholesale/Retail Trade	526	1350	6669	5534
Transportation	509	1383	3208	1008

Occupation

Table 5.1.4-62. Employment by Occupation for Mount Pleasant, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	213	843	2703	-
Clerical	452	12500	2043	-
Craft	449	659	1543	-
Exec/Managerial	284	1006	2910	-
Farm/Fish/Forest	0	81	162	72
Household Services	36	105	54	-
Laborer/Handler	40	187	351	-
Operative/Transport	182	235	323	-
Service, except Household	186	600	1394	-
Technical	19	400	853	-

Mount Pleasant Fishing Demographics

Table 5.1.4-63. Number of Federal Permit by Type for Mount Pleasant, South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	7	8	8	6
Commercial King Mackerel	2	4	4	3
Commercial Spanish Mackerel	2	3	2	1
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	2	2	2	2
Charter/Headboat for Snapper Grouper	2	2	3	2
Snapper Grouper Class 1	1	3	1	2
Snapper Grouper Class 2	1	2	1	1

Swordfish	0	0	0	0
Shark	0	1	1	1
Rock Shrimp	3	2	2	2
Federal Dealers	5	4	4	3

Table 5.1.4-64. Employment in Fishing Related Industry for Mount Pleasant, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	12
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	7
Fish and Seafoods	422460	10
Fish and Seafood Markets	445220	18
Marinas	713930	17
Total Fishing Employment		64

Table 5.1.4-65. Number of State Permits by Type for Mount Pleasant, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	3
Channel Net	0
Crab Pots	24
Drag Dredge	0
Gill Net	0
Hand Held Equipment	19
Herring Net	1
Mechanical Equipment	2
Miscellaneous Pots/Traps	1
Other Equipment	1
Peeler Crab Permit	1
Saltwater License	57
Seine Net	0
Shad Net	1
Shellfish Dealer	2
Shellfish License	15
Trawler License	23
Trotlines	1
Wholesale Dealer	11
Total	170

5.1.4.6 Isle of Palms (29451)

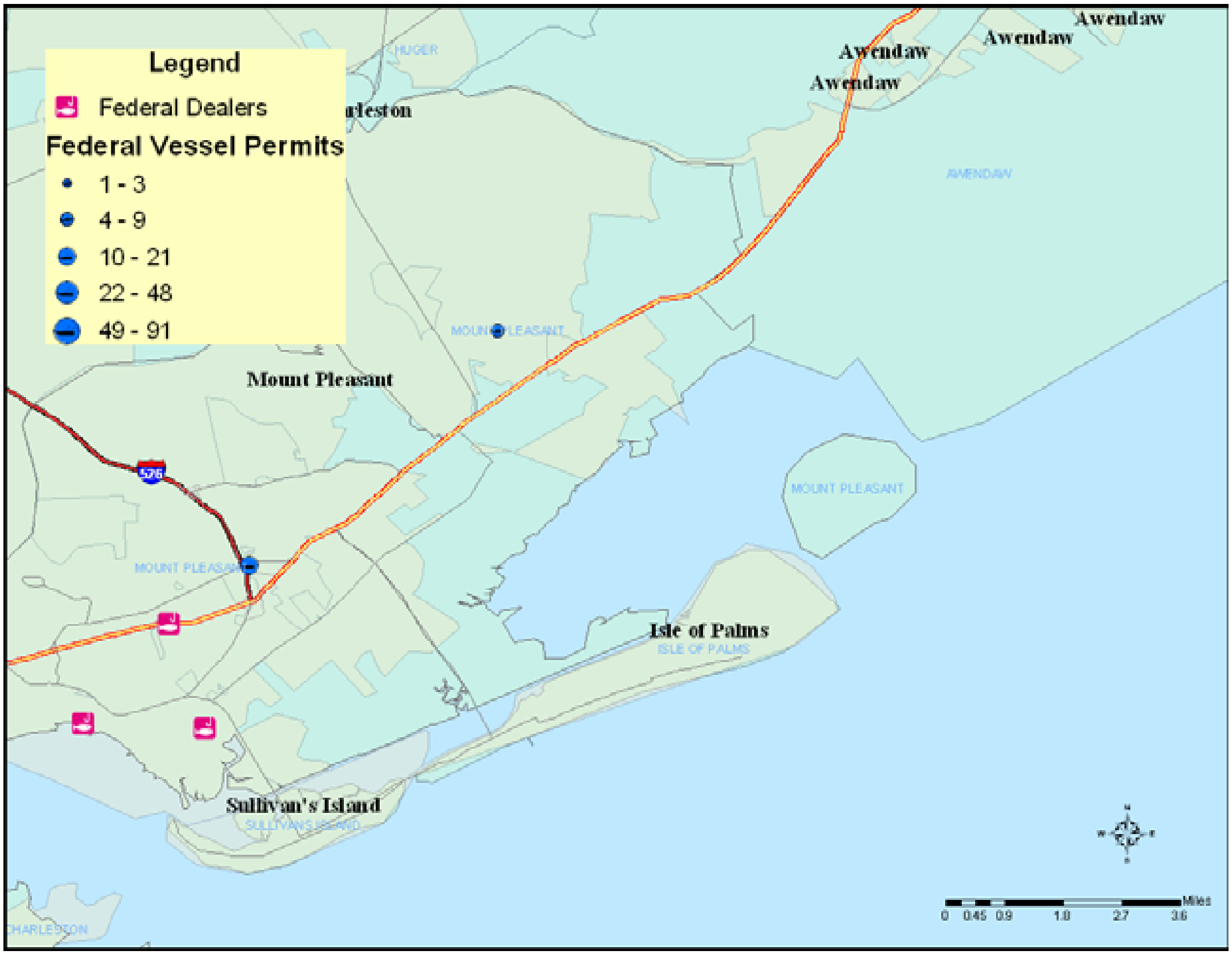


Figure 5.1.4-7. Isle of Palms, South Carolina.

Isle of Palms has seen little population growth over the past several decades. The percent of the population in the labor force has dropped slightly to 63.1 percent and unemployment is down to 1.3 percent in 2000. Average wage and salary has almost doubled every ten years since 1970 to a high of $76,170 in 2000. The number of persons below the poverty level dropped dramatically in 1990 but has since risen to 156. The number of persons in farm, fish, and forestry occupations and the industry has dropped steadily over the years. There are no vessels with federal permits that call Isle of Palms homeport (Table 5.1.4-75) most all employment in fishing related businesses is in marinas with 18 and 3 persons in fish and seafood markets. There were a total of 20 state permits according to (Table 5.1.4-77) and 7 of those were saltwater licenses and 6 were shellfish.

Isle of Palms Census Demographics

Population

Table 5.1.4-66. Total Persons and Persons by Age category for Isle of Palms, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	2657	3421	3682	4583
Persons Age 0-5	268	165	203	264
Persons Age 6-15	653	489	450	499
Persons Age 16-17	57	118	102	114
Persons Age 18-24	270	419	223	231
Persons Age 25-34	547	765	476	489
Persons Age 35-44	263	466	735	364
Persons Age 45-54	337	339	572	907
Persons Age 55-64	122	382	468	696
Persons Age 65+	82	244	453	698

Housing Tenure

Table 5.1.4-67. Housing Tenure for Isle of Palms, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	20.9	19.3
Percent Owner Occupied	**1990**	**2000**
	70.6	80.7

Residence in 1985 and 1995

Table 5.1.4-68. Residence in 1985 and 1995 for Isle of Palms, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	802	809
Same House	**1990**	**2000**
	1520	2214

Employment/Unemployment

Table 5.1.4-69. Employment and Unemployment for Isle of Palms, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	72.2	63.1
Percent unemployed	4.6	1.3

Race

Table 5.1.4-70. Race for Isle of Palms, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	0	0	0	16
Latino Black Persons	0	0	0	0
Latino Persons	0	24	11	55
White Persons	2657	3416	3671	4458
Latino White Persons	0	19	11	44

Education

Table 5.1.4-71. Years of Education by Category for those 25 Years and Older for Isle of Palms, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	95	72	38	17
25+ w/ 9-11 years education	231	155	178	91
25+ w/ HS diploma	454	594	479	363
25+ w/ 13-15 years. education	311	547	656	720
25+ w/ College Degree	260	828	1155	2284
Drop outs	43	7	0	0

Income and Poverty

Table 5.1.4-72. Average Household Wage/Salary and Persons Below the Poverty Level for Isle of Palms, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$10772	$21527	$40083	$76170
Poverty Level				
Persons Below Poverty Level	199	250	76	156
Age 65+ Below Poverty Level	20	18	0	7
Households with Public Assistance	12	16	12	17

Industry

Table 5.1.4-73. Employment by Industry for Isle of Palms, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	8	11	8	2
Construction	80	137	254	195
Business Services	43	61	95	208
Communication/Utilities	66	82	127	73
Manufacturing	282	209	170	161
Financial, Insurance & Real Estate	212	144	131	259

Services	63	108	188	1350
Wholesale/Retail Trade	307	324	762	507
Transportation	185	343	359	54

Occupation

Table 5.1.4-74. Employment by Occupation for Isle of Palms, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	111	228	413	-
Clerical	244	2800	210	-
Craft	155	220	239	-
Exec/Managerial	135	232	432	-
Farm/Fish/Forest	4	11	26	0
Household Services	0	0	0	-
Laborer/Handler	11	45	54	-
Operative/Transport	50	18	10	-
Service, except Household	81	151	132	-
Technical	42	72	66	-

Isle of Palms Fishing Demographics

Table 5.1.4-75. Number of Federal Permit by Type for Isle of Palms, South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	0	0	0	0
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.4-76. Employment in Fishing Related Industry for Isle of Palms, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	3

Marinas	713930	18
Total Fishing Employment		21

Table 5.1.4-77. Number of State Permits by Type for Isle of Palms, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	0
Channel Net	0
Crab Pots	0
Drag Dredge	0
Gill Net	0
Hand Held Equipment	6
Herring Net	0
Mechanical Equipment	0
Miscellaneous Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	0
Saltwater License	7
Seine Net	0
Shad Net	0
Shellfish Dealer	0
Shellfish License	6
Trawler License	1
Trotlines	0
Wholesale Dealer	0
Total	20

5.1.4.7 McClellanville (29458)

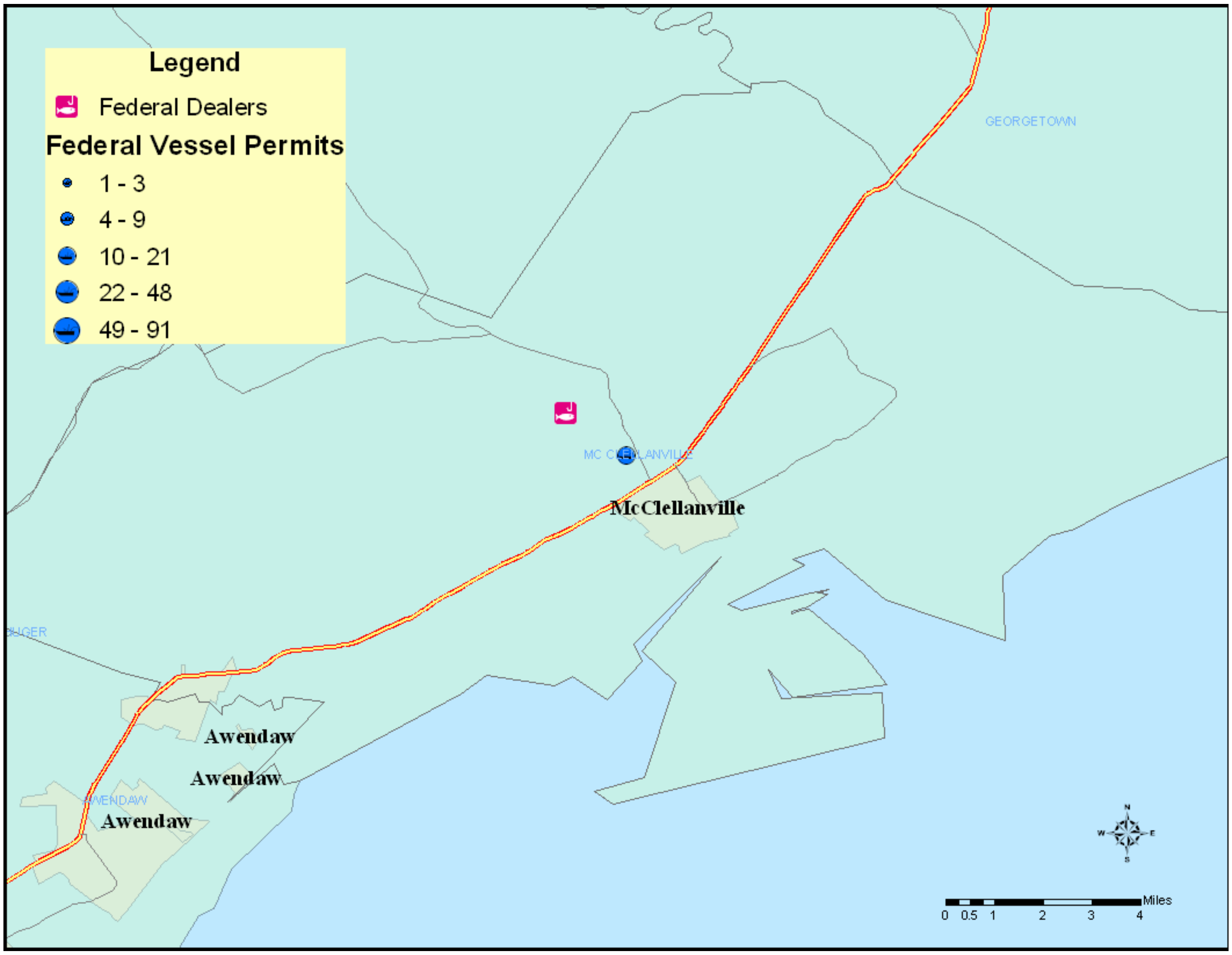


Figure 5.1.4-8. McClellanville, South Carolina.

The population of McClellanville dropped in the 1990 census but has since increased again in 2000 to 459. The percent of the population that is unemployed has remained very low while the percent of population in the work force has dropped from 64.3 percent to 56.9. Average wage and salary have grown, but so has the number of persons living below the poverty level. The number of persons employed in farm, fish, and forestry occupations has remained fairly constant over the past three decades. There are 4 vessels with federal permits homeported in McClellanville and all four have rock shrimp permits (Table 5.1.4-87). All employment in fishing related business is in fish and seafood according to (Table 5.1.4-88). There are 133 state permits in McClellanville, with 52 of those being saltwater licenses (Table 5.1.4-89). There are 27 trawler licenses, 16 handheld equipment licenses and 5 wholesale dealer licenses.

McClellanville Census Demographics

<u>Population</u>

Table 5.1.4-78. Total Persons and Persons by Age category for McClellanville, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	441	364	459
Persons Age 0-5	.	55	17	21
Persons Age 6-15	.	54	81	55
Persons Age 16-17	.	11	11	13
Persons Age 18-24	.	25	15	29
Persons Age 25-34	.	83	54	43
Persons Age 35-44	.	52	74	22
Persons Age 45-54	.	34	23	119
Persons Age 55-64	.	56	34	64
Persons Age 65+	.	70	55	70

Housing Tenure

Table 5.1.4-79. Housing Tenure for McClellanville, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	12.2	19.9
Percent Owner Occupied	**1990**	**2000**
	87.8	80.1

Residence in 1985 and 1995

Table 5.1.4-80. Residence in 1985 and 1995 for McClellanville, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	62	65
Same House	**1990**	**2000**
	258	309

Employment/Unemployment

Table 5.1.4-81. Employment and Unemployment for McClellanville, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	64.3	56.9
Percent unemployed	1.8	0.9

Race

Table 5.1.4-82. Race for McClellanville, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	60	26	34
Latino Black Persons	.	0	0	0
Latino Persons	.	3	0	10
White Persons	.	381	338	415
Latino White Persons	.	3	0	10

Education

Table 5.1.4-83. Years of Education by Category for those 25 Years and Older for McClellanville, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	37	16	19
25+ w/ 9-11 years education	.	32	26	32
25+ w/ HS diploma	.	69	53	59
25+ w/ 13-15 years. education	.	68	44	92
25+ w/ College Degree	.	89	81	139
Drop outs	.	2	3	0

Income and Poverty

Table 5.1.4-84. Average Household Wage/Salary and Persons Below the Poverty Level for McClellanville, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$17490	$26388	$42500
Poverty Level				
Persons Below Poverty Level	.	32	45	54
Age 65+ Below Poverty Level	.	12	6	6
Households with Public Assistance	.	5	7	4

Industry

Table 5.1.4-85. Employment by Industry for McClellanville, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	34	30	27
Construction	.	27	22	33
Business Services	.	0	2	13
Communication/Utilities	.	8	5	1
Manufacturing	.	11	6	8
Financial, Insurance & Real Estate	.	7	3	7

Services	.	0	4	135
Wholesale/Retail Trade	.	12	51	28
Transportation	.	35	29	6

Occupation

Table 5.1.4-86. Employment by Occupation for McClellanville, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	7	15	-
Clerical	.	190	23	-
Craft	.	33	24	-
Exec/Managerial	.	23	9	-
Farm/Fish/Forest	.	26	24	24
Household Services	.	0	0	-
Laborer/Handler	.	9	7	-
Operative/Transport	.	0	8	-
Service, except Household	.	17	4	-
Technical	.	3	2	-

McClellanville Fishing Demographics

Table 5.1.4-87. Number of Federal Permit by Type for McClellanville, South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	5	6	4	4
Commercial King Mackerel	2	2	2	2
Commercial Spanish Mackerel	3	4	2	2
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	3	4	1	2
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	1	0	1
Rock Shrimp	3	4	3	4
Federal Dealers	1	1	1	1

Table 5.1.4-88. Employment in Fishing Related Industry for McClellanville, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	50
Fish and Seafood Markets	445220	0

Marinas	713930	0
Total Fishing Employment		50

Table 5.1.4-89. Number of State Permits by Type for McClellanville, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	2
Channel Net	0
Crab Pots	5
Drag Dredge	0
Gill Net	0
Hand Held Equipment	16
Herring Net	0
Mechanical Equipment	4
Miscellaneous Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	1
Saltwater License	52
Seine Net	0
Shad Net	0
Shellfish Dealer	3
Shellfish License	7
Trawler License	27
Trotlines	0
Wholesale Dealer	5
Total	133

5.1.4.8 Georgetown (29440)

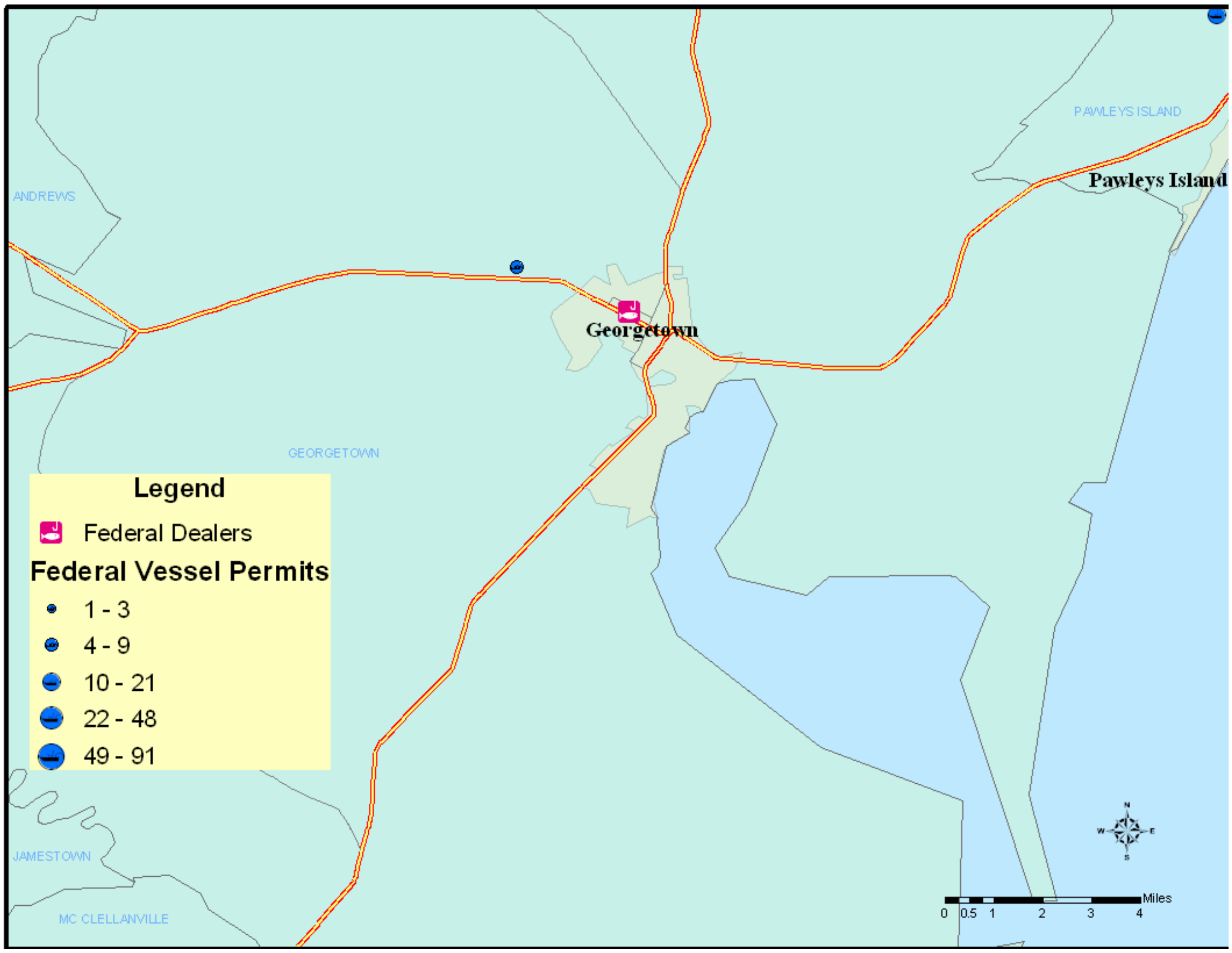


Figure 5.1.4-9. Georgetown, South Carolina.

Georgetown is South Carolina's third oldest city, following Charleston and Beaufort. The town became a busy seaport by 1729 as the import and export of cargo created wealth for the town, as well as targets for the pirates who were hiding out in the bays of the barrier islands. Many of the local stores in the area sold naval materials and uniforms. The indigo plant, of which the blue dye was derived from, grew along the coastal plains. An aristocratic society of plantation owners was established and they formed the "Winyah Indigo Society". However as the price of the dye fell from overseas markets, local planters began cultivating rice instead. The original rice seeds were brought in from Madagascar to the port of Charleston around 1680. Grocers in England were said to praise the "Carolina Gold" rice above all other rice. Rice even was used as a replacement for money, being accepted as payment for taxes. However with the Emancipation Proclamation and destructive hurricanes, the last commercial rice harvest in Georgetown County was in 1919. The area then turned to lumber production. In 1936, the International Paper Company built a plant in Georgetown. By 1942, this plant became the largest craft paper mill in the world. Commercial fishing and tourism are now significant industries in the area that contribute greatly to its economic well-being.

Georgetown's population has been declining from 1980 when it was 10,144 until 2000 where it dropped to 8,934. Georgetown's population is predominantly African-American and has approximately 56 percent of its population in the labor force. The unemployment rate has gone down since 1990 to 7.8 percent. Average wage and salary have grown slightly over the past 30 years, but the number of people living below the poverty level has dropped little. As is the case for most communities the number of persons employed in farm, fish and forestry has seen a steady decline. There are five vessels with federal permits homeported in Georgetown (Table 5.1.4-99) and most fishing related employment is in boat building (Table 5.1.4-100). There are 8 persons reported as working in fish and seafood and markets also. With little fishing employment evident elsewhere, it is surprising to see over 350 state permits issued for Georgetown residents. Over 140 of those permits were for saltwater licenses and 50 were trawler permits. There are 13 wholesale dealer licenses in the community as well as, 64 crab pot permits and 27 channel net (Table 5.1.4-101).

Georgetown Census Demographics

Population

Table 5.1.4-90. Total Persons and Persons by Age category for Georgetown, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	10144	9517	8934
Persons Age 0-5	.	812	909	735
Persons Age 6-15	.	1763	1652	1496
Persons Age 16-17	.	362	358	299
Persons Age 18-24	.	1162	810	745
Persons Age 25-34	.	1458	1374	1101
Persons Age 35-44	.	940	1289	646
Persons Age 45-54	.	1052	753	1151
Persons Age 55-64	.	1058	816	701
Persons Age 65+	.	1362	1556	1515

Housing Tenure

Table 5.1.4-91. Housing Tenure for Georgetown, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	37.5	38.3
Percent Owner Occupied	**1990**	**2000**
	62.5	61.7

Residence in 1985 and 1995

Table 5.1.4-92. Residence in 1985 and 1995 for Georgetown, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	2,174	2,129
Same House	**1990**	**2000**
	5,222	4,900

Employment/Unemployment

Table 5.1.4-93. Employment and Unemployment for Georgetown, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	57.6	56.3
Percent unemployed	9.4	7.8

Race

Table 5.1.4-94. Race for Georgetown, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	4729	5111	5078
Latino Black Persons	.	85	23	26
Latino Persons	.	96	49	168
White Persons	.	5386	4307	3611
Latino White Persons	.	11	8	58

Education

Table 5.1.4-95. Years of Education by Category for those 25 Years and Older for Georgetown, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	.	1489	917	534
25+ w/ 9-11 years education	.	1303	1188	1077
25+ w/ HS diploma	.	1495	1596	1676
25+ w/ 13-15 years. education	.	809	853	1062
25+ w/ College Degree	.	774	907	1178
Drop outs	.	85	118	132

Income and Poverty

Table 5.1.4-96. Average Household Wage/Salary and Persons Below the Poverty Level for Georgetown, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN

Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$14727	$26608	$29424
Poverty Level				
Persons Below Poverty Level	.	2644	2756	2087
Age 65+ Below Poverty Level	.	359	388	223
Households with Public Assistance	.	445	465	124

Industry

Table 5.1.4-97. Employment by Industry for Georgetown, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	141	117	61
Construction	.	337	242	251
Business Services	.	61	106	98
Communication/Utilities	.	62	86	80
Manufacturing	.	794	760	669
Financial, Insurance & Real Estate	.	295	371	216
Services	.	161	148	1431
Wholesale/Retail Trade	.	739	1144	973
Transportation	.	707	846	90

Occupation

Table 5.1.4-98. Employment by Occupation for Georgetown, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	317	510	-
Clerical	.	6230	380	-
Craft	.	436	360	-
Exec/Managerial	.	319	315	-
Farm/Fish/Forest	.	55	65	53
Household Services	.	48	25	-
Laborer/Handler	.	255	178	-
Operative/Transport	.	343	458	-
Service, except Household	.	759	681	-
Technical	.	128	77	-

Georgetown Fishing Demographics

Table 5.1.4-99. Number of Federal Permit by Type for Georgetown, South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	5	6	4	5
Commercial King Mackerel	4	5	4	5
Commercial Spanish Mackerel	2	1	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	1	1	2	2
Charter/Headboat for Snapper Grouper	1	1	2	2
Snapper Grouper Class 1	4	5	2	5
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	2	1	2
Rock Shrimp	0	0	0	0
Federal Dealers	0	1	1	1

Table 5.1.4-100. Employment in Fishing Related Industry for Georgetown, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	16
Fish and Seafoods	422460	4
Fish and Seafood Markets	445220	4
Marinas	713930	16
Total Fishing Employment		40

Table 5.1.4-101. Number of State Permits by Type for Georgetown, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	2
Channel Net	27
Crab Pots	64
Drag Dredge	0
Gill Net	2
Hand Held Equipment	11
Herring Net	0
Mechanical Equipment	0
Miscellaneous Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	2
Saltwater License	144
Seine Net	0
Shad Net	25
Shellfish Dealer	0
Shellfish License	10
Trawler License	50
Trotlines	2
Wholesale Dealer	13
Total	352

5.1.4.9 Murrells Inlet (29576)

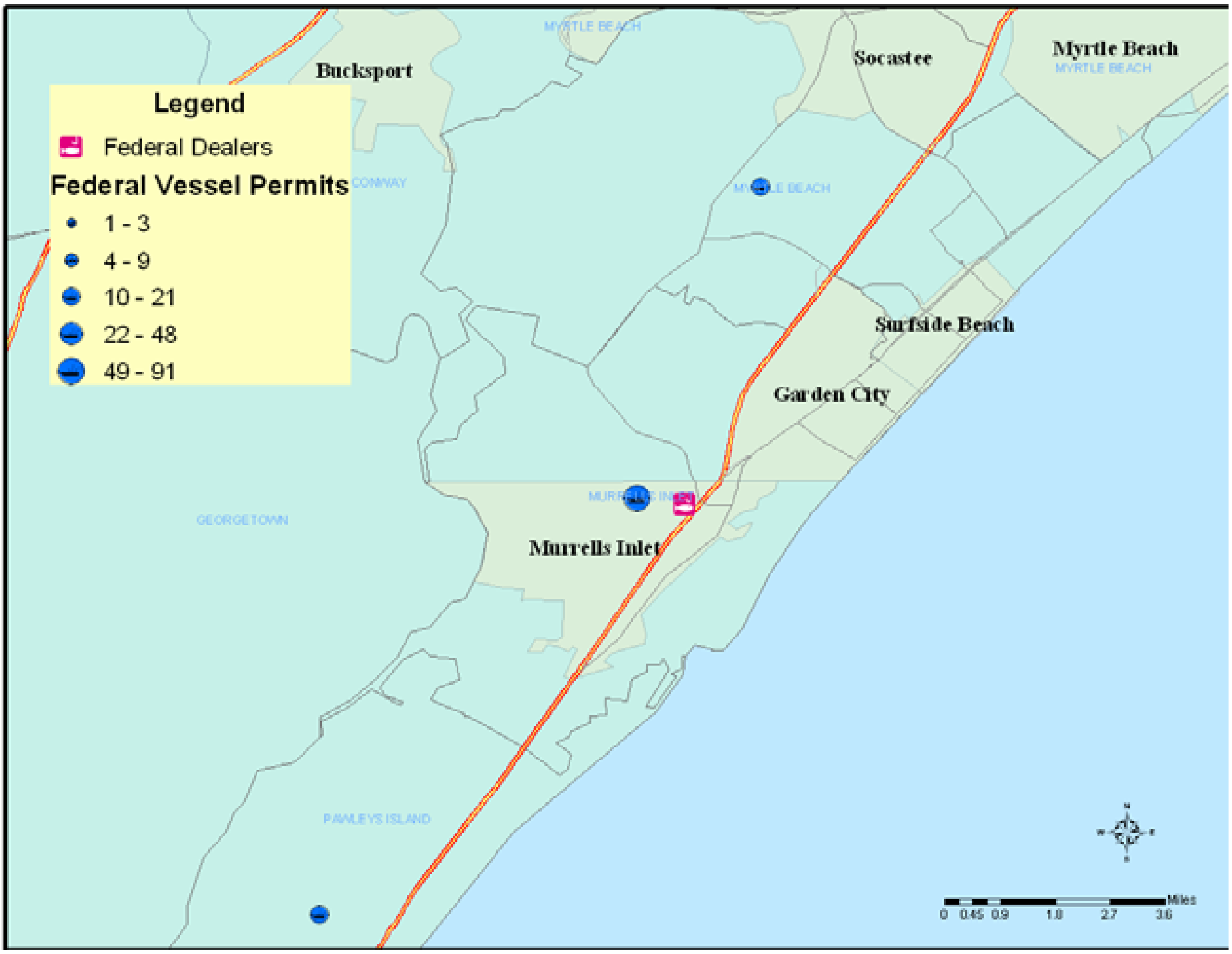


Figure 5.1.4-10. Murrells Inlet, South Carolina.

Murrells Inlet is known as the Seafood Capital of South Carolina. The origin of its name remains a mystery. However Murrells Inlet was officially named by the post office in 1913. The first settlers of the area were Native American Tribes. However beginning in the 16th and 17th centuries, Spanish and English colonists arrived in the area. Pirates also utilized the Inlet's winding creeks for refuge and a hiding place. Large tracts of land were cultivated into successful rice plantations. By 1850, almost 47 million pounds of rice were produced in this area. Murrells Inlet was used a port during the Civil War to sneak cotton and other products to England in exchange for war supplies, such as food and medicine. The Civil War led to the decline of the rice culture and in 1916, the last remaining commercial rice grower was out of business.

By this time, commercial and recreational fishing became a popular industry. By 1914, captain-led fishing excursions cost $5 per person for a day trip out of the Inlet on a 20-foot skiff. Today, charter, recreational and commercial fishing are still popular in Murrells Inlet.

Murrells Inlet has seen its population increase to a high of 5492 in 2000. The percentage of owner occupied housing has also increased to 85 percent. The percent of the population in the labor force has remained practically the same while unemployment has risen from 3 percent in 1990 to 5.2 percent in 2000. Average wage and salary has risen over the past few decades while the number of persons living below the poverty level has fluctuated and now is 435 in 2000. The number of persons working in farm, fish and forestry occupations has seen a decline like most communities.

There are a total of 33 vessels with federal permits. The majority has king mackerel and snapper grouper class 1 permits. Almost half of those permitted vessels have charter permits for either coastal pelagics or snapper grouper (Table 5.1.4-111). There are four federal dealers in the community. Most of the fishing employment is in fish and seafood markets with 10 persons employed in that sector out of the 16 total (Table 5.1.4-112). There are 111 state permits issued to residents of Murrells Inlet. Forty-four of those permits are for saltwater licenses. Another 14 are for handheld equipment and 12 are for crab pots. There are 10 wholesale dealer licenses held by Murrells Inlet residents (Table 5.1.4-113).

Murrells Inlet Census Demographics

Population

Table 5.1.4-102. Total Persons and Persons by Age category for Murrells Inlet, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	2394	3277	5492
Persons Age 0-5	.	145	218	213
Persons Age 6-15	.	388	281	541
Persons Age 16-17	.	102	12	98
Persons Age 18-24	.	264	292	249
Persons Age 25-34	.	291	602	629
Persons Age 35-44	.	329	480	408
Persons Age 45-54	.	182	370	860
Persons Age 55-64	.	333	527	859
Persons Age 65+	.	337	495	1189

Housing Tenure

Table 5.1.4-103. Housing Tenure for Murrells Inlet, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	20.1	14.7
Percent Owner Occupied	**1990**	**2000**
	79.9	85.3

Residence in 1985 and 1995

Table 5.1.4-104. Residence in 1985 and 1995 for Murrells Inlet, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	615	495
Same House	**1990**	**2000**
	1194	2857

Employment/Unemployment

Table 5.1.4-105. Employment and Unemployment for Murrells Inlet, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	60.7	61.6
Percent unemployed	3.0	5.2

Race

Table 5.1.4-106. Race for Murrells Inlet, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	516	410	389
Latino Black Persons	.	2	0	4
Latino Persons	.	7	0	34
White Persons	.	1867	2827	5035
Latino White Persons	.	0	0	20

Education

Table 5.1.4-107. Years of Education by Category for those 25 Years and Older for Murrell's Inlet, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	.	323	156	110
25+ w/ 9-11 years education	.	364	477	572
25+ w/ HS diploma	.	445	784	1285
25+ w/ 13-15 years. education	.	205	426	969
25+ w/ College Degree	.	135	456	1427
Drop outs	.	26	21	28

Income and Poverty

Table 5.1.4-108. Average Household Wage/Salary and Persons Below the Poverty Level for Murrells Inlet, South Carolina 1970-2000 (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$13233	$30776	$39877
Poverty Level				
Persons Below Poverty Level	.	350	501	435
Age 65+ Below Poverty Level	.	59	20	74
Households with Public Assistance	.	70	26	42

Industry

Table 5.1.4-109. Employment by Industry for Murrells Inlet, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	58	39	15
Construction	.	57	168	361
Business Services	.	13	162	149
Communication/Utilities	.	25	59	84
Manufacturing	.	123	97	140
Financial, Insurance & Real Estate	.	75	55	243
Services	.	38	98	1077
Wholesale/Retail Trade	.	161	646	861
Transportation	.	424	476	69

Occupation

Table 5.1.4-110. Employment by Occupation for Murrells Inlet, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	189	231	-
Clerical	.	1300	141	-
Craft	.	98	172	-
Exec/Managerial	.	132	339	-
Farm/Fish/Forest	.	39	39	11
Household Services	.	10	11	-
Laborer/Handler	.	42	68	-
Operative/Transport	.	53	100	-
Service, except Household	.	216	297	-
Technical	.	30	15	-

Murrells Inlet Fishing Demographics

Table 5.1.4-111. Number of Federal Permit by Type for Murrells Inlet, South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	34	37	37	33
Commercial King Mackerel	20	23	22	21
Commercial Spanish Mackerel	13	6	0	2
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	10	11	8	10
Charter/Headboat for Snapper Grouper	12	13	11	12
Snapper Grouper Class 1	17	26	26	30
Snapper Grouper Class 2	5	6	2	2
Swordfish	0	0	0	0
Shark	0	1	0	1
Rock Shrimp	0	0	0	0
Federal Dealers	5	5	5	4

Table 5.1.4-112. Employment in Fishing Related Industry for Murrells Inlet, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	3
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	3
Fish and Seafood Markets	445220	10
Marinas	713930	0
Total Fishing Employment		16

Table 5.1.4-113. Number of State Permits by Type for Murrells Inlet, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	4
Channel Net	0
Crab Pots	12
Drag Dredge	0
Gill Net	0
Hand Held Equipment	14
Herring Net	0
Mechanical Equipment	0
Miscellaneous Pots/Traps	0
Other Equipment	0
Peeler Crab Permit	3
Saltwater License	44
Seine Net	0
Shad Net	0
Shellfish Dealer	8

Shellfish License	7
Trawler License	9
Trotlines	0
Wholesale Dealer	10
Total	111

5.1.4.10 Little River (29566)

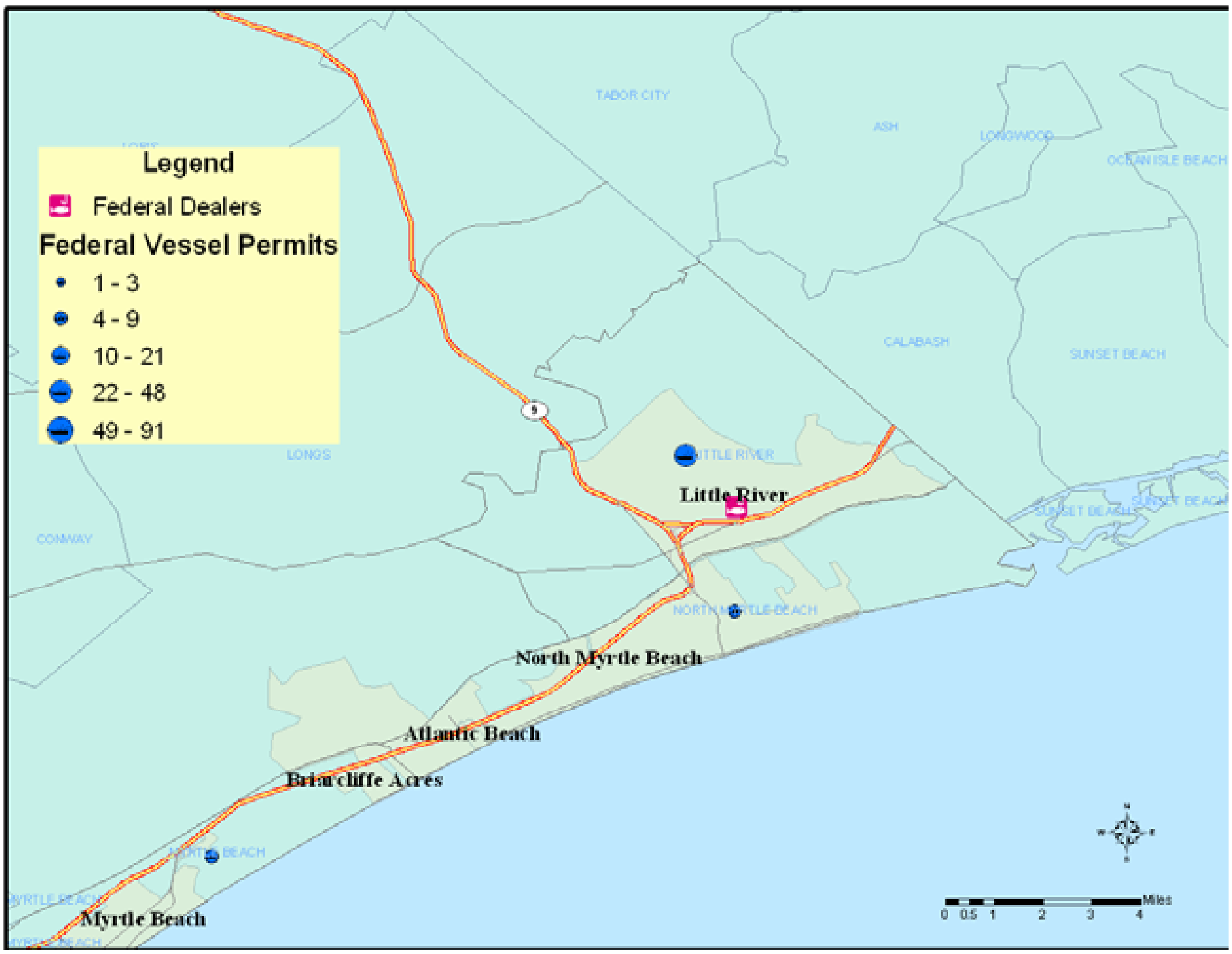


Figure 5.1.4-11. Little River, South Carolina.

Native American tribes who settled this area called the stream “Mineola,” which means “Little River.” Little River is one of the oldest settlements along the South Carolina coast. Fishermen and farmers began settling the area in the late 1600s and 1700s. The small, protected harbor was a refuge for shipwreck survivors and pirates, who needed a place to repair their boats and rest. It is still common to see treasure maps attempting to locate buried treasure on the placemats of the local restaurants.

For a time, Little River became known as “Yankee Town” by the rest of Horry County because of the settlers from New England. The area became a thriving port town in the 1850s. The shipments included fine lumber and naval supplies to Northern markets. The town had a few stores, sawmill, water house, school, churches and a bank. However the Civil War halted much of the town's developments. Today, Little River is widely known for its charter boats, deep-sea and commercial fishing.

Little River's population has nearly doubled in the last decade. The percent of owner occupied housing has risen from 61 percent in 1990 to over 80 percent in 2000. The percent of the population in the labor force has remained unchanged while unemployment has dropped. Average wage and salary have increased and so has the number of person living below the poverty level. The number of person working in the agriculture, fishing and mining sector has grown to 87 over the past ten years, while those in the occupation of farm, fishing and forestry has dropped. There are 17 vessels with federal permits homeported in Little River and the majority of them have either snapper grouper class 1 or snapper grouper charter permits (Table 5.1.4-123). Fishing related employment reported in Table 5.1.4-124 is mostly in the marinas sector with 31 persons and 7 more are in fish and seafood. Of the 24 state permits listed in Table 5.1.4-125, ten were for saltwater licenses.

Little River Census Demographics

Population

Table 5.1.4-114. Total Persons and Persons by Age category for Little River, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	.	3682	6904
Persons Age 0-5	.	.	244	337
Persons Age 6-15	.	.	325	682
Persons Age 16-17	.	.	81	100
Persons Age 18-24	.	.	270	258
Persons Age 25-34	.	.	601	723
Persons Age 35-44	.	.	539	487
Persons Age 45-54	.	.	356	1017
Persons Age 55-64	.	.	618	1206
Persons Age 65+	.	.	648	1842

Housing Tenure

Table 5.1.4-115. Housing Tenure for Little River, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	32.3	18.2
Percent Owner Occupied	**1990**	**2000**
	67.7	81.8

Residence in 1985 and 1995

Table 5.1.4-116. Residence in 1985 and 1995 for Little River, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	589	1408
Same House	**1990**	**2000**
	1568	2748

Employment/Unemployment

Table 5.1.4-117. Employment and Unemployment for Little River, South Carolina 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	56.6	58.0
Percent unemployed	6.5	3.4

Race

Table 5.1.4-118. Race for Little River, South Carolina 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	.	487	466
Latino Black Persons	.	.	0	12
Latino Persons	.	.	22	72
White Persons	.	.	3186	6385
Latino White Persons	.	.	13	38

Education

Table 5.1.4-119. Years of Education by Category for those 25 Years and Older for Little River, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	.	.	94	72
25+ w/ 9-11 years education	.	.	335	503
25+ w/ HS diploma	.	.	937	2119
25+ w/ 13-15 years. education	.	.	672	1277
25+ w/ College Degree	.	.	565	1533
Drop outs	.	.	22	23

Income and Poverty

Table 5.1.4-120. Average Household Wage/Salary and Persons Below the Poverty Level for Little River, South Carolina 1970-2000 (Source: U.S. Census Bureau & MARFIN

Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	.	$30023	$40427
Poverty Level				
Persons Below Poverty Level	.	.	496	517
Age 65+ Below Poverty Level	.	.	63	32
Households with Public Assistance	.	.	45	24

Industry

Table 5.1.4-121. Employment by Industry for Little River, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	.	68	87
Construction	.	.	163	354
Business Services	.	.	50	156
Communication/Utilities	.	.	83	153
Manufacturing	.	.	54	156
Financial, Insurance & Real Estate	.	.	54	463
Services	.	.	73	1340
Wholesale/Retail Trade	.	.	605	925
Transportation	.	.	465	31

Occupation

Table 5.1.4.122. Employment by Occupation for Little River, South Carolina 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	.	260	-
Clerical	.	.	241	-
Craft	.	.	180	-
Exec/Managerial	.	.	244	-
Farm/Fish/Forest	.	.	58	31
Household Services	.	.	10	-
Laborer/Handler	.	.	64	-
Operative/Transport	.	.	39	-
Service, except Household	.	.	278	-
Technical	.	.	28	-

Little River Fishing Demographics

Table 5.1.4-123. Number of Federal Permit by Type for Little River, South Carolina (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	15	17	15	17
Commercial King Mackerel	7	7	5	6
Commercial Spanish Mackerel	6	5	1	2
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	7	6	7	8
Charter/Headboat for Snapper Grouper	9	9	8	10
Snapper Grouper Class 1	13	15	10	13
Snapper Grouper Class 2	1	1	1	2
Swordfish	0	0	0	0
Shark	0	3	2	5
Rock Shrimp	0	1	2	2
Federal Dealers	1	1	2	2

Table 5.1.4-124. Employment in Fishing Related Industry for Little River, South Carolina (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	7
Fish and Seafood Markets	445220	0
Marinas	713930	31
Total Fishing Employment		38

Table 5.1.4-125. Number of State Permits by Type for Little River, South Carolina. (Source South Carolina Division of Marine Fisheries, 2003).

Type	Permits
Bait Dealer	0
Channel Net	0
Crab Pots	2
Drag Dredge	0
Gill Net	2
Hand Held Equipment	2
Herring Net	0
Mechanical Equipment	0
Miscellaneous Pots/Traps	1
Other Equipment	0
Peeler Crab Permit	0
Saltwater License	8
Seine Net	0
Shad Net	0
Shellfish Dealer	0
Shellfish License	1
Trawler License	5
Trotlines	0
Wholesale Dealer	3
Total	24

5.1.4.11 South Carolina Fishing Infrastructure and Community Characterization

The following tables provide a general view of the presence or absence of fishing infrastructure located within the coastal communities of South Carolina with substantial fishing activity. It should be noted that there are many other attributes that might have been included in this table, however, because of inconsistency in rapid appraisal for all communities, these items were selected as the most consistently reported or had secondary data available to determine presence or absence. It should also be noted that in some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. Table 5.1.4-126 offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 5.1.4-126. Fishing Infrastructure Table for South Carolina Potential Fishing Communities.

Community	Federal Commercial Permits (5+)	State Commercial Licenses (10+)	Federal Charter Permits (5+)	Seafood Landings	Fish processors, Wholesale fish house	Recreational docks / marinas	Recreational Fishing Tournaments	Total
Hilton Head Island	-	+	-	+	+	+	+	5
Port Royal	-	-	-	+	+	+	-	3
Edisto Beach	-	+	-	-	+	-	-	2
Seabrook Island	-	+	-	-	-	-	-	1
Mt. Pleasant	+	+	-	+	+	+	-	5
Isle of Palms	-	-	-	-	-	+	-	1
McClellanville	-	+	-	+	+	+	-	3
Georgetown	+	+	-	+	+	+	+	6
Murrells Inlet	+	+	+	+	+	+	-	6
Little River	+	+	+	+	+	+	-	6

In attempting a preliminary characterization of potential fishing communities in Table 5.1.4-127, we have provided a grouping of communities that appear to have more involvement in various fishing enterprises and therefore are classified as primarily involved. These communities have considerable fishing infrastructure, but also have a history and culture surrounding both commercial and recreational fishing that contributes to an appearance and perception of being a fishing community in the mind of residents and others. The communities are not ranked in any particular order, this is merely a categorization.

Table 5.1.4-127. Preliminary Characterization of Potential Fishing Communities in South Carolina.

Primarily-Involved	Secondarily-Involved
Mt. Pleasant	Edisto Beach
McClellanville	Seabrook Island
Georgetown	Isle of Palms

Murrells Inlet	
Little River	
Hilton Head Island	

Charleston, while having many commercial and charter permits is a large enough metropolitan area that fishing is rather small when compared to the larger economy and although historically may have played a role in the community culture is likely not a major focus historically or does it play a large role in the economy at this time. It is likely that the fishing community of Charleston has become ensconced in other parts of the metropolitan area, such as Shem Creek (Mt. Pleasant) and has become a component of that community's history and culture. Many of these communities are in transition due to various social and demographic changes from coastal development, growing populations, increasing tourism, changing regulations, etc. This preliminary characterization is just that and should not be considered a definite designation as fishing community, but a general guide for locating communities that may warrant consideration as a potential fishing community.

5.1.5 Georgia Communities with Substantial Fishing Activity

Figure 5.1.5-1. Potential Fishing Communities of Georgia.

Georgia landed over 9 million pounds of seafood in both 2001 and 2002. The value of those landings was over 14 million dollars in 2001 and over 15 million dollars in 2002. No Georgia port was listed in the top 50 U.S. ports in terms of pounds landed or in terms of value of landings. According to NMFS (2002) Georgia recreational fishermen landed over 2 million pounds of finfish in 2001 and in 2002 that number dropped to just over than 1 million pounds. There were 5 processors in Georgia for 2001 with a total of 1,119 employees and 30 wholesale dealers employing 432 persons. In the years 2001 and 2002, Georgia did have approximately 265 and 226 registered vessels respectively.

Georgia has had just over 50 federally permitted vessels since 1998 and through 2001. The majority of those vessels carried rock shrimp permits with the next most common being king mackerel and snapper grouper class 1. It must be remembered that there is no shrimp permit in the South Atlantic region; so many vessels in the state are not included in the federal permit list.

Table 5.1.5-1. Number of Federal Permit by Type for Georgia (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	50	53	57	53
Commercial King Mackerel	15	17	19	16
Commercial Spanish Mackerel	11	10	11	8
Commercial Spiny Lobster	5	4	5	5
Charter/Headboat for Coastal Pelagics	7	6	6	5
Charter/Headboat for Snapper Grouper	6	5	5	4
Snapper Grouper Class 1	14	18	14	14
Snapper Grouper Class 2	1	6	2	2
Swordfish	0	0	0	0
Shark	0	5	5	4
Rock Shrimp	22	25	28	29

Table 5.1.5-2. Number of State Permit by Type for Georgia (Source: GADNR 2002).

Type	Number
Commercial Fishing Vessel Registration	947
Vessels with shrimp gear	482
Full-time commercial fishermen	612
Part-time commercial fishermen	147

Georgia requires commercial fishermen to be licensed and also requires a license for commercial crabbing and commercial cast netting. A commercial trawling license is required to use power drawn nets in the state waters. In addition, the state requires a dealer license for retail and wholesale fish to be sold, soft-shell crab and bait dealers. Figure 5.1.5-1 shows potential fishing communities in Georgia.

5.1.5.1 Tybee Island (31328)

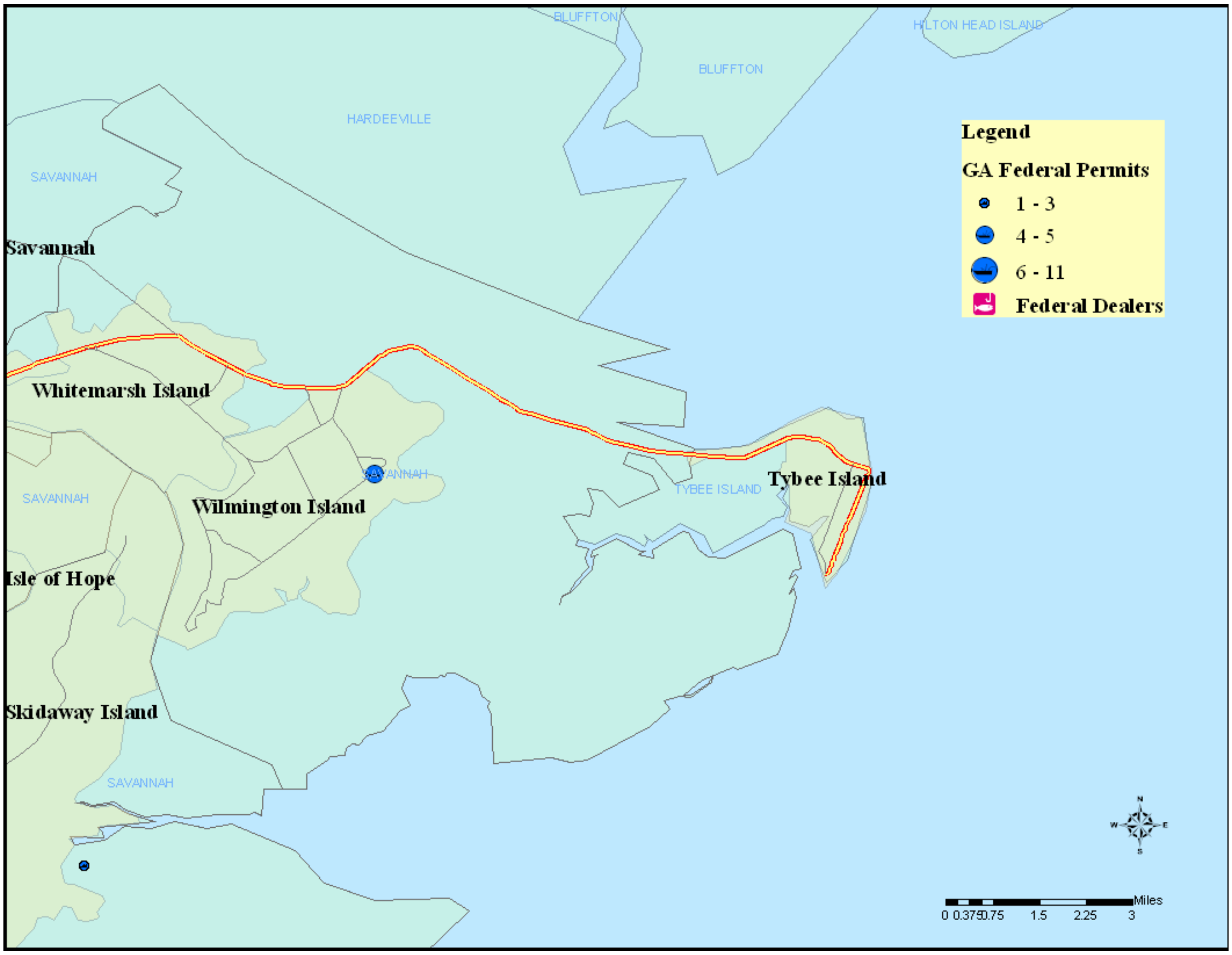


Figure 5.1.5-2. Tybee Island, Georgia.

Tybee Island stands at the mouth of the Savannah River. In 1736, a 90 foot lighthouse was built to help aid navigation in the area. At this time in America, this structure was the tallest. This lighthouse had to be rebuilt three times, lastly in 1773, due to storms. It currently stands at 154 feet tall and is Georgia's oldest lighthouse. After the Civil War, Tybee began to grow into a resort area. Before 1870 there were very few full time residents, but by the 1890s, there were over 400 beach cottages and local business for the summer residents. Tybee is still an attractive tourist destination with seven miles of beaches, with many options for both inshore and offshore fishing.

The population of Tybee Island has grown steadily over the past 20 years. The percent of the population in the labor force has also remained stable at around 61 percent and the percent of unemployed around 4.5 percent. Average wage and salary has increased to a high of $49,741 in 2000 while the number of persons living below the poverty level has remained around 330. The number person employed in the farm, fish, and forestry sectors of industry and occupation has slowly declined to where there were none reported in 2000. This is consistent with Table 5.1.5-12 where there are no vessels listed with federal permits for 2000 or 2001. Furthermore, Table 5.1.5-13 lists 3 persons employed in boat building as the only fishing related employment. There are however, 7 commercial vessels registered with the state from Tybee Island and all seven have full time fishermen as owners (Table 5.1.5-14).

Tybee Island Census Demographics

Population

Table 5.1.5-3. Total Persons and Persons by Age category for Tybee Island, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	2240	2689	3432
Persons Age 0-5	.	126	192	104
Persons Age 6-15	.	264	273	350
Persons Age 16-17	.	63	91	50
Persons Age 18-24	.	234	239	192
Persons Age 25-34	.	381	381	326
Persons Age 35-44	.	222	391	528
Persons Age 45-54	.	212	323	738
Persons Age 55-64	.	281	258	510
Persons Age 65+	.	430	541	634

Housing Tenure

Table 5.1.5-4. Housing Tenure for Tybee Island, Georgia 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	35.1	31.3
Percent Owner Occupied	**1990**	**2000**
	64.9	68.8

Residence in 1985 and 1995

Table 5.1.5-5. Residence in 1985 and 1995 for Tybee Island, Georgia 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	802	736
Same House	**1990**	**2000**
	1,134	1,589

Employment/Unemployment

Table 5.1.5-6. Employment and Unemployment for Tybee Island, Georgia 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000

Percent in labor force	59.3	61.9
Percent unemployed	4.8	4.5

Race

Table 5.1.5-7. Race for Tybee Island, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	35	13	64
Latino Black Persons	.	0	0	0
Latino Persons	.	20	76	43
White Persons	.	2160	2625	3219
Latino White Persons	.	18	63	35

Education

Table 5.1.5-8. Years of Education by Category for those 25 Years and Older for Tybee Island, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	187	114	74
25+ w/ 9-11 years education	.	257	205	208
25+ w/ HS diploma	.	476	661	649
25+ w/ 13-15 years. education	.	292	401	404
25+ w/ College Degree	.	314	342	1063
Drop outs	.	11	9	24

Income and Poverty

Table 5.1.5-9. Average Household Wage/Salary and Persons Below the Poverty Level for Tybee Island, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$17558	$33194	$49741
Poverty Level				
Persons Below Poverty Level	.	221	324	332
Age 65+ Below Poverty Level	.	44	35	17
Households with Public Assistance	.	37	15	28

Industry

Table 5.1.5-10. Employment by Industry for Tybee Island, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	10	35	0
Construction	.	96	121	190
Business Services	.	38	49	103
Communication/Utilities	.	43	13	60
Manufacturing	.	110	150	123
Financial, Insurance & Real Estate	.	32	85	96
Services	.	55	63	1094
Wholesale/Retail Trade	.	209	405	415
Transportation	.	214	290	42

Occupation

Table 5.1.5-11. Employment by Occupation for Tybee Island, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	140	162	-
Clerical	.	1290	203	-
Craft	.	126	150	-
Exec/Managerial	.	150	223	-
Farm/Fish/Forest	.	10	35	0
Household Services	.	4	13	-
Laborer/Handler	.	36	9	-
Operative/Transport	.	45	50	-
Service, except Household	.	138	208	-
Technical	.	28	0	-

Tybee Island Fishing Demographics

Table 5.1.5-12. Number of Federal Permit by Type for Tybee Island, Georgia (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	3	2	0	0
Commercial King Mackerel	1	1	0	0
Commercial Spanish Mackerel	1	1	0	0
Commercial Spiny Lobster	1	0	0	0
Charter/Headboat for Coastal Pelagics	2	1	0	0
Charter/Headboat for Snapper Grouper	2	0	0	0
Snapper Grouper Class 1	1	1	0	0
Snapper Grouper Class 2	0	1	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0

Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.5-13. Employment in Fishing Related Industry for Tybee Island, Georgia (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	3
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	0
Marinas	713930	0
Total Fishing Employment		3

Table 5.1.5-14. Number of State Permit by Type for Tybee Island, Georgia (Source: GADNR 2002).

Type	Number
Commercial Fishing Vessel Registration	7
Vessels with shrimp gear	3
Full-time commercial fishermen	7
Part-time commercial fishermen	0

5.1.5.2 Thunderbolt (31404, 31410)

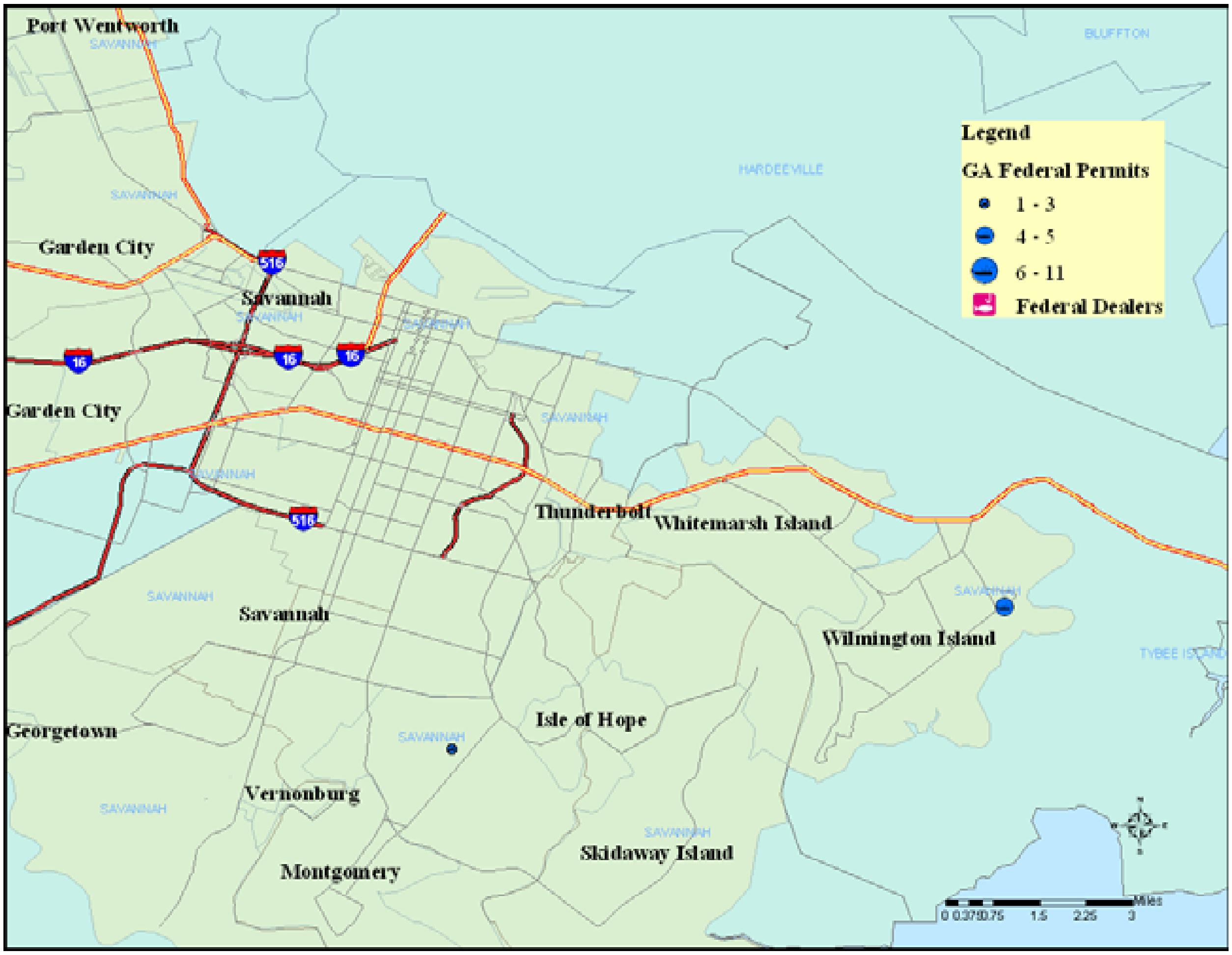


Figure 5.1.5-3. Thunderbolt, Georgia.

Thunderbolt's population has fluctuated over the past three decades and most recently declined during 1990 to 2000 where it stands at 2360. While the percent of population in the labor force has remained fairly stable, unemployment dropped significantly from a high of 17.2 in 1990 to 4.4 percent in 2000. Average wage and salary have risen slowly and the number of persons living below the poverty level has fluctuated some, but remains over 250. The number of persons employed in the farm, fish and forestry sectors under occupation and industry has dropped to zero over the past decade. This is consistent with fishing demographics as there are no vessels with federal permits listing Thunderbolt as homeport. There are at least three vessels registered with the state and three individuals who consider themselves to be full-time commercial fishermen according to Table 5.1.5-26.

Thunderbolt Census Demographics

Population

Table 5.1.5-15. Total Persons and Persons by Age category for Thunderbolt, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	2766	2161	2786	2360
Persons Age 0-5	121	136	143	112
Persons Age 6-15	391	268	227	204
Persons Age 16-17	114	103	51	51
Persons Age 18-24	988	272	1011	213
Persons Age 25-34	211	411	393	349
Persons Age 35-44	252	154	243	291
Persons Age 45-54	206	207	181	395
Persons Age 55-64	288	337	208	237
Persons Age 65+	136	257	329	508

Housing Tenure

Table 5.1.5-16. Housing Tenure for Thunderbolt, Georgia 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	44.3	35.7
Percent Owner Occupied	**1990**	**2000**
	55.7	64.3

Residence in 1985 and 1995

Table 5.1.5-17. Residence in 1985 and 1995 for Thunderbolt, Georgia 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	567	628
Same House	**1990**	**2000**
	1041	1185

Employment/Unemployment

Table 5.1.5-18. Employment and Unemployment for Thunderbolt, Georgia 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	59.9	61.1
Percent unemployed	17.2	4.4

Race

Table 5.1.5-19. Race for Thunderbolt, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	1466	785	1495	758
Latino Black Persons	20	0	0	1
Latino Persons	20	24	11	33
White Persons	1300	1360	1270	1339
Latino White Persons	0	24	11	16

Education

Table 5.1.5-20. Years of Education by Category for those 25 Years and Older for Thunderbolt, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	259	176	75	227
25+ w/ 9-11 years education	307	292	180	280
25+ w/ HS diploma	272	387	358	317
25+ w/ 13-15 years. education	100	185	345	245
25+ w/ College Degree	155	326	314	396
Drop outs	134	13	11	14

Income and Poverty

Table 5.1.5-21. Average Household Wage/Salary and Persons Below the Poverty Level for Thunderbolt, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$9079	$16017	$33591	$35824
Poverty Level				
Persons Below Poverty Level	267	292	143	279
Age 65+ Below Poverty Level	45	10	23	49
Households with Public Assistance	11	33	44	33

Industry

Table 5.1.5-22. Employment by Industry for Thunderbolt, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	17	22	9	0
Construction	120	71	80	110
Business Services	52	33	34	42

Communication/Utilities	19	27	21	36
Manufacturing	172	80	133	121
Financial, Insurance & Real Estate	46	26	43	14
Services	16	69	44	673
Wholesale/Retail Trade	458	134	452	317
Transportation	171	176	290	78

Occupation

Table 5.1.5-23. Employment by Occupation for Thunderbolt, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	45	68	201	-
Clerical	199	1590	251	-
Craft	227	108	115	-
Exec/Managerial	93	116	161	-
Farm/Fish/Forest	6	37	19	0
Household Services	26	8	0	-
Laborer/Handler	80	22	70	-
Operative/Transport	109	16	22	-
Service, except Household	157	104	123	-
Technical	8	7	31	-

Thunderbolt Fishing Demographics

Table 5.1.5-24. Number of Federal Permit by Type for Thunderbolt, Georgia (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	0	0	0	0
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.5-25. Employment in Fishing Related Industry for Thunderbolt, Georgia (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0

Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	3
Fish and Seafood Markets	445220	6
Marinas	713930	60
Total Fishing Employment		69

Table 5.1.5-26. Number of State Permit by Type for Thunderbolt, Georgia (Source: GADNR 2002).

Type	Number
Commercial Fishing Vessel Registration	3
Vessels with shrimp gear	1
Full-time commercial fishermen	3
Part-time commercial fishermen	0

5.1.5.3 Darien (31305)

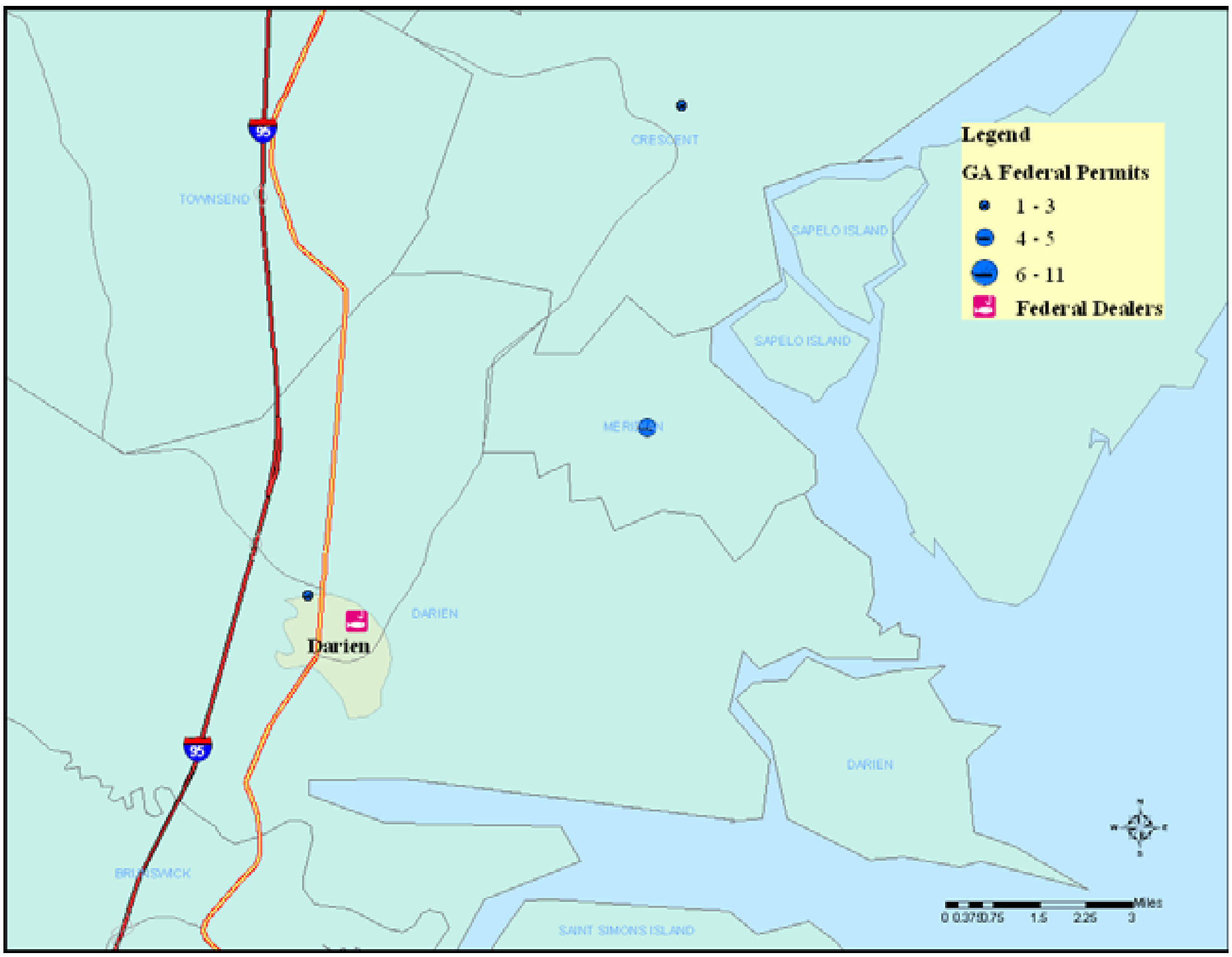


Figure 5.1.5-4. Darien, Georgia.

Darien was settled by Scottish Highlanders in the mid-1700s. During the 1800s, it was a leading seaport on the east coast. Even today, many shrimp fishing boats dock at the waterfront. Darien was named in honor of the unsuccessful colonization led by Darien Scots, at the Isthmus of Panama. After the American Revolution, Darien became an important port due to its position near the mouth of the Altamaha River. In 1816, the town of Darien was incorporated and it became the county seat in 1818.

The area became known as an international shipping port which was frequented by ships from Asia, Europe and South America. In 1900, more than 100 million linear board feet of timber and lumber were shipped from Darien. However, these shipments began to decline and in 1916, the last of Darien's sawmills went bankrupt. By the mid 1920s, the area experienced renewed growth with the commercial seafood industry. Many turned to the productive nearshore waters for their livelihood. By the early 1960s, McIntosh County had the largest shrimping fleet on the Georgia coast, with several oyster and shrimp packing houses along the banks of the Altamaha River. Even though today this area is economically dependent on tourism, commercial fishing is still the livelihood for many members of the community.

Over the past decade Darien's population has remained almost unchanged. Other demographic variables have also remained fairly stable as average wage and salary have also remained practically the same in 1990 and 2000. The number of persons living under the poverty level has also remained stable, while the percent of population in the labor force has gone up slightly; the unemployment percentage has gone down from 9.9 in 1990 to 2.4 in 2000. While there has been a decline in the number of persons reported in farm, fish and forestry occupations and industry there remain about 17 persons in those sectors. Darien does have 3 vessels with federal permits according to Table 5.1.5-36 and fishing related employment shows 12 people employed in the sectors of fishing, seafood processing and fish and seafood (Table 5.1.5-37). The state has 92 commercial vessels registered in Darien and 44 of those have shrimp gear. Of those vessels registered, 61 consider themselves to be full time commercial fishermen and 3 part time (Table 5.1.5-38).

Darien Census Demographics

Population

Table 5.1.5-27. Total Persons and Persons by Age category for Darien, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	1731	1783	1751
Persons Age 0-5	.	115	150	172
Persons Age 6-15	.	335	302	329
Persons Age 16-17	.	62	46	46
Persons Age 18-24	.	242	157	125
Persons Age 25-34	.	223	263	179

Persons Age 35-44	.	175	234	254
Persons Age 45-54	.	188	199	235
Persons Age 55-64	.	160	164	201
Persons Age 65+	.	214	268	210

Housing Tenure

Table 5.1.5-28. Housing Tenure for Darien, Georgia 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	26.5	27.5
Percent Owner Occupied	**1990**	**2000**
	73.5	72.5

Residence in 1985 and 1995

Table 5.1.5-29. Residence in 1985 and 1995 for Darien, Georgia 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	197	305
Same House	**1990**	**2000**
	1152	897

Employment/Unemployment

Table 5.1.5-30. Employment and Unemployment for Darien, Georgia 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	56.0	60.4
Percent unemployed	9.9	2.8

Race

Table 5.1.5-31. Race for Darien, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	749	766	751
Latino Black Persons	.	0	3	5
Latino Persons	.	6	5	11
White Persons	.	982	1017	926
Latino White Persons	.	6	2	4

Education

Table 5.1.5-32. Years of Education by Category for those 25 Years and Older for Darien, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	268	191	84
25+ w/ 9-11 years education	.	266	266	187
25+ w/ HS diploma	.	236	375	386
25+ w/ 13-15 years. education	.	87	141	151
25+ w/ College Degree	.	103	130	154
Drop outs	.	44	16	27

Income and Poverty

Table 5.1.5-33. Average Household Wage/Salary and Persons Below the Poverty Level for Darien, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$13161	$24025	$24135
Poverty Level				
Persons Below Poverty Level	.	605	416	425
Age 65+ Below Poverty Level	.	98	85	53
Households with Public Assistance	.	60	147	40

Industry

Table 5.1.5-34. Employment by Industry for Darien, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	39	38	20
Construction	.	38	46	68
Business Services	.	17	15	14
Communication/Utilities	.	27	22	21
Manufacturing	.	155	154	67
Financial, Insurance & Real Estate	.	37	57	33
Services	.	21	14	401
Wholesale/Retail Trade	.	92	188	228
Transportation	.	150	150	21

Occupation

Table 5.1.5-35. Employment by Occupation for Darien, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	78	62	-
Clerical	.	890	84	-
Craft	.	70	115	-
Exec/Managerial	.	43	55	-
Farm/Fish/Forest	.	35	33	17
Household Services	.	13	11	-
Laborer/Handler	.	39	37	-
Operative/Transport	.	97	62	-
Service, except Household	.	112	118	-
Technical	.	7	17	-

Darien Fishing Demographics

Table 5.1.5-36. Number of Federal Permit by Type for Darien, Georgia (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	4	4	5	3
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	4	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	4	4	5	3
Federal Dealers	2	1	1	1

Table 5.1.5-37. Employment in Fishing Related Industry for Darien, Georgia (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	6
Seafood Canning	311711	0
Seafood Processing	311712	3
Boat Building	336612	0
Fish and Seafoods	422460	3
Fish and Seafood Markets	445220	0
Marinas	713930	0
Total Fishing Employment		12

Table 5.1.5-38. Number of State Permit by Type for Darien, Georgia (Source: GADNR 2002).

Type	Number
Commercial Fishing Vessel Registration	92
Vessels with shrimp gear	44
Full-time commercial fishermen	61
Part-time commercial fishermen	3

5.1.5.4 Brunswick (31520, 31523, 31525)

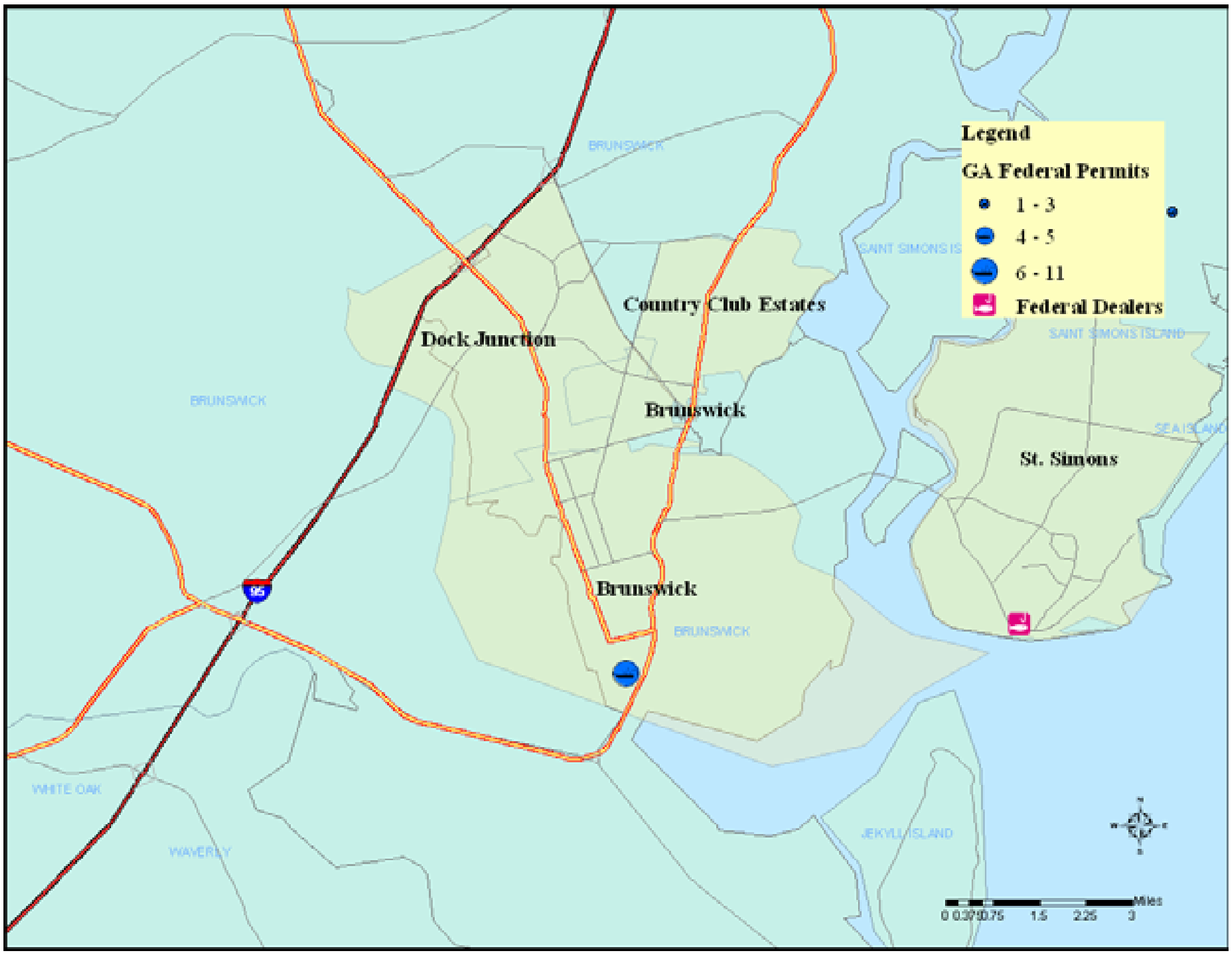


Figure 5.1.5-5. Brunswick, Georgia.

Brunswick's population has seen a steady decline over the past three decades in almost every age category.   The percent of the population in the labor force has remained the same since 1990 but unemployment has risen to 10.4 percent in 2000. Average wage and salary has dropped since 1990 and the number of people living under the poverty level has increased. For those working in the sectors of farm, fish and forestry in occupation and industry there has also been a steady decline. Brunswick has 8 vessels registered with federal permits according to Table 5.1.5-48. There are a substantial number of persons working in fishing related businesses according to Table 5.1.5-49 with over 1500 persons working in the seafood processing sector. The state has 88 vessels registered in Brunswick and 56 of them have shrimp gear (Table 5.1.5-50). Of those vessel owners registered 66 consider themselves to be full-time commercial fishermen and 11 part-time.

Brunswick Census Demographics

Population

Table 5.1.5-39. Total Persons and Persons by Age category for Brunswick, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	19585	17605	16433	15424
Persons Age 0-5	1732	1349	1678	1442
Persons Age 6-15	4106	3031	2562	2443
Persons Age 16-17	756	741	491	433
Persons Age 18-24	2311	2126	1509	1563
Persons Age 25-34	2045	2454	2625	1826
Persons Age 35-44	2213	1710	2032	2299
Persons Age 45-54	2338	1604	1482	1836
Persons Age 55-64	1793	1936	1444	1174
Persons Age 65+	1900	2407	2610	2408

Housing Tenure

Table 5.1.5-40. Housing Tenure for Brunswick, Georgia 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	50.5	55.4
Percent Owner Occupied	**1990**	**2000**
	49.5	44.6

Residence in 1985 and 1995

Table 5.1.5-41. Residence in 1985 and 1995 for Brunswick, Georgia 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	4579	2442
Same House	**1990**	**2000**
	7806	7598

Employment/Unemployment

Table 5.1.5.42. Employment and Unemployment for Brunswick, Georgia 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	58.0	58.7
Percent unemployed	9.4	10.2

Race

Table 5.1.5-43. Race for Brunswick, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	8754	9464	9606	9247
Latino Black Persons	0	140	8	83
Latino Persons	62	275	82	908
White Persons	10803	8020	6734	5162
Latino White Persons	62	110	54	518

Education

Table 5.1.5-44. Years of Education by Category for those 25 Years and Older for Brunswick, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	3898	2856	1532	1032
25+ w/ 9-11 years education	2446	2225	2308	1998
25+ w/ HS diploma	2354	2883	3454	2935
25+ w/ 13-15 years. education	838	1186	1490	1062
25+ w/ College Degree	753	961	1056	1516
Drop outs	428	348	142	176

Income and Poverty

Table 5.1.5-45. Average Household Wage/Salary and Persons Below the Poverty Level for Brunswick, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$6674	$13078	$23510	$22272
Poverty Level				
Persons Below Poverty Level	4879	4737	4142	4508
Age 65+ Below Poverty Level	711	585	475	487
Households with Public Assistance	664	951	985	322

Industry

Table 5.1.5-46. Employment by Industry for Brunswick, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	96	88	143	93
Construction	433	406	407	425
Business Services	155	152	281	130
Communication/Utilities	188	205	141	84
Manufacturing	1999	1482	874	527
Financial, Insurance & Real Estate	461	472	225	299
Services	310	294	317	3833
Wholesale/Retail Trade	2315	1625	2178	2098
Transportation	1474	1504	1648	136

Occupation

Table 5.1.5-47. Employment by Occupation for Brunswick, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	421	597	852	-
Clerical	966	8780	873	-
Craft	872	834	598	-
Exec/Managerial	572	514	591	-
Farm/Fish/Forest	27	156	129	77
Household Services	432	138	109	-
Laborer/Handler	621	455	308	-
Operative/Transport	1206	679	377	-
Service, except Household	1738	1675	1718	-
Technical	79	207	183	-

Brunswick Fishing Demographics

Table 5.1.5-48. Number of Federal Permit by Type for Brunswick, Georgia (Source: NMFS 2002).

Type of Permit	**1998**	**1999**	**2000**	**2001**
Total permitted vessels	3	5	7	8
Commercial King Mackerel	1	1	1	1
Commercial Spanish Mackerel	1	1	0	1
Commercial Spiny Lobster	1	2	2	2
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	1

Rock Shrimp	3	5	7	8
Federal Dealers	1	0	0	0

Table 5.1.5-49. Employment in Fishing Related Industry for Brunswick, Georgia (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	3
Seafood Canning	311711	0
Seafood Processing	311712	1582
Boat Building	336612	0
Fish and Seafoods	422460	25
Fish and Seafood Markets	445220	0
Marinas	713930	53
Total Fishing Employment		1663

Table 5.1.5-50. Number of State Permit by Type for Brunswick, Georgia (Source: GADNR 2002).

Type	Number
Commercial Fishing Vessel Registration	88
Vessels with shrimp gear	56
Full-time commercial fishermen	63
Part-time commercial fishermen	11

5.1.5.5 St. Simons Island (31522)

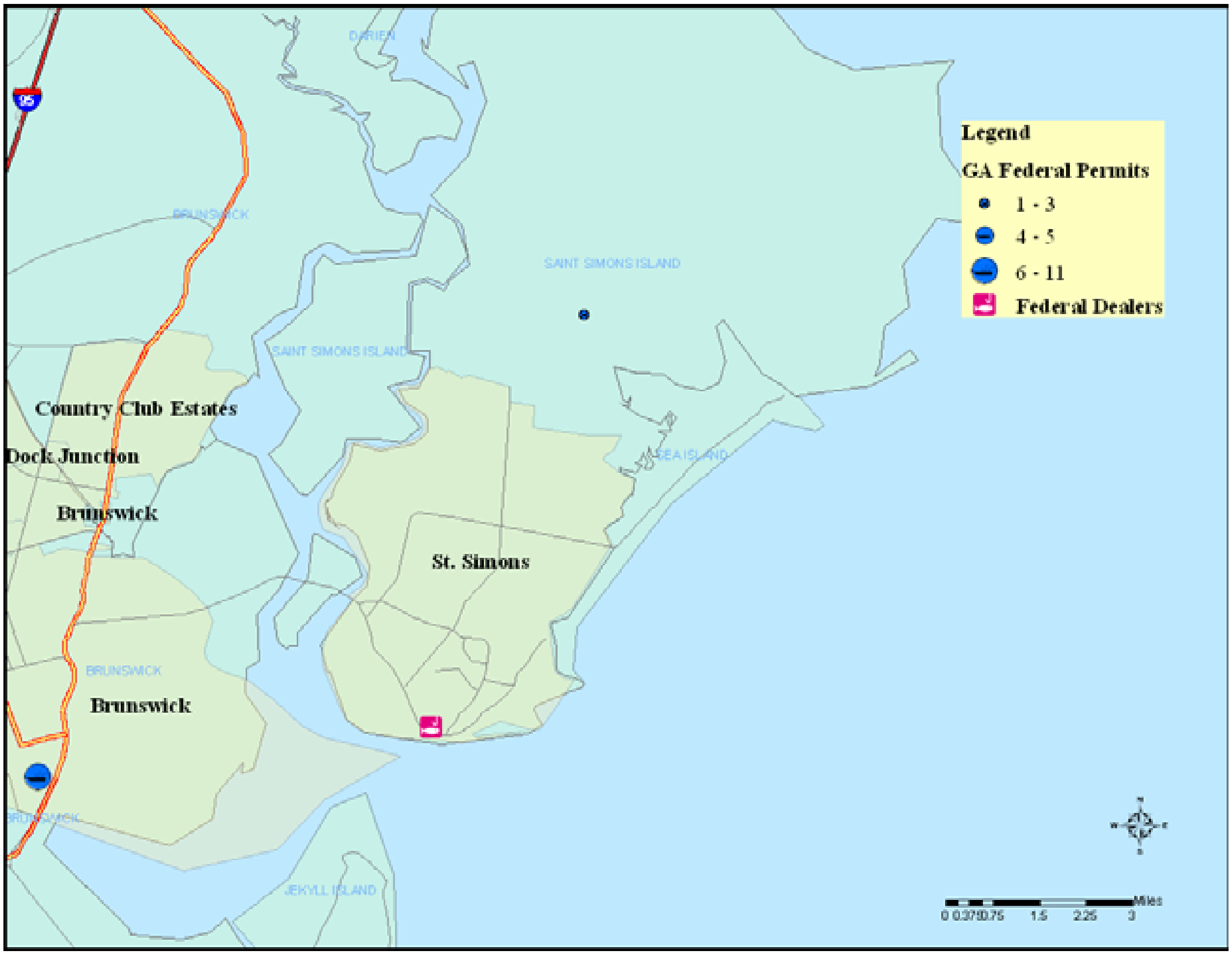


Figure 5.1.5-6. St. Simons Island, Georgia.

St. Simons Island has seen a fairly steady growth in its population. The percent of population in the labor force has remained fairly stable at just above 60 percent and unemployment has remained low at 3.4 percent. Average wage and salary have raised significantly while the number of person living under the poverty level has remained about the same at over 600. As for most coastal communities, the number of persons employed in farm, fish, and forestry sectors under occupation and industry has declined steadily over the past 30 years for this community. St. Simons Island has little commercial fishing employment as there are only 2 vessels registered with federal permits that homeport there (Table 5.1.5-60). Most all of the fishing related employment is in the marinas sector according to Table 5.1.5-61 and there are only 4 commercial vessels registered with the state in Table 5.1.5-62 and 7 individuals who consider themselves to be full-time commercial fishermen.

St. Simons Island Census Demographics

Population

Table 5.1.5-51. Total Persons and Persons by Age category for St. Simons Island, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	5191	6566	12026	13448
Persons Age 0-5	383	298	726	661
Persons Age 6-15	992	823	1364	1616
Persons Age 16-17	168	223	241	288
Persons Age 18-24	625	617	798	672
Persons Age 25-34	799	1258	1661	1265
Persons Age 35-44	506	822	2022	1982
Persons Age 45-54	561	660	1466	2307
Persons Age 55-64	593	690	1309	1735
Persons Age 65+	449	1119	2439	2922

Housing Tenure

Table 5.1.5-52. Housing Tenure for St. Simons Island, Georgia 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	33.7	26.2
Percent Owner Occupied	**1990**	**2000**
	66.3	73.8

Residence in 1985 and 1995

Table 5.1.5-53. Residence in 1985 and 1995 for St. Simons Island, Georgia 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	1,429	2,871
Same House	**1990**	**2000**
	4,425	6,138

Employment/Unemployment

Table 5.1.5-54. Employment and Unemployment for St. Simons Island, Georgia 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	62.3	64.5
Percent unemployed	1.8	3.5

Race

Table 5.1.5-55. Race for St. Simons Island, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	583	440	631	486
Latino Black Persons	0	6	0	8
Latino Persons	0	96	187	253
White Persons	4602	6092	11362	12426
Latino White Persons	0	90	177	191

Education

Table 5.1.5-56. Years of Education by Category for those 25 Years and Older for St. Simons Island, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	456	346	220	167
25+ w/ 9-11 years education	426	492	516	263
25+ w/ HS diploma	800	1073	1614	1366
25+ w/ 13-15 years. education	544	1129	2133	1532
25+ w/ College Degree	682	1509	3967	5894
Drop outs	43	20	9	-

Income and Poverty

Table 5.1.5-57. Average Household Wage/Salary and Persons Below the Poverty Level for St. Simons Island, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$8778	$20621	$42677	$58475
Poverty Level				
Persons Below Poverty Level	683	336	660	602
Age 65+ Below Poverty Level	128	88	130	218
Households with Public Assistance	49	89	217	35

Industry

Table 5.1.5-58. Employment by Industry for St. Simons Island, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	14	110	134	15
Construction	167	143	289	388
Business Services	60	120	202	503
Communication/Utilities	44	42	108	215
Manufacturing	375	290	597	519
Financial, Insurance & Real Estate	39	78	249	754

Services	86	224	400	4006
Wholesale/Retail Trade	749	795	2712	1673
Transportation	475	876	1234	107

Occupation

Table 5.1.5-59. Employment by Occupation for St. Simons Island, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	226	526	790	-
Clerical	307	4440	646	-
Craft	159	290	310	-
Exec/Managerial	371	455	1155	-
Farm/Fish/Forest	8	83	126	0
Household Services	88	50	42	-
Laborer/Handler	68	44	107	-
Operative/Transport	109	73	97	-
Service, except Household	313	661	753	-
Technical	10	67	148	-

St. Simons Fishing Demographics

Table 5.1.5-60. Number of Federal Permit by Type for St. Simons Island, Georgia (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	2	2	2	2
Commercial King Mackerel	1	1	1	1
Commercial Spanish Mackerel	1	1	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	1	1	1	1
Charter/Headboat for Snapper Grouper	1	0	1	1
Snapper Grouper Class 1	1	1	0	1
Snapper Grouper Class 2	0	1	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	1	1	1	1
Federal Dealers	1	1	1	1

Table 5.1.5-61. Employment in Fishing Related Industry for St. Simons Island, Georgia (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	15
Fish and Seafood Markets	445220	0

Marinas	713930	43
Total Fishing Employment		58

Table 5.1.5-62. Number of State Permit by Type for St. Simons, Georgia (Source: GADNR 2002).

Type	Number
Commercial Fishing Vessel Registration	4
Vessels with shrimp gear	4
Full-time commercial fishermen	7
Part-time commercial fishermen	2

5.1.5.6 St. Mary's (31558)

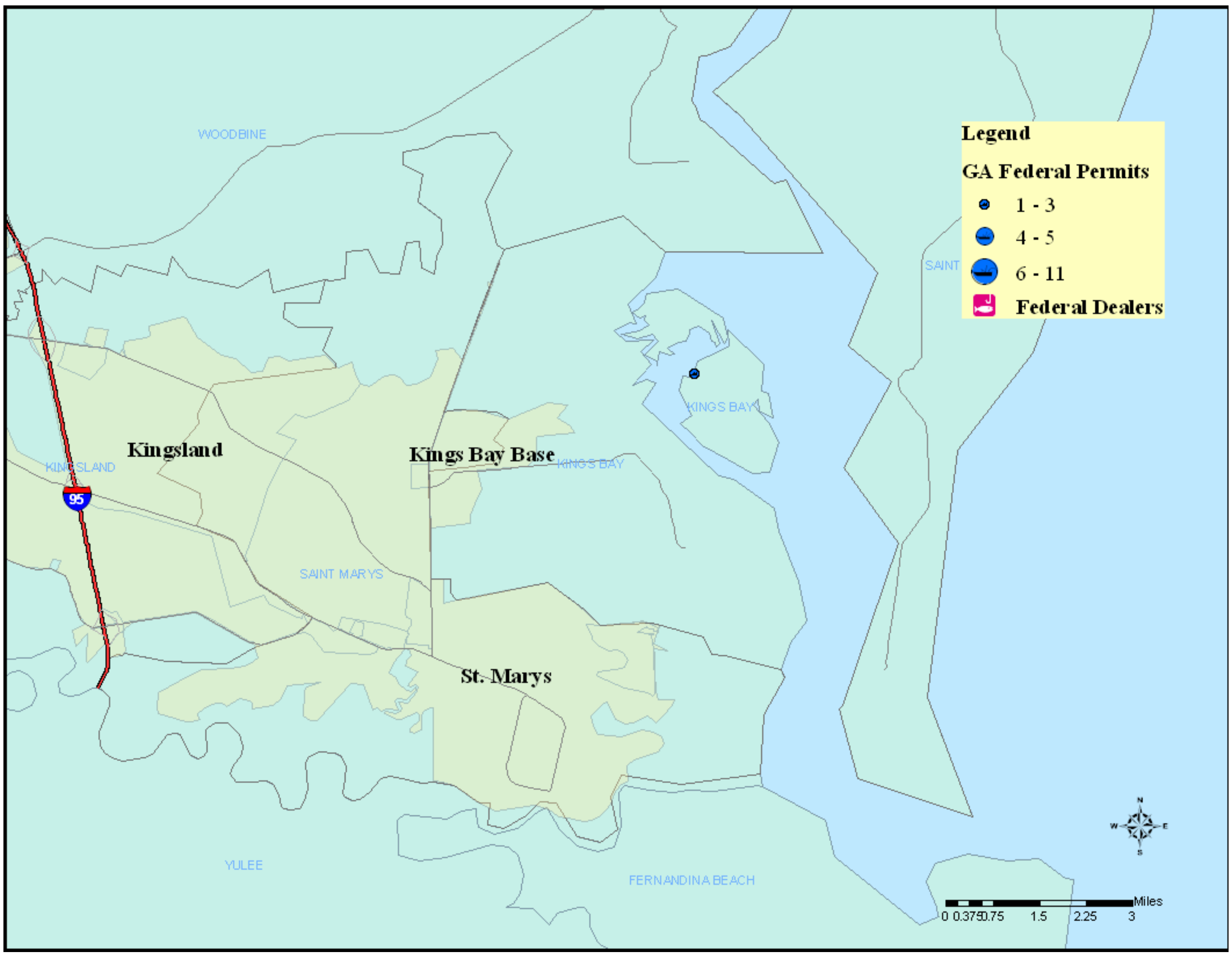


Figure 5.1.5-7. St. Mary's, Georgia.

St. Mary's has seen steady population growth since 1970. The percent of the population in the labor force has remained fairly constant while unemployment has risen to 6.4 percent. Average wage and salary has risen consistently over the years, but the number of persons living under the poverty level took a significant jump in 2000 to over 1400 persons in 2000 from 975 in 1990. Those employed in farm, fish and forestry sector have seen a steady decline in their numbers since 1970 also. There were only 2 vessels registered with federal permits from the community in Table 5.1.5-72, but there were 42 persons listed in the fishing sector in Table 5.1.5-73. The state has 19 vessels registered with 9 of those having shrimp gear and 13 of those owners considered full time fishermen (Table 5.1.5-74).

St. Mary's Census Demographics

Table 5.1.5-63. Total Persons and Persons by Age category for St. Mary's, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	3364	3596	8187	13445
Persons Age 0-5	336	296	1070	1408
Persons Age 6-15	904	674	1465	2465
Persons Age 16-17	149	159	252	460
Persons Age 18-24	235	468	879	1677
Persons Age 25-34	536	513	1902	2355
Persons Age 35-44	443	455	1120	2210
Persons Age 45-54	328	474	684	1394
Persons Age 55-64	193	245	399	711
Persons Age 65+	129	260	416	765

Housing Tenure

Table 5.1.5-64. Housing Tenure for St. Mary's, Georgia 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	44.5	46.5
Percent Owner Occupied	**1990**	**2000**
	55.5	53.5

Residence in 1985 and 1995

Table 5.1.5-65. Residence in 1985 and 1995 for St. Mary's, Georgia 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	1,078	5,312
Same House	**1990**	**2000**
	2,161	3,934

Employment/Unemployment

Table 5.1.5-66. Employment and Unemployment for St. Mary's, Georgia 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000

Percent in labor force	73.4	74.2
Percent unemployed	5.9	6.6

Race

Table 5.1.5-67. Race for St. Mary's, Georgia 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	673	753	1405	2710
Latino Black Persons	0	0	0	41
Latino Persons	56	145	346	614
White Persons	2691	2781	6478	9969
Latino White Persons	56	109	192	298

Education

Table 5.1.5-68. Years of Education by Category for those 25 Years and Older for St. Mary's, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	370	344	251	200
25+ w/ 9-11 years education	377	410	545	730
25+ w/ HS diploma	638	657	1606	2328
25+ w/ 13-15 years. education	131	270	1012	998
25+ w/ College Degree	113	266	756	2184
Drop outs	37	30	49	28

Income and Poverty

Table 5.1.5-69. Average Household Wage/Salary and Persons Below the Poverty Level for St. Mary's, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	9224	19855	31056	42087
Poverty Level				
Persons Below Poverty Level	430	612	975	1488
Age 65+ Below Poverty Level	42	31	59	50
Households with Public Assistance	52	78	152	143

Industry

Table 5.1.5-70. Employment by Industry for St. Mary's, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	52	21	47	24
Construction	5	75	231	313
Business Services	13	24	138	355
Communication/Utilities	5	31	44	164
Manufacturing	676	618	490	705
Financial, Insurance & Real Estate	28	15	142	313
Services	23	95	186	2787
Wholesale/Retail Trade	217	142	825	1306
Transportation	145	274	558	142

Occupation

Table 5.1.5-71. Employment by Occupation for St. Mary's, Georgia 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	57	160	366	-
Clerical	132	2570	645	-
Craft	214	217	360	-
Exec/Managerial	72	139	340	-
Farm/Fish/Forest	10	18	34	0
Household Services	45	0	28	-
Laborer/Handler	111	97	150	-
Operative/Transport	254	219	91	-
Service, except Household	116	128	508	-
Technical	48	26	69	-

St. Marys' Fishing Demographics

Table 5.1.5-72. Number of Federal Permit by Type for St. Mary's, Georgia (Source: NMFS 2002).

Type of Permit	**1998**	**1999**	**2000**	**2001**
Total permitted vessels	3	3	2	2
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	0
Charter/Headboat for Snapper Grouper	0	0	0	0
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0

Shark	0	0	0	0
Rock Shrimp	3	3	2	2
Federal Dealers	0	0	0	0

Table 5.1.5-73. Employment in Fishing Related Industry for St. Mary's, Georgia (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	42
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	3
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	0
Marinas	713930	0
Total Fishing Employment		45

Table 5.1.5-74. Number of State Permit by Type for St. Mary's, Georgia (Source: GADNR 2002).

Type	Number
Commercial Fishing Vessel Registration	19
Vessels with shrimp gear	9
Full-time commercial fishermen	13
Part-time commercial fishermen	5

5.1.5.7 Georgia Fishing Infrastructure and Community Characterization

The following tables provide a general view of the presence or absence of fishing infrastructure located within the coastal communities of Georgia with substantial fishing activity. It should be noted that there are many other attributes that might have been included in this table, however, because of inconsistency in rapid appraisal for all communities, these items were selected as the most consistently reported or had secondary data available to determine presence or absence. It should also be noted that in some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. Table 5.1.5-75 offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 5.1.5-75. Fishing Infrastructure Table for Georgia Potential Fishing Communities

Community	Federal Commercial Permits (5+)	State Commercial Licenses (10+)	Federal Charter Permits (5+)	Seafood Landings	Seafood retail markets	Fish processors, Wholesale fish house	Recreational docks / marinas	Recreational Fishing Tournaments	Total
Tybee Island	-	-	-	-	+	-	+	-	2

Thunderbolt	-	-	-	-	-	-	+	-	1
Darien	-	+	-	+	+	+	+	-	5
Brunswick	+	+	-	-	+	+	+	+	6
St. Simons Island	-	-	-	-	+	+	+	+	4
St. Mary's	-	+	-	-	+	-	+	+	4

In attempting a preliminary characterization of potential fishing communities in Table 5.1.5-76, we have provided a grouping of communities that appear to have more involvement in various fishing enterprises and therefore are classified as primarily involved. These communities have considerable fishing infrastructure, but also have a history and culture surrounding both commercial and recreational fishing that contributes to an appearance and perception of being a fishing community in the mind of residents and others. The communities are not ranked in any particular order, this is merely a categorization.

Table 5.1.5-76. Preliminary Characterization of Potential Fishing Communities in Georgia

Primarily-Involved	Secondarily-Involved
Darien	Tybee Island
Brunswick	Thunderbolt
St. Mary's	
St. Simons Island	

Many of these communities are in transition due to various social and demographic changes from coastal development, growing populations, increasing tourism, changing regulations, etc. This preliminary characterization is just that and should not be considered a definite designation as fishing community, but a general guide for locating communities that may warrant consideration as a potential fishing community.

5.1.6 Florida Communities with Substantial Fishing Activity

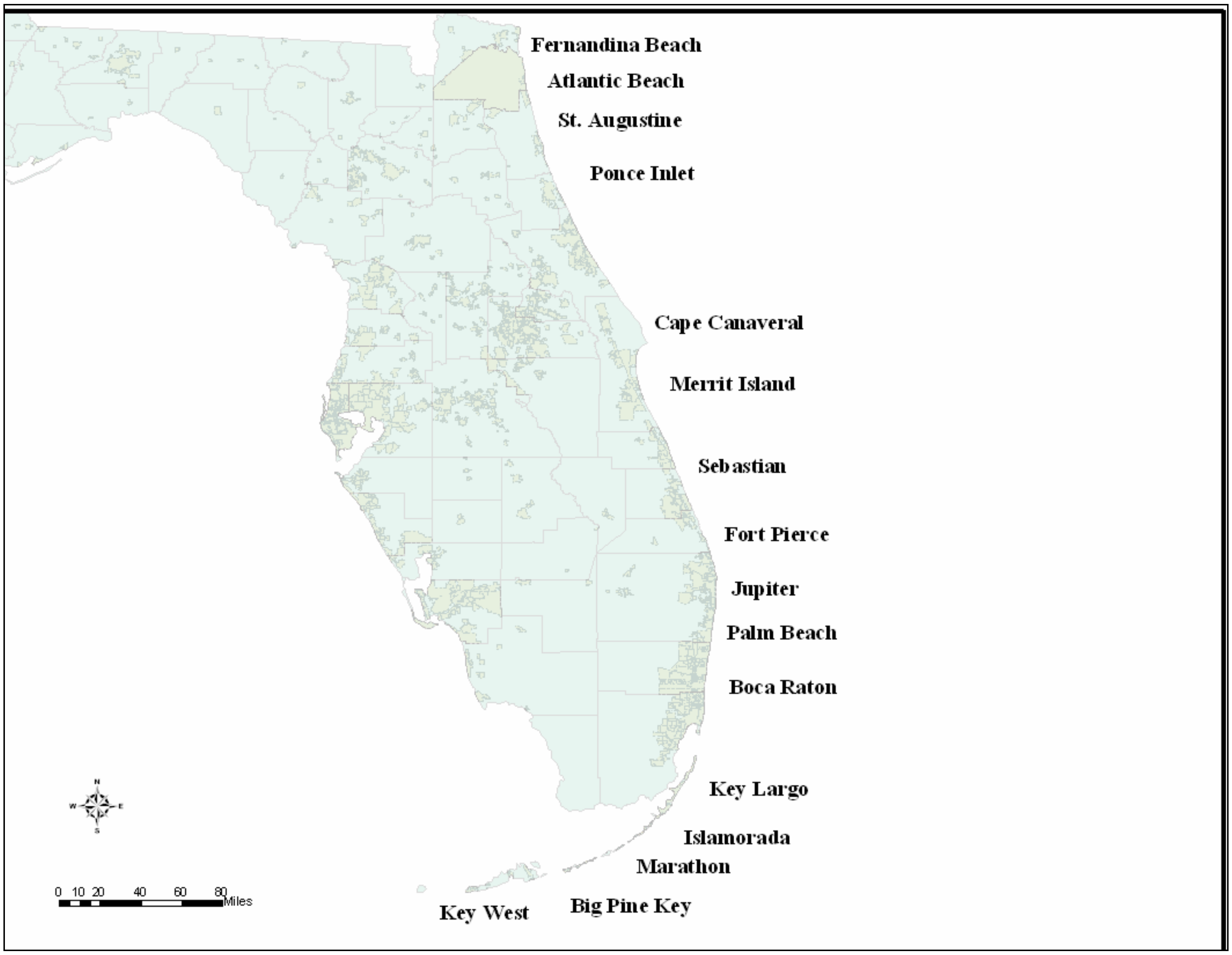


Figure 5.1.6-1. Florida Communities with Substantial Fishing Activity as Identified by South Atlantic Advisory Panels.

Figure 5.1.6-1 illustrates those communities which were identified originally by the advisory panels as communities that might be considered fishing communities. They are included below with brief profiles and census and fishing demographic tables used to describe the communities.

The East coast of Florida landed over 37 million and over 32 million pounds of seafood in 2001 and 2002 respectively. The value of those landings was over 48 million dollars in 2001 and over 38 million dollars in 2002. Florida had one port, Key West, listed in the top 50 U.S. ports in terms of pounds landed and in terms of value of landings there were three ports for Florida: Key West, St. Petersburg and Ft. Myers. According to NMFS (2002) Florida recreational fishermen landed over 68 million pounds of finfish in 2001 and in 2002 that number dropped to just over 59 million pounds for the entire state. There were 93 processors in all of Florida for 2001 with a total of 2,654 employees and 284 wholesale dealers employing 2,485. In the years 2001 and 2002, Florida had approximately 2,136 and 1,934 registered vessels respectively. During those same years there were 5,502 boats registered in 2001 and in 2002 that number was 4,438.

Table 5.1.6-1. Number of Federal Permit by Type for Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	3384	1949	2432	2311
Commercial King Mackerel	1359	1216	1559	1519
Commercial Spanish Mackerel	1540	1228	1479	1377
Commercial Spiny Lobster	574	457	532	498
Charter/Headboat for Coastal Pelagics	790	275	397	417
Charter/Headboat for Snapper Grouper	401	182	241	257
Snapper Grouper Class 1	83	564	676	641
Snapper Grouper Class 2	48	239	269	258
Swordfish	460	58	79	75
Shark	1039	212	251	242
Rock Shrimp	167	149	176	167

Florida has seen the number of permitted vessels decline over the past four years (Table 5.1.6-1) with a high of 3,384 vessels in 1998 and in 2001 that number dropped to 2311. The majority of those vessels held either of both king mackerel permits or Spanish mackerel permits. The next most commonly held permits were snapper grouper class 1 and spiny lobster.

5.1.6.1 Fernandina Beach (32034)

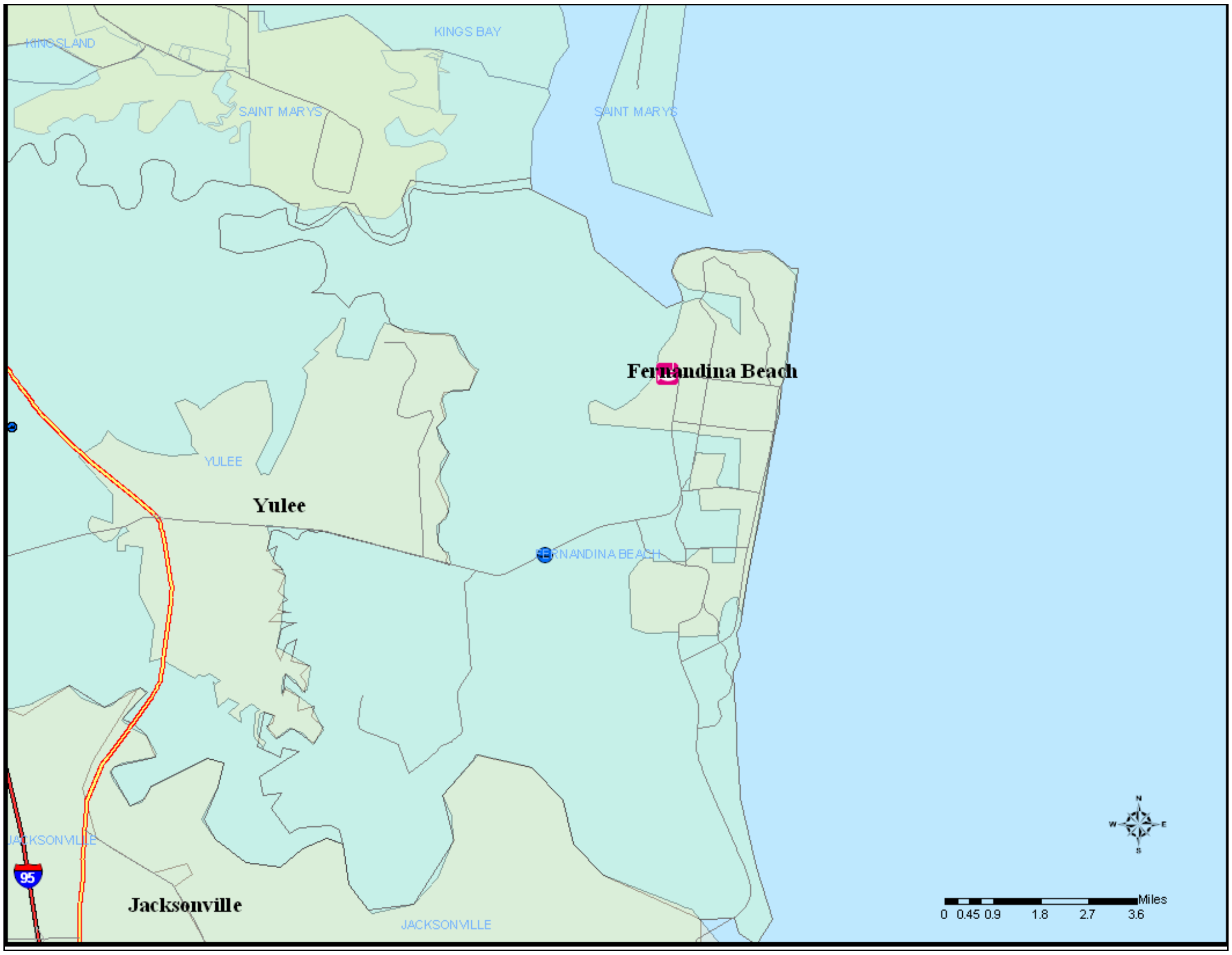


Figure 5.1.6-2. Fernandina Beach, Florida.

Fernandina Beach is located in Nassau County, Florida, on the northernmost barrier island (Amelia Island) of the state's east coast. The island extends from the mouth of the St. Mary's River southward to Nassau Sound and is just over thirteen miles long and two miles wide (Jacob et al. 2002).

Fishing has had a long history in the community as immigrants in the 1700s were net fishermen seeking mullet, sheepshead, crabs, trout, turtles, drum, oysters and "pogies" (menhaden). Agriculture, forestry, fishing, and tourism were the most prominent industries in the Fernandina Beach area during the early 1900's. Shrimp fishing was developed in 1902 by a Sicilian immigrant living in Fernandina Beach who fished with a small diesel engine on his boat to pull a shrimp seine net across the ocean floor. Commercial shrimp fishing grew substantially when a New England fisherman, who was searching the Florida peninsula for blue fish, began harvesting large quantities of shrimp. Shrimp processing and shipment facilities were soon developed in Fernandina Beach. That fishing heritage has been preserved in Old Town Fernandina Beach, which has been designated a National Historic District. Today, Fernandina's harbor is filled with commercial and charter fishing boats, shrimp boats and private vessels. Seafood restaurants contribute to the fishing village theme which continues to resonate throughout the community although tourism has become the primary source of economic revenue (Jacob et al. 2002).

Fernandina Beach Census Demographics

Population

Table 5.1.6-2. Total Persons and Persons by Age category for Fernandina Beach, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	6955	7224	8765	10242
Persons Age 0-5	586	468	652	682
Persons Age 6-15	1594	1252	1121	1128
Persons Age 16-17	371	351	252	234
Persons Age 18-24	577	723	805	712
Persons Age 25-34	754	1076	1344	1063
Persons Age 35-44	831	786	1457	1565
Persons Age 45-54	755	816	903	1550
Persons Age 55-64	767	878	923	1337
Persons Age 65+	599	791	1308	1971

Housing Tenure

Table 5.1.6-3. Housing Tenure for Fernandina Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	35.2	31.8
Percent Owner Occupied	**1990**	**2000**
	64.8	68.2

Residence in 1985 and 1995

Table 5.1.6-4. Residence in 1985 and 1995 for Fernandina Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	1672	1776
Same House	**1990**	**2000**
	3630	4802

Employment/Unemployment

Table 5.1.6-5. Employment and Unemployment for Fernandina Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000

Percent in labor force	63.9	58.9
Percent unemployed	4.5	7.1

Race

Table 5.1.6-6. Race for Fernandina Beach, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	2136	2054	1975	1698
Latino Black Persons	13	61	0	10
Latino Persons	58	248	48	246
White Persons	4819	5158	6739	8434
Latino White Persons	45	187	48	168

Education

Table 5.1.6-7. Years of Education by Category for those 25 Years and Older for Fernandina Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	1128	796	556	438
25+ w/ 9-11 years education	767	625	754	713
25+ w/ HS diploma	1159	1493	1869	2019
25+ w/ 13-15 years. education	301	707	1071	2140
25+ w/ College Degree	351	726	1371	3145
Drop outs	127	74	67	80

Income and Poverty

Table 5.1.6-8. Average Household Wage/Salary and Persons Below the Poverty Level for Fernandina Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	$8499	$19526	$35352	$40893
Poverty Level				
Persons Below Poverty Level	1366	897	1211	1026
Age 65+ Below Poverty Level	214	146	189	158
Households with Public Assistance	145	251	215	97

Industry

Table 5.1.6-9. Employment by Industry for Fernandina Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	79	90	71	25
Construction	169	58	305	341
Business Services	60	68	156	304
Communication/Utilities	63	73	59	161
Manufacturing	921	769	686	442
Financial, Insurance & Real Estate	74	199	220	295
Services	106	186	268	2112
Wholesale/Retail Trade	709	556	1389	1230
Transportation	448	537	916	248
Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	79	90	71	25
Construction	169	58	305	341
Business Services	60	68	156	304
Communication/Utilities	63	73	59	161
Manufacturing	921	769	686	442
Financial, Insurance & Real Estate	74	199	220	295
Services	106	186	268	2112
Wholesale/Retail Trade	709	556	1389	1230
Transportation	448	537	916	248

Occupation

Table 5.1.6-10. Employment by Occupation for Fernandina Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	95	197	426	-
Clerical	381	3630	440	-
Craft	319	385	491	-
Exec/Managerial	318	363	636	-
Farm/Fish/Forest	22	74	90	12
Household Services	114	63	35	-
Laborer/Handler	235	133	162	-
Operative/Transport	391	190	155	-
Service, except Household	517	601	773	-
Technical	15	108	189	-

Fernandina Beach Fishing Demographics

Table 5.1.6-11. Number of Federal Permit by Type for Fernandina Beach, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	14	7	9	13
Commercial King Mackerel	1	0	1	1
Commercial Spanish Mackerel	2	0	1	1
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	5	0	1	5
Charter/Headboat for Snapper Grouper	3	0	1	3
Snapper Grouper Class 1	1	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	2	0	0	0
Rock Shrimp	4	7	8	8
Federal Dealers	1	1	1	1

Table 5.1.6-12. Employment in Fishing Related Industry for Fernandina Beach, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	3
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	7
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	10
Marinas	713930	10
Total Fishing Employment		30

5.1.6.2 Atlantic Beach (32233)

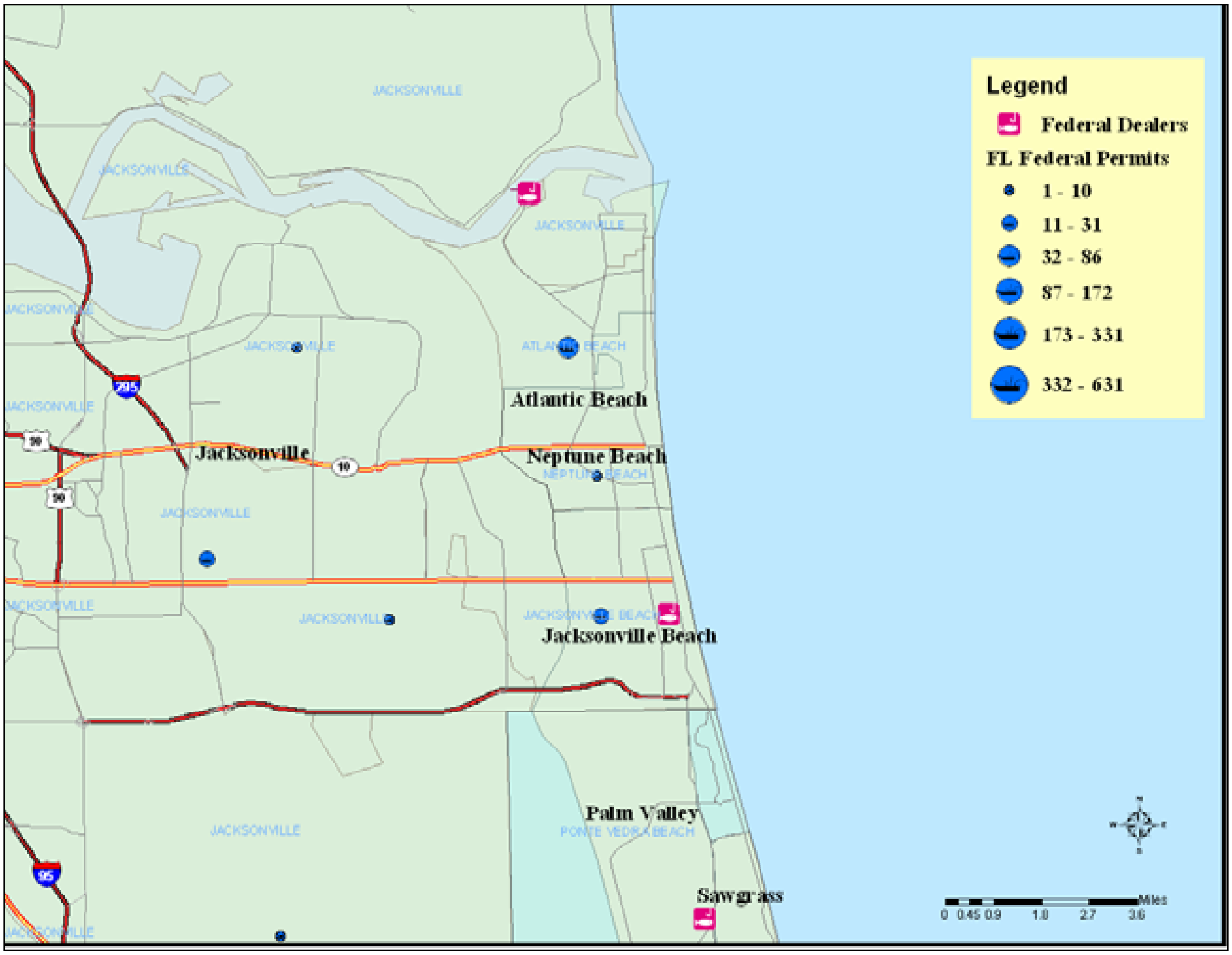


Figure 5.1.6-3. Atlantic Beach, Florida.

The community of Atlantic Beach has remained fairly small throughout its history. The arrival of Henry Flagler's Florida East Coast Railroad in 1900 helped spur development and prominence within this coastal community. However, it was not until the construction of the Mayport Naval Station in the 1940s and the completion of the Matthews Bridge in the 1950s that the area truly became ready for development. Beginning in the 1990s, the Atlantic Beach community embarked on environmental endeavors regarding their aquatic resources. They created the Tideviews Preserve and the Dutton Island Preserve. Among some of the many activities offered in the Dutton Island Preserve, fishing off the pier is a popular activity for park visitors.

Atlantic Beach has seen steady growth in its population. There has been a decline in the percent of the population in the labor force and unemployment has dropped to 3.3 percent in 2000. Average wage and salary rose significantly between 1980 and 1990, but only slightly in 2000. The number of persons living below the poverty level has dropped every decade but still is around 1100 person in 2000. Jobs in the sector of farm, fish and forestry have fluctuated over the past three decades, but dropped to low levels in 2000.

Although there is only one vessel with federal permits in Atlantic Beach (Table 5.1.6-22) there are 56 persons employed in the fish and seafood sector according to Table 5.1.6-23.

Atlantic Beach Census Demographics

Population

Table 5.1.6-13. Total Persons and Persons by Age category for Atlantic Beach, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	7847	11636	13474
Persons Age 0-5	.	598	1172	947
Persons Age 6-15	.	1336	1483	1669
Persons Age 16-17	.	351	351	418
Persons Age 18-24	.	1068	1177	945
Persons Age 25-34	.	1421	2236	1727
Persons Age 35-44	.	998	1716	1948
Persons Age 45-54	.	843	1366	2210
Persons Age 55-64	.	580	1131	1040
Persons Age 65+	.	567	1004	1995

Housing Tenure

Table 5.1.6-14. Housing Tenure for Atlantic Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	37.7	35.0
Percent Owner Occupied	**1990**	**2000**
	62.3	65.0

Residence in 1985 and 1995

Table 5.1.6-15. Residence in 1985 and 1995 for Atlantic Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	3238	3201
Same House	**1990**	**2000**
	4215	6702

Employment/Unemployment

Table 5.1.6-16. Employment and Unemployment for Atlantic Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	71.8	65.0

Percent unemployed	4.7	3.3

Race

Table 5.1.6-17. Race for Atlantic Beach, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	1470	1813	1669
Latino Black Persons	.	35	0	28
Latino Persons	.	271	334	559
White Persons	.	5933	9271	10627
Latino White Persons	.	106	164	365

Education

Table 5.1.6-18. Years of Education by Category for those 25 Years and Older for Atlantic Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	343	323	316
25+ w/ 9-11 years education	.	704	896	985
25+ w/ HS diploma	.	1507	1778	2312
25+ w/ 13-15 years. education	.	887	1530	2512
25+ w/ College Degree	.	968	2319	4395
Drop outs	.	78	116	29

Income and Poverty

Table 5.1.6-19. Average Household Wage/Salary and Persons Below the Poverty Level for Atlantic Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$18276	$41525	$48353
Poverty Level				
Persons Below Poverty Level	.	1377	1248	1179
Age 65+ Below Poverty Level	.	159	58	110
Households with Public Assistance	.	161	249	128

Industry

Table 5.1.6-20. Employment by Industry for Atlantic Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	77	98	24
Construction	.	205	365	521
Business Services	.	104	260	564
Communication/Utilities	.	80	147	219
Manufacturing	.	229	447	462
Financial, Insurance & Real Estate	.	157	230	644
Services	.	320	547	3107
Wholesale/Retail Trade	.	648	2054	1530
Transportation	.	874	1451	293

Occupation

Table 5.1.6-21. Employment by Occupation for Atlantic Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	462	1064	-
Clerical	.	5250	701	-
Craft	.	379	373	-
Exec/Managerial	.	386	986	-
Farm/Fish/Forest	.	57	86	36
Household Services	.	25	39	-
Laborer/Handler	.	97	165	-
Operative/Transport	.	68	114	-
Service, except Household	.	675	942	-
Technical	.	75	162	-

Atlantic Beach Fishing Demographics

Table 5.1.6-22. Number of Federal Permit by Type for Atlantic Beach, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	1	0	0	1
Commercial King Mackerel	0	0	0	0
Commercial Spanish Mackerel	0	0	0	0
Commercial Spiny Lobster	0	0	0	0
Charter/Headboat for Coastal Pelagics	0	0	0	1
Charter/Headboat for Snapper Grouper	0	0	0	1
Snapper Grouper Class 1	0	0	0	0
Snapper Grouper Class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.6-23. Employment in Fishing Related Industry for Atlantic Beach, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	3
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	56
Fish and Seafood Markets	445220	0
Marinas	713930	3
Total Fishing Employment		62

5.1.6.3 St. Augustine (32084, 32085, 32086, 32092)

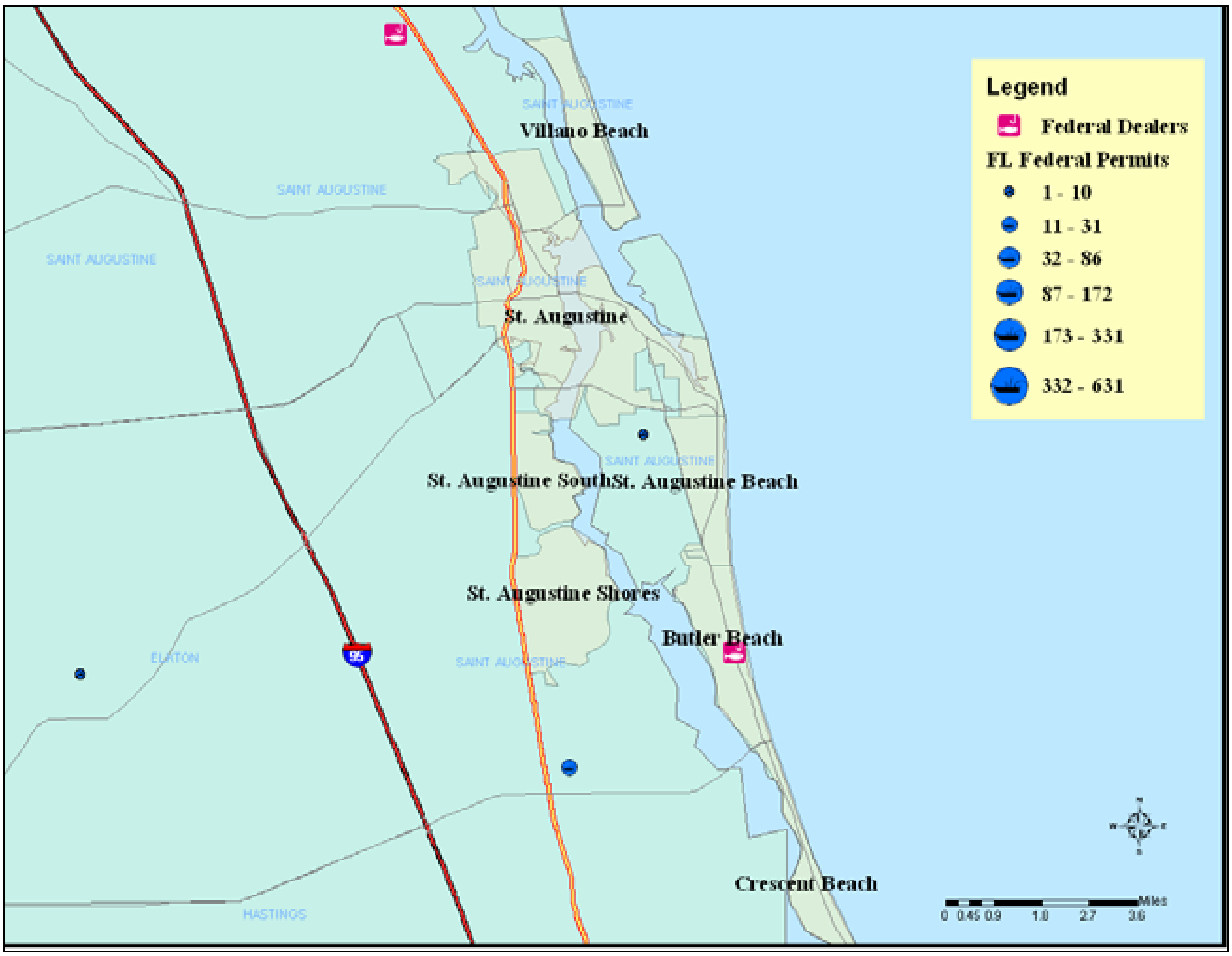


Figure 5.1.6-4. St. Augustine, Florida.

St. Augustine has the distinction of being the oldest European city in the United States. First sited by the Spanish explorer Don Juan Ponce de Leon in 1513, it was not settled until 1565 by Don Pedro Menendez de Aviles, a Spanish admiral, in the name of King Phillip II. The town's boom did not occur until the 1880s with the arrival of Henry M.

Flagler. His goal was to turn St. Augustine into a winter resort for wealthy Americans. It was this thinking that transformed the town. The construction of the railroad linked the city with much of the east coast. Flagler built three large hotels to help fulfill his dream of a tourist mecca. By the mid-1900s, St. Augustine's local economy was dominated by tourism.

The commercial fishing industry began in the St. Augustine/Fernandina area around 1900 with the arrival of a Sicilian immigrant named Sallecito Salvador. He placed an engine on his boat that allowed him to pull a shrimp seine across the ocean floor in 1902, and in 1906, he began his company, S. Salvador & Sons. Salvador moved his business to St. Augustine in 1922, where it thrived until 1929. Shrimp catch levels soared from about 1934 to 1940. These stories illustrate the longstanding culture of fishing in the St. Augustine area and the importance it holds for many of the fishing families there. Commercial fishing still continues at the port, the oldest continuously active port in the United States. Boat building, tourism, and recreational activities are also important to St. Augustine's port.

St. Augustine has seen a steady decline in its population since 1970. Both the percent of population in the labor force and unemployment have remained relatively stable over the years. Average wage and salary has grown steadily, while the number of person living below the poverty level has dropped. The number of people employed in farm, fish and forestry has also dropped significantly over the past three decades, with the most pronounced decline from 1990 to 2000. St. Augustine has 28 vessels with federal permits and the majority of them have charter permits for either snapper grouper or coastal pelagics (Table 5.1.6-33). There is significant employment in fishing related business as there are over 370 people employed in boat building according to Table 5.1.6-34 and another 75 in the seafood processing sector.

St. Augustine Census Demographics

<u>Population</u>

Table 5.1.6-24. Total Persons and Persons by Age category for St. Augustine, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	12352	11985	11692	11512
Persons Age 0-5	676	574	696	560
Persons Age 6-15	2550	1708	1304	1069
Persons Age 16-17	510	425	367	214
Persons Age 18-24	1242	1833	1720	1767
Persons Age 25-34	927	1418	1522	1181
Persons Age 35-44	1181	909	1404	1542
Persons Age 45-54	1300	1114	1163	1760
Persons Age 55-64	1540	1363	1098	1187
Persons Age 65+	2197	2529	2418	2232

Housing Tenure

Table 5.1.6-25. Housing Tenure for St. Augustine, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	37.9	40.3
Percent Owner Occupied	**1990**	**2000**
	62.1	59.7

Residence in 1985 and 1995

Table 5.1.6-26. Residence in 1985 and 1995 for St. Augustine, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	2239	2547
Same House	**1990**	**2000**
	5388	5121

Employment/Unemployment

Table 5.1.6-27. Employment and Unemployment for St. Augustine, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	57.3	61.9
Percent unemployed	5.6	5.4

Race

Table 5.1.6-28. Race for St. Augustine, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	2679	2527	2303	1,741
Latino Black Persons	0	45	30	6
Latino Persons	139	367	560	361
White Persons	9673	9383	9154	9,193
Latino White Persons	139	279	438	221

Education

Table 5.1.6-29. Years of Education by Category for those 25 Years and Older for St. Augustine, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**

25+ w/ 0-8 years education	2293	1597	697	519
25+ w/ 9-11 years education	1291	1352	1152	1099
25+ w/ HS diploma	2193	2128	2037	2430
25+ w/ 13-15 years. education	615	1204	1528	2568
25+ w/ College Degree	753	1052	1789	3074
Drop outs	240	165	116	66

Income and Poverty

Table 5.1.6-30. Average Household Wage/Salary and Persons Below the Poverty Level for St. Augustine, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$6958	$13757	$26572	$32358
Poverty Level				
Persons Below Poverty Level	2927	1876	1697	1664
Age 65+ Below Poverty Level	760	355	301	200
Households with Public Assistance	275	422	372	125

Industry

Table 5.1.6-31. Employment by Industry for St. Augustine, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	142	126	67	19
Construction	259	327	287	353
Business Services	111	127	253	226
Communication/Utilities	149	109	91	202
Manufacturing	522	441	437	423
Financial, Insurance & Real Estate	342	304	292	420
Services	227	193	249	2827
Wholesale/Retail Trade	1622	1237	2203	1941
Transportation	948	1123	1421	225

Occupation

Table 5.1.6-32. Employment by Occupation for St. Augustine, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	323	510	866	-
Clerical	726	6710	569	-
Craft	568	536	509	-
Exec/Managerial	481	631	536	-

Farm/Fish/Forest	86	141	105	43
Household Services	145	103	36	-
Laborer/Handler	231	220	149	-
Operative/Transport	232	256	175	-
Service, except Household	898	1125	1040	-
Technical	58	124	140	-

St. Augustine Fishing Demographics

Table 5.1.6-33. Number of Federal Permit by Type for St. Augustine, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	34	14	15	28
Commercial King Mackerel	9	8	8	7
Commercial Spanish Mackerel	10	8	8	8
Commercial Spiny Lobster	3	1	2	2
Charter/Headboat for Coastal Pelagics	1	4	5	19
Charter/Headboat for Snapper Grouper	18	4	5	18
Snapper Grouper Class 1	1	7	9	9
Snapper Grouper Class 2	3	3	2	2
Swordfish	2	0	0	0
Shark	3	0	0	0
Rock Shrimp	1	1	1	1
Federal Dealers				

Table 5.1.6-34. Employment in Fishing Related Industry for St. Augustine, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	75
Boat Building	336612	375
Fish and Seafoods	422460	3
Fish and Seafood Markets	445220	0
Marinas	713930	0
Total Fishing Employment		453

5.1.6.4 Ponce Inlet (32127)

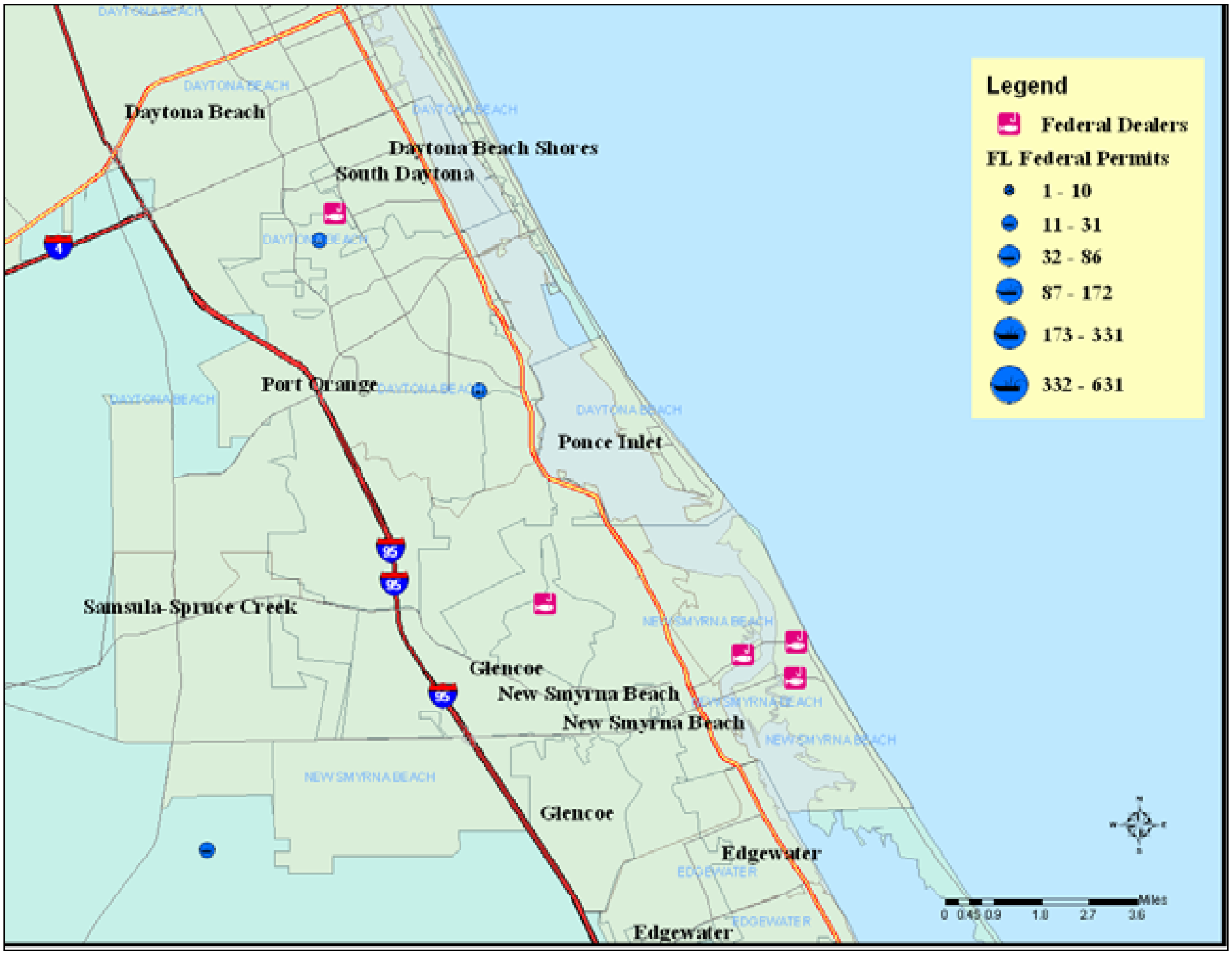


Figure 5.1.6-5. Ponce Inlet, Florida.

The town of Ponce Inlet was originally referred to as the port of mosquitoes until the early twentieth century and is located at the southern boundary of Ponce de Leon Inlet. There is some controversy as to whom actually first stepped foot on Ponce Inlet; perhaps it was Ponce de Leon in 1513 that went ashore to high ground to search for a lost vessel. Others believe it may have been Frenchman Jean Ribault in 1563 (Davies, 1995).

Sport fishing became the mainstay for most residents of the Ponce Inlet area. The industry began to grow in the 1950s; however, many found that it was not very profitable. “In the winter the waters were so uncertain that sometimes the boats rocked at the dock for days while the tourist sought other recreation” (Davies, 1995). However, when charter fishermen in the Florida Keys heard about the good conditions in the summer months in northern Florida, they would work out of the “growing number of docks from Daytona to the Inlet” (Davies, 1995). The arrival of the head boat scared many of the original fishermen because they thought it would ruin the business. Eventually, the locals understood the economic opportunities associated with the head boat. By the 1960s, the sport fishing industry was quite successful for the fishermen of Ponce Inlet (Davies, 1995).

The population of Ponce Inlet has grown over the years, but most of that growth came within the last decade. The percent of population in the labor force has remained around 45 percent and unemployment has dropped to a low of 1.9 in 2000 from 4.5 in 1990. Average wage and salary have risen significantly over the years, but so has the number of persons living below the poverty level. The number of people who work in farm, fish and forestry has dropped to fewer than 3 people according to census measures of occupation and industry. However Table 5.1.6-44 shows over 25 vessels with federal permits homeported in the community with the majority of those with charter permits for either snapper grouper or coastal pelagics. There is also some fishing related employment according to Table 5.1.6-45, which indicates over 180 people employed in the marinas sector.

Ponce Inlet Census Demographics

Population

Table 5.1.6-35. Total Persons and Persons by Age category for Ponce Inlet, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	1003	1704	2514
Persons Age 0-5	.	20	55	37
Persons Age 6-15	.	86	70	184
Persons Age 16-17	.	44	24	52
Persons Age 18-24	.	88	104	83
Persons Age 25-34	.	121	185	131
Persons Age 35-44	.	99	250	266
Persons Age 45-54	.	120	190	450
Persons Age 55-64	.	250	350	542
Persons Age 65+	.	163	476	769

Housing Tenure

Table 5.1.6-36. Housing Tenure for Ponce Inle, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	14.6	9.6
Percent Owner Occupied	**1990**	**2000**
	85.4	90.4

Residence in 1985 and 1995

Table 5.1.6-37. Residence in 1985 and 1995 for Ponce Inle, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000

		274	402
Same House		**1990**	**2000**
		716	1250

Employment/Unemployment

Table 5.1.6-38. Employment and Unemployment for Ponce Inlet, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	48.1	45.6
Percent unemployed	4.2	1.9

Race

Table 5.1.6-39. Race for Ponce Inlet, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	0	1	14
Latino Black Persons	.	0	1	1
Latino Persons	.	16	21	39
White Persons	.	982	1662	2420
Latino White Persons	.	7	20	36

Education

Table 5.1.6-40. Years of Education by Category for those 25 Years and Older for Ponce Inlet, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	52	40	50
25+ w/ 9-11 years education	.	85	145	118
25+ w/ HS diploma	.	265	463	557
25+ w/ 13-15 years. education	.	184	346	556
25+ w/ College Degree	.	167	326	877
Drop outs	.	7	2	0

Income and Poverty

Table 5.1.6-41. Average Household Wage/Salary and Persons Below the Poverty Level for Ponce Inlet, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	15923	33162	52112
Poverty Level				

Persons Below Poverty Level	.	66	116	128
Age 65+ Below Poverty Level	.	6	15	24
Households with Public Assistance	.	10	22	0

Industry

Table 5.1.6-42. Employment by Industry for Ponce Inlet, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	.	16	20	0
Construction	.	16	40	71
Business Services	.	26	23	67
Communication/Utilities	.	6	13	26
Manufacturing	.	28	57	99
Financial, Insurance & Real Estate	.	21	31	108
Services	.	49	83	518
Wholesale/Retail Trade	.	69	235	238
Transportation	.	107	211	55

Occupation

Table 5.1.6-43. Employment by Occupation for Ponce Inlet, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	.	74	131	-
Clerical	.	510	93	-
Craft	.	25	53	-
Exec/Managerial	.	70	121	-
Farm/Fish/Forest	.	16	20	2
Household Services	.	0	0	-
Laborer/Handler	.	0	26	-
Operative/Transport	.	2	19	-
Service, except Household	.	59	113	-
Technical	.	5	28	-

Ponce Inlet Fishing Demographics

Table 5.1.6-44. Number of Federal Permit by Type for Ponce Inlet, Florida (Source: NMFS 2002).

Type of Permit	**1998**	**1999**	**2000**	**2001**
Total permitted vessels	28	13	18	29
Commercial King Mackerel	11	7	10	10
Commercial Spanish Mackerel	12	6	12	11
Commercial Spiny Lobster	4	2	2	2

Charter/Headboat for Coastal Pelagics	21	8	13	25
Charter/Headboat for Snapper Grouper	22	8	12	22
Snapper Grouper Class 1	1	11	12	12
Snapper Grouper Class 2	0	0	0	0
Swordfish	4	0	1	1
Shark	11	5	7	7
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.6-45. Employment in Fishing Related Industry for Ponce Inlet, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	6
Fish and Seafoods	422460	3
Fish and Seafood Markets	445220	0
Marinas	713930	181
Total Fishing Employment		190

5.1.6.5 Merritt Island (32952, 32953)

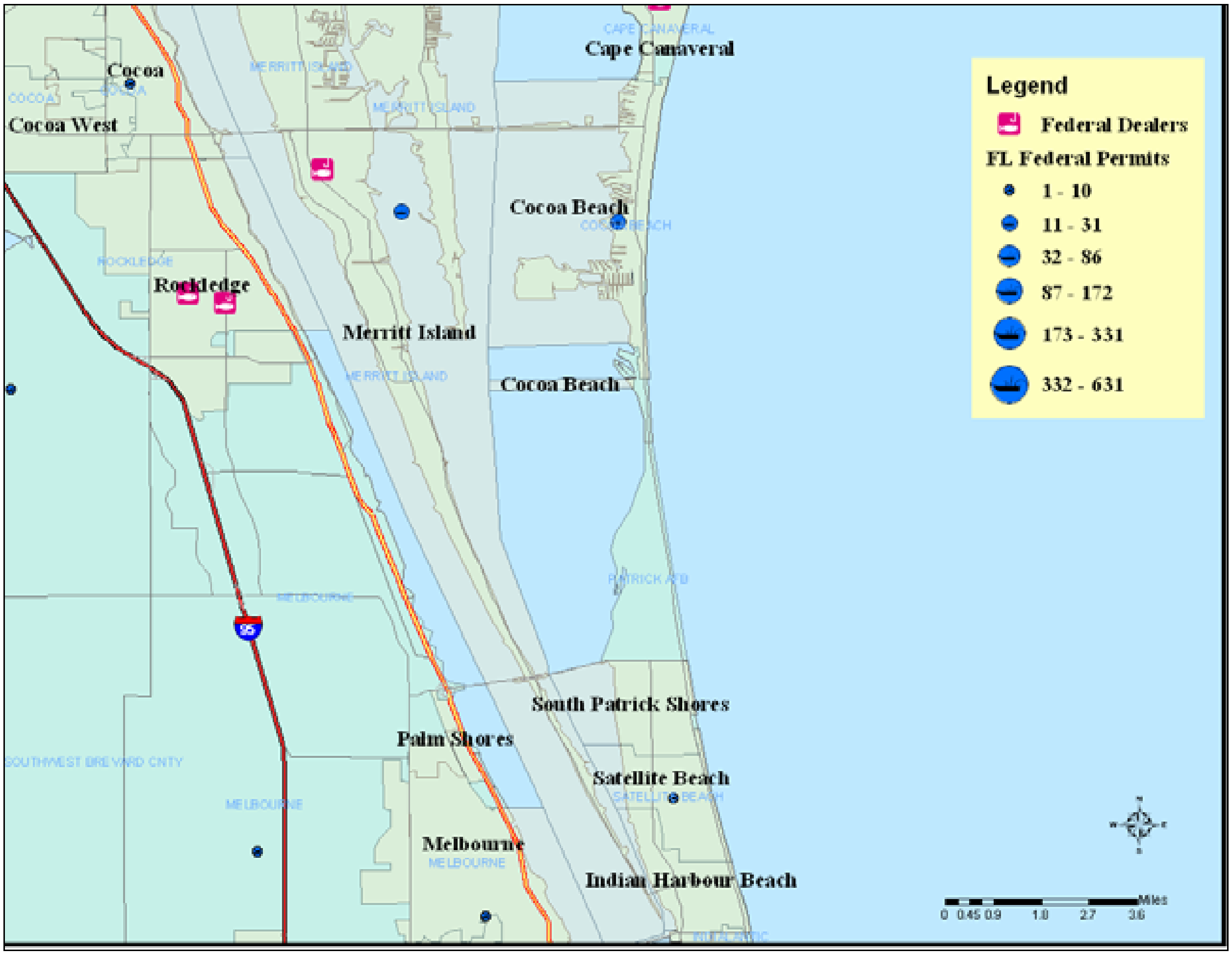


Figure 5.1.6-6. Merritt Island, Florida.

Merritt Island's population has grown slowly over the past three decades. The percent of the population in the labor force has dropped slightly over the past ten years, but unemployment has increased slightly. Average wage and salary have increased to over $40,000 for the year 2000, but the number of persons living under the poverty level has also grown considerably. As for most coastal communities the number of people working in the farm, fish and forestry sector of the economy has dropped significantly over the past decade but has shown a steady decline prior to the 2000 census. Merritt Island has only 8 vessels with federal permits and half of them have charter permits (Table 5.1.6-55). There is substantial employment represented in the fishing related sector of boat building with over 1100 persons employed in that sector according to Table 5.1.6-56.

Merrit Island Census Demographics

Population

Table 5.1.6-46. Total Persons and Persons by Age category for Merritt Island, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	29233	30708	32886	36091
Persons Age 0-5	2822	1558	2346	2171
Persons Age 6-15	7486	4786	3929	4496
Persons Age 16-17	1095	1380	776	1158
Persons Age 18-24	2343	3448	2476	2191
Persons Age 25-34	4813	3804	5148	3335
Persons Age 35-44	4630	4126	4817	6038
Persons Age 45-54	3170	4308	4278	5182
Persons Age 55-64	1190	3802	4055	4323
Persons Age 65+	1068	3163	5061	7197

Housing Tenure

Table 5.1.6-47. Housing Tenure for Merritt Island, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	27.7	25.1
Percent Owner Occupied	**1990**	**2000**
	72.3	74.9

Residence in 1985 and 1995

Table 5.1.6-48. Residence in 1985 and 1995 for Merritt Island, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	7987	9158
Same House	**1990**	**2000**
	15381	18634

Employment/Unemployment

Table 5.1.6-49. Employment and Unemployment for Merritt Island, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	65.1	58.4
Percent unemployed	4.2	5.0

Race

Table 5.1.6-50. Race for Merritt Island, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	1586	1641	1711	1871
Latino Black Persons	32	3	41	47
Latino Persons	657	759	1067	1381
White Persons	27466	28602	30345	31565
Latino White Persons	520	698	887	995

Education

Table 5.1.6-51. Years of Education by Category for those 25 Years and Older for Merritt Island, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	1601	1878	877	796
25+ w/ 9-11 years education	2018	2282	2512	2858
25+ w/ HS diploma	5899	6905	6328	7416
25+ w/ 13-15 years. education	2936	4294	6082	7020
25+ w/ College Degree	2417	3844	5457	10002
Drop outs	223	191	98	90

Income and Poverty

Table 5.1.6-52. Average Household Wage/Salary and Persons Below the Poverty Level for Merritt Island, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$12011	$20355	$39680	$43532
Poverty Level				
Persons Below Poverty Level	2176	2512	2331	3334
Age 65+ Below Poverty Level	257	260	287	478
Households with Public Assistance	187	409	636	354

Industry

Table 5.1.6-53. Employment by Industry for Merritt Island, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	180	165	298	79
Construction	620	1014	1021	1142
Business Services	983	1001	918	1358
Communication/Utilities	312	416	371	494
Manufacturing	3169	2424	2965	2051
Financial, Insurance & Real Estate	2864	2209	2760	987
Services	357	743	1113	7378

Wholesale/Retail Trade	3156	2188	5105	3750
Transportation	1737	3107	3627	632

<u>Occupation</u>

Table 5.1.6-54. Employment by Occupation for Merritt Island, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	677	1805	2231	-
Clerical	1877	22430	2342	-
Craft	1426	1636	1936	-
Exec/Managerial	975	1861	2597	-
Farm/Fish/Forest	89	152	232	79
Household Services	94	13	15	-
Laborer/Handler	220	455	405	-
Operative/Transport	608	449	431	-
Service, except Household	1118	1367	2003	-
Technical	692	793	862	-

Merritt Island Fishing Demographics

Table 5.1.6-55. Number of Federal Permit by Type for Merritt Island, Florida (Source: NMFS 2002).

Type of Permit	**1998**	**1999**	**2000**	**2001**
Total Permitted Vessels	7	4	7	8
Commercial King Mackerel	3	3	6	5
Commercial Spanish Mackerel	4	3	2	0
Commercial Spiny Lobster	2	0	0	0
Charter/Headboat for Coastal Pelagics	1	0	1	4
Charter/Headboat for Snapper Grouper	0	0	1	4
Snapper Grouper Class 1	0	0	2	2
Snapper Grouper Class 2	0	0	0	0
Swordfish	2	0	0	0
Shark	4	1	1	0
Rock Shrimp	1	0	0	0
Federal Dealers	2	1	1	1

Table 5.1.6-56. Employment in Fishing Related Industry for Merritt Island, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	**NAIC Code**	**Number Employed**
Fishing	114100	3
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	1125
Fish and Seafoods	422460	18
Fish and Seafood Markets	445220	7

Marinas	713930	23
Total Fishing Employment		1176

5.1.6.6 Cape Canaveral (32920)

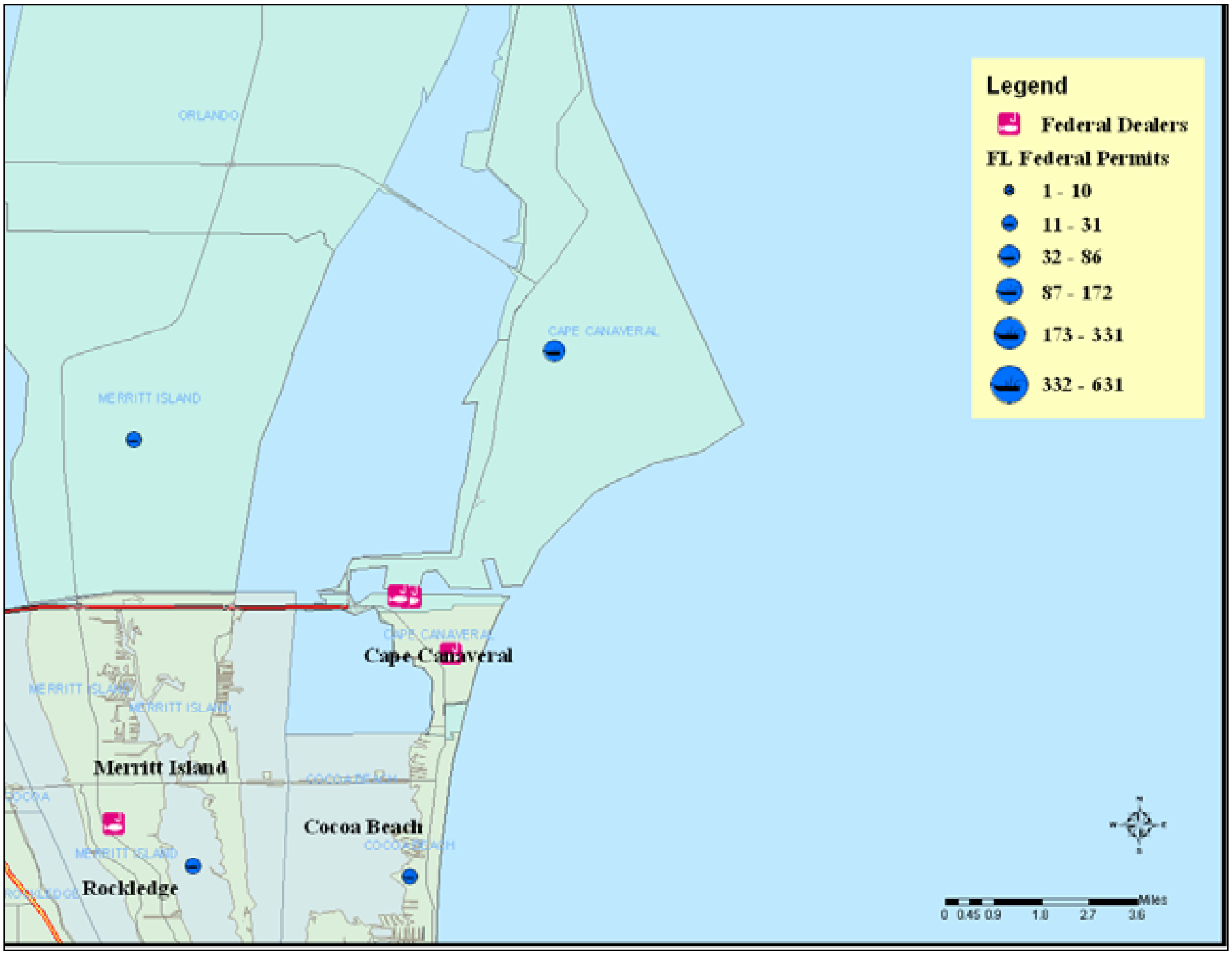


Figure 5.1.6-7. Cape Canaveral, Florida.

Cape Canaveral received its name from the Spanish explorers who found it in the early 1500s. The word "Cape" was used to describe the land formation, and the word "Canaveral" comes from the Spanish word for "canebreak." There is much debate over the exact translation and meaning of the name. A traveling exhibition for the Smithsonian Institute translates Cape Canaveral as "Place of the Cane Bearers," so named by Spanish explorer Francisco Gordillo after he was shot by an Ais Indian arrow made of cane. Others believe it should be translated as "Point of Reeds" or "Point of Canes" because the Spanish mistook some of the indigenous plants for sugar cane. Whatever the exact translation of the name may be, all agree that it is of Spanish origin.

Even before the area of Cape Canaveral was settled, it was an important landmark for sailors. Once sighted, they would turn northeastward for the journey back to Europe. Douglas D. Dummitt arrived in the area in the 1820s, establishing Dummitt Grove on

Merritt Island. He used the Indian River to ship his oranges northward, beginning in 1828. However, the actual geographic area known as Cape Canaveral was not settled until the 1840s. Cut off from the mainland, this small community remained self-reliant until the late 1800s.

The city of Cape Canaveral really began to expand in the early 1920s when a group of retired Orlando journalists were vacationing in the area and appraising its value. They invested over $150,000 in the surrounding beach areas, calling it Journalista, the area today known as Avon-by-the-Sea. Instead of the area becoming solely a beach resort for wealthy inland residents and northerners, many fishermen moved into the area as well. However, with the establishment and expansion of the space program in the United States in the late 1950s and early 1960s, Cape Canaveral, Titusville, Merritt Island, and the surrounding communities truly began to expand.

Today, the residents of Cape Canaveral and the rest of Brevard County rely on the surrounding waters. Port Canaveral, constructed in the 1950s, is the second busiest cruise port in the world and home to many charter fishing companies in the area. The more than three dozen charter fishing boats offer half-day, three-quarter-day, full-day, and gulf stream trips for dolphin, tuna, king and Spanish mackerel, wahoo, redfish, tarpon, snook, snapper, grouper, and many others. Both light tackle flats fishing on the Indian and Banana Rivers and Mosquito Lagoon as well as deep sea fishing are available. Most of the boat captains are second or third generation fishermen. The history of fishing in Brevard County dates back more than 100 years.

Cape Canaveral's population has grown steadily over the years while the percent of the population in the labor force has dropped. Unemployment has also dropped but remains above 5 percent. Average wage and salary has grown while the number of persons living below the poverty level has dropped from a high in 1990 of 1282 to 1035 in 2000. The number of persons working in the fish, farm and forestry sector has dropped significantly to only 17 persons in 2000 for both occupation and industry. Cape Canaveral has 15 vessels with federal permits homeported there (Table 5.1.6-66) with a large portion of the employment in fishing related business in marinas with 125 according to Table 5.1.6-67 with 35 in boat building and 17 in fish and seafood.

Cape Canaveral Census Demographics

Population

Table 5.1.6-57. Total Persons and Persons by Age category for Cape Canaveral, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	4258	5733	8014	8954
Persons Age 0-5	352	251	466	308
Persons Age 6-15	618	444	540	509
Persons Age 16-17	81	100	100	163

Persons Age 18-24	838	1165	789	589
Persons Age 25-34	855	1073	1870	1155
Persons Age 35-44	664	639	1239	1504
Persons Age 45-54	435	552	850	1416
Persons Age 55-64	221	734	867	1138
Persons Age 65+	132	721	1293	2172

Housing Tenure

Table 5.1.6-58. Housing Tenure for Cape Canaveral, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	58.1	50.4
Percent Owner Occupied	**1990**	**2000**
	41.9	49.6

Residence in 1985 and 1995

Table 5.1.6-59. Residence in 1985 and 1995 for Cape Canaveral, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	2371	2812
Same House	**1990**	**2000**
	2117	3196

Employment/Unemployment

Table 5.1.6-60. Employment and Unemployment for Cape Canaveral, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	70.2	59.6
Percent unemployed	6.8	5.3

Race

Table 5.1.6-61. Race for Cape Canaveral, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	0	182	277	119
Latino Black Persons	0	0	40	7
Latino Persons	95	159	374	307
White Persons	4242	5410	7545	8,114
Latino White Persons	95	121	300	245

Education

Table 5.1.6-62. Years of Education by Category for those 25 Years and Older for Cape Canaveral, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	209	280	213	179
25+ w/ 9-11 years education	306	419	814	849
25+ w/ HS diploma	904	1461	1939	2315
25+ w/ 13-15 years. education	458	863	1368	2147
25+ w/ College Degree	430	696	1311	2585
Drop outs	49	58	36	13

Income and Poverty

Table 5.1.6-63. Average Household Wage/Salary and Persons Below the Poverty Level for Cape Canaveral, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$9357	$14616	$27764	$30858
Poverty Level				
Persons Below Poverty Level	332	890	1282	1035
Age 65+ Below Poverty Level	40	52	74	155
Households with Public Assistance	43	115	204	147

Industry

Table 5.1.6-64. Employment by Industry for Cape Canaveral, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	20	32	68	17
Construction	83	276	319	398
Business Services	263	146	309	323
Communication/Utilities	77	89	32	132
Manufacturing	739	584	864	462
Financial, Insurance & Real Estate	722	501	799	283
Services	86	166	201	1722
Wholesale/Retail Trade	656	360	1438	1191
Transportation	327	621	1060	270

Occupation

Table 5.1.6-65. Employment by Occupation for Cape Canaveral, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	86	240	638	-
Clerical	492	3840	583	-
Craft	242	410	492	-
Exec/Managerial	175	353	488	-
Farm/Fish/Forest	0	23	123	17
Household Services	0	10	18	-
Laborer/Handler	30	107	143	-
Operative/Transport	119	138	199	-
Service, except Household	216	469	754	-
Technical	137	179	238	-

Cape Canaveral Fishing Demographics

Table 5.1.6-66. Number of Federal Permit by Type for Cape Canaveral, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	19	6	10	15
Commercial King Mackerel	5	1	1	3
Commercial Spanish Mackerel	8	4	7	8
Commercial Spiny Lobster	1	1	2	3
Charter/Headboat for Coastal Pelagics	2	0	0	3
Charter/Headboat for Snapper Grouper	2	0	0	3
Snapper Grouper Class 1	0	0	1	1
Snapper Grouper Class 2	1	0	0	2
Swordfish	3	0	0	1
Shark	9	1	3	3
Rock Shrimp	10	3	4	4
Federal Dealers	5	2	2	3

Table 5.1.6-67. Employment in Fishing Related Industry for Cape Canaveral, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	35
Fish and Seafoods	422460	17
Fish and Seafood Markets	445220	0
Marinas	713930	125
Total Fishing Employment		177

5.1.6.7 Sebastian (32976, 32958)

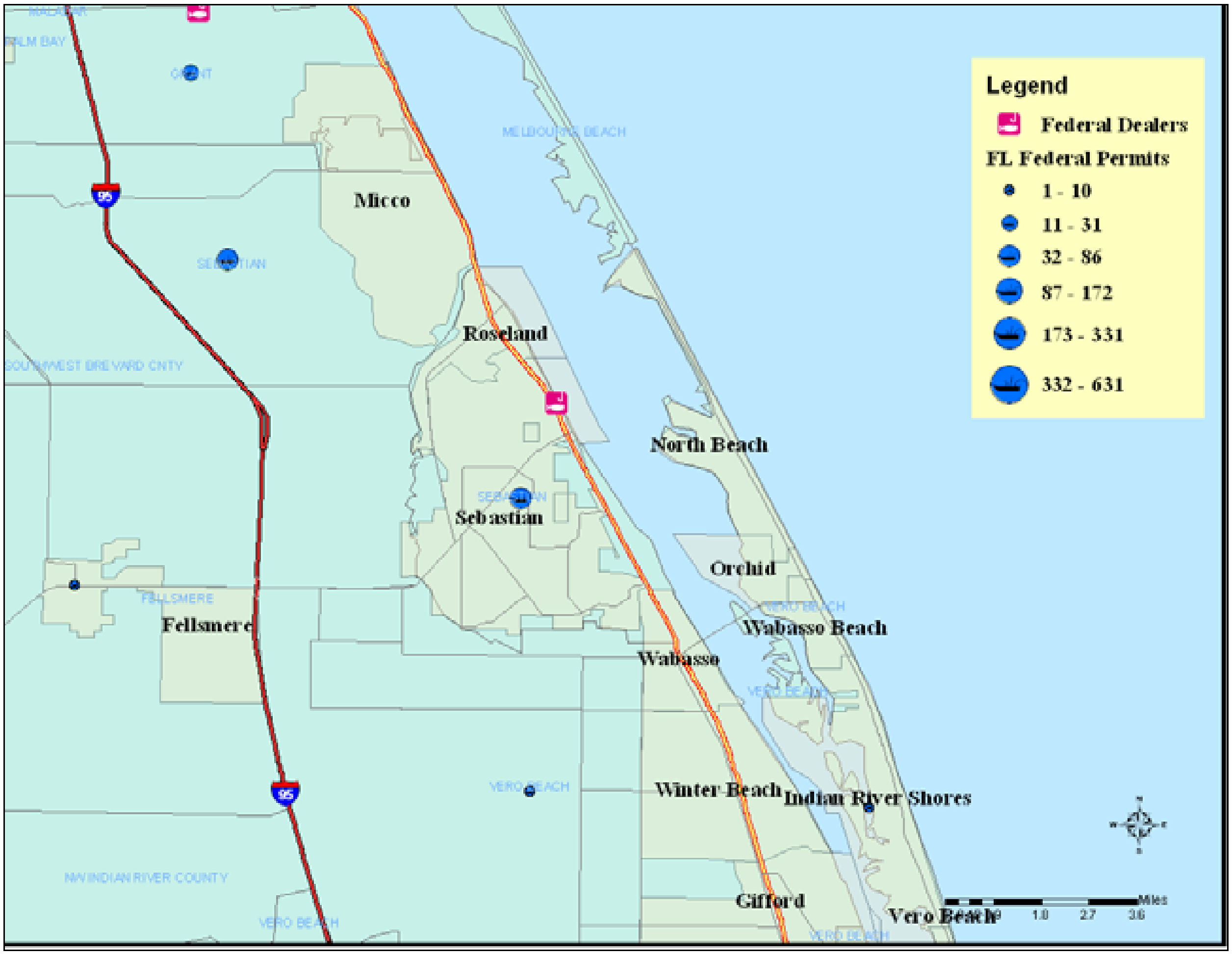


Figure 5.1.6-8. Sebastian, Florida.

Sebastian and Vero Beach are two of the five districts that comprise Indian River County. Both communities were first settled in the 1880s. Communication with the rest of the country and even other counties was difficult. Therefore, settlers had to hunt, trap, and fish for everything. The railroad was completed in time for the Spanish American War, bringing troops to Florida (Newman, 1953). The arrival of the railroad also increased the commercial fishing sector of Sebastian and Vero Beach. Icehouses developed to pack and store the fish around 1900, and the trains exported the products north. The original fish house of one of the very first commercial fishing families still operates today on Indian River Drive in Sebastian.

Today, recreational fishing, along with commercial fishing, is an important part of the Indian River County culture. The Indian River Lagoon is home to more than 700 species of fresh and saltwater fish. Saltwater anglers can fish the Sebastian Inlet and the Sebastian River for snook and red drum in the 20 to 30 pound class. Grouper, snapper, flounder, sheepshead, permit, whiting, blues, and shark can be caught off the Sebastian

Inlet pier. Deep sea fishing charters also leave from Sebastian and Vero Beach, offering bottom fishing and blue water trolling for dolphin, sailfish, wahoo, grouper, and cobia.

Sebastian has seen moderate population growth since 1990 to 2000 after a large increase from 1980 to 1990. The percent of the population in the labor force has remained relatively stable while unemployment has dropped from 5.7 percent in 1990 to 3.2 in 2000. Average wage and salary have grown steadily over the past few decades, but the number of persons who live under the poverty level has increased dramatically. The number of persons working in the farm, fish and forestry sectors for occupation and industry has fluctuated since 1980, but has dropped in the most recent census. There are 71 commercial vessels with federal permits according to Table 5.1.6-77 and most of those have coastal pelagic permits. Only 12 of those vessels have charter permits. There is not much employment reported in the fishing related sectors of Table 5.1.6-78 with only15 in the marinas sector, 9 in fish and seafood and 3 in fishing.

Sebastian Census Demographics

Population

Table 5.1.6-68. Total Persons and Persons by Age category for Sebastian, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	2831	10158	16450
Persons Age 0-5	.	144	762	909
Persons Age 6-15	.	346	1201	1990
Persons Age 16-17	.	66	138	427
Persons Age 18-24	.	208	499	855
Persons Age 25-34	.	324	1475	1279
Persons Age 35-44	.	226	1267	2507
Persons Age 45-54	.	230	928	2145
Persons Age 55-64	.	587	1323	1848
Persons Age 65+	.	682	2565	4490

Housing Tenure

Table 5.1.6-69. Housing Tenure for Sebastian, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	19.2	12.8
Percent Owner Occupied	**1990**	**2000**
	80.8	87.2

Residence in 1985 and 1995

Table 5.1.6-70. Residence in 1985 and 1995 for Sebastian, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	1923	2735
Same House	**1990**	**2000**
	3066	7761

Employment/Unemployment

Table 5.1.6-71. Employment and Unemployment for Sebastian, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	51.3	52.0
Percent unemployed	5.7	3.2

Race

Table 5.1.6-72. Race for Sebastian, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	0	51	503
Latino Black Persons	.	0	0	12
Latino Persons	.	48	90	625
White Persons	.	2808	9856	14748
Latino White Persons	.	27	51	407

Education

Table 5.1.6-73. Years of Education by Category for those 25 Years and Older for Sebastian, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	.	347	532	401
25+ w/ 9-11 years education	.	413	1473	1986
25+ w/ HS diploma	.	835	2894	4859
25+ w/ 13-15 years. education	.	320	1389	3804
25+ w/ College Degree	.	134	749	2478
Drop outs	.	37	85	52

Income and Poverty

Table 5.1.6-74. Average Household Wage/Salary and Persons Below the Poverty Level for Sebastian, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$13218	$28122	$39327
Poverty Level				
Persons Below Poverty Level	.	290	684	1025
Age 65+ Below Poverty Level	.	48	203	223
Households with Public Assistance	.	65	150	126

Industry

Table 5.1.6-75. Employment by Industry for Sebastian, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	89	149	82
Construction	.	130	567	602
Business Services	.	34	184	245
Communication/Utilities	.	42	71	222
Manufacturing	.	130	326	408
Financial, Insurance & Real Estate	.	111	264	558
Services	.	77	306	3615
Wholesale/Retail Trade	.	152	1221	1833
Transportation	.	237	1048	171

Occupation

Table 5.1.6-76. Employment by Occupation for Sebastian, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	138	547	-
Clerical	.	1560	620	-
Craft	.	197	591	-
Exec/Managerial	.	76	429	-
Farm/Fish/Forest	.	70	139	50
Household Services	.	2	35	-
Laborer/Handler	.	31	193	-
Operative/Transport	.	94	203	-
Service, except Household	.	114	541	-
Technical	.	12	172	-

Sebastian Fishing Demographics

Table 5.1.6-77. Number of Federal Permit by Type for Sebastian, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	69	60	74	71
Commercial King Mackerel	51	50	62	61
Commercial Spanish Mackerel	52	46	56	47
Commercial Spiny Lobster	6	2	7	6
Charter/Headboat for Coastal Pelagics	6	5	7	12
Charter/Headboat for Snapper Grouper	5	5	8	12
Snapper Grouper Class 1	1	11	13	15
Snapper Grouper Class 2	2	8	7	6
Swordfish	6	0	1	2
Shark	23	5	6	6
Rock Shrimp	0	1	0	0
Federal Dealers	1	1	1	2

Table 5.1.6-78. Employment in Fishing Related Industry for Sebastian, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	3
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	9
Fish and Seafood Markets	445220	0
Marinas	713930	15
Total Fishing Employment		27

5.1.6.8 Fort Pierce (34950)

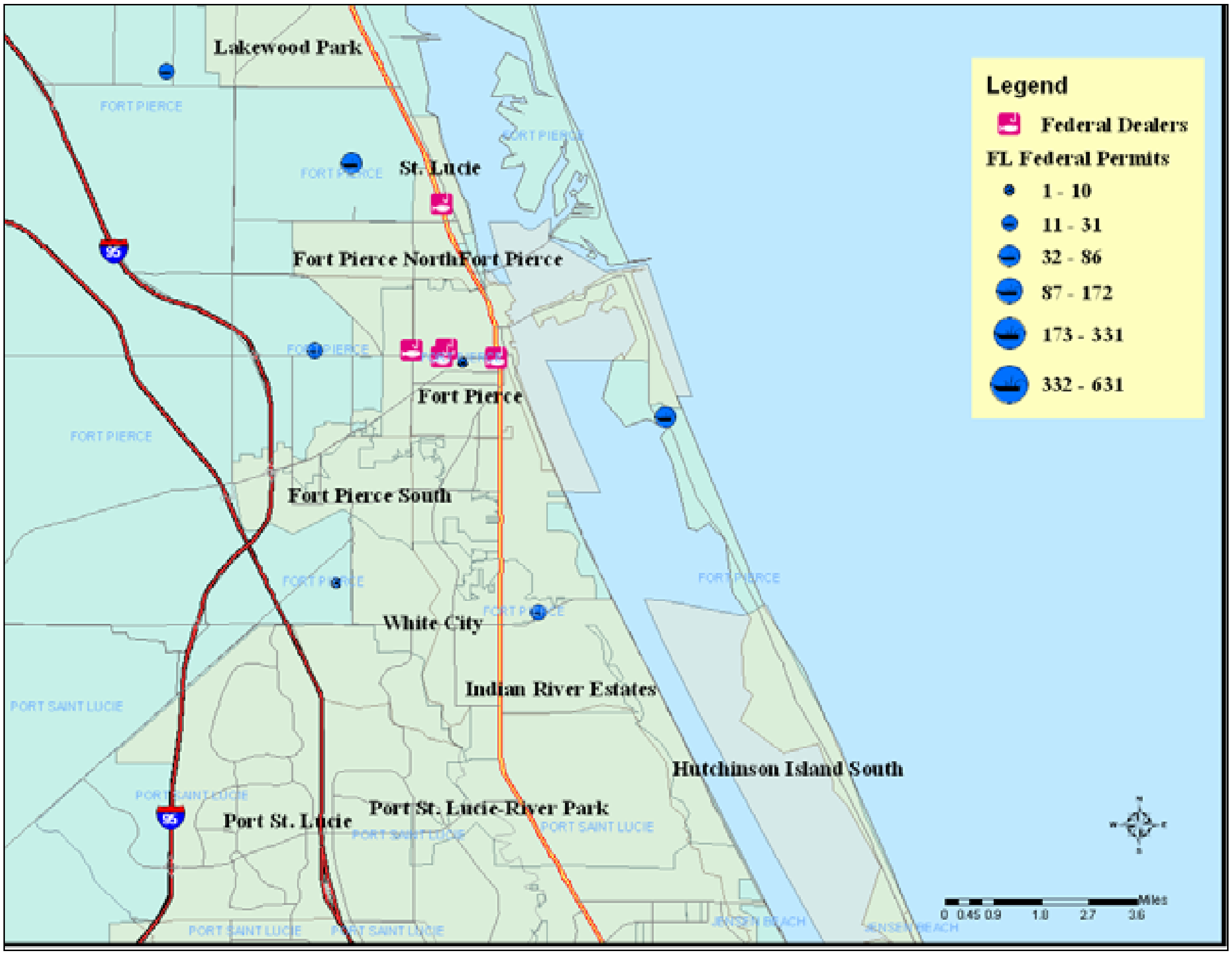


Figure 5.1.6-9. Fort Pierce, Florida.

The Spanish built Fort Santa Lucia on the Jupiter Inlet in 1565 from which the county now draws its name—St. Lucie County. Permanent US inhabitance of Ft. Pierce dates back to the Seminole Indian War. US Army Lt. Col. Benjamin Kendrick Pierce, for whom the town is named, built a fort in 1837 to use as the army's headquarters. The war ended in the early 1840s, making way for settlement and development: "Water transportation, fishing and canning fish were key to the area's early economy." The arrival of Henry Flagler's railroad in the early 1900s opened Ft. Pierce's economy to the rest of the east coast. Ft. Pierce beach was used as a naval base during World War II.

The culture of fishing has been in the area since its inception. Anecdotes passed down from one generation to the next of Ft. Pierce residents describe the abundance of fish in the area in the late 1800s and early 1900s. One such story, told by Newman (1953) in her book, *Early Life along the Beautiful Indian River*, tells of a man who bound his shirt at the sleeves and waist and cut a plunging neckline. He would then stand in the water until the shirt was full of fish and then empty it out into a bucket on the shore. In the late 1800s, a man from the nearby town of Titusville helped to create the commercial fishing sector in Ft. Pierce. He would bring the fish to Titusville for shipping to the rest of the east coast. The first icehouse for packaging fish was built in 1900 (Newman, 1953).

Recreational fishing has also become a popular pastime in Ft. Pierce and the rest of St. Lucie County. This is due in large part to the fleet of Spanish galleons that sunk off the St. Lucie and Martin Counties coastline. These artificial reefs have created excellent fishing and diving spots for locals and tourists. The reefs attract spiny lobsters, marlin, snook, flounder, and grouper. Some of the more popular fish in the St. Lucie River include channel bass, snook, ladyfish, jack crevalle, and trout. Black bass is another famous catch in the area. Most charter fishing boats in the area offer half, three-quarter, and full-day trips for dolphin, sailfish, wahoo, amberjack, tuna, kingfish, snapper and grouper.

Fort Pierce has seen moderate population growth over the past three decades while the percent of the population in the labor force has remained around 55 percent while unemployment has dropped from 12.4 percent in 1990 to 8.8 percent in 2000. Average wage and salary has grown slowly over the past ten years while the number of persons living under the poverty level has risen significantly. The number of people working in farm, fish and forestry has remained relatively high for both occupation and industry over the years with both categories having over 1000 persons in each. There are over 100 vessels with federal permits homeported in Ft. Pierce and most of those have coastal pelagic permits (Table 5.1.6-87). There are over 260 persons employed in the boat building sector of fishing related employment according to Table 5.1.6-88.

Fort Pierce Census Demographics

Population

Table 5.1.6-79. Total Persons and Persons by Age category for Fort Pierce, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	29728	33802	36830	37489
Persons Age 0-5	2825	2672	3770	3319
Persons Age 6-15	6204	5161	5001	5685
Persons Age 16-17	1153	1227	950	961
Persons Age 18-24	3013	4263	3203	3912
Persons Age 25-34	3232	4507	5372	4627
Persons Age 35-44	3038	3110	4245	5004
Persons Age 45-54	3261	3149	3322	4135
Persons Age 55-64	2810	3691	3586	3172
Persons Age 65+	3633	5471	7381	6674

Housing Tenure

Table 5.1.6-80. Housing Tenure for Fort Pierce, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	46.7	47.0
Percent Owner Occupied	**1990**	**2000**
	53.3	53.0

Residence in 1985 and 1995

Table 5.1.6-81. Residence in 1985 and 1995 for Fort Pierce, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	10927	10892
Same House	**1990**	**2000**
	15288	16134

Employment/Unemployment

Table 5.1.6-82. Employment and Unemployment for Fort Pierce, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	55.0	55.1
Percent unemployed	12.4	8.8

Race

Table 5.1.6-83. Race for Fort Pierce, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	14422	14600	15666	15109
Latino Black Persons	17	63	197	217
Latino Persons	37	736	2168	5629
White Persons	15289	18978	19807	15516
Latino White Persons	20	622	851	3069

Education

Table 5.1.6-84. Years of Education by Category for those 25 Years and Older for Fort Pierce, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	5802	5688	4386	4737
25+ w/ 9-11 years education	3515	3786	5929	7004

25+ w/ HS diploma	3872	5936	6091	6839
25+ w/ 13-15 years. education	1585	2710	3590	5549
25+ w/ College Degree	1200	1808	2691	4229
Drop outs	696	753	612	1025

Income and Poverty

Table 5.1.6-85. Average Household Wage/Salary and Persons Below the Poverty Level for Fort Pierce, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	$6273	$13564	$23595	$25121
Poverty Level				
Persons Below Poverty Level	10006	9135	10591	11471
Age 65+ Below Poverty Level	1337	1129	1145	1168
Households with Public Assistance	857	1503	1660	863

Industry

Table 5.1.6-86. Employment by Industry for Fort Pierce, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	2460	1838	1324	1119
Construction	885	1258	1100	1803
Business Services	260	467	521	388
Communication/Utilities	315	693	463	365
Manufacturing	846	1149	962	1139
Financial, Insurance & Real Estate	342	485	593	625
Services	440	693	661	6453
Wholesale/Retail Trade	3110	1916	4277	3822
Transportation	2405	3005	3387	433

Occupation

Table 5.1.6-87. Employment by Occupation for Fort Pierce, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	749	1504	1658	-
Clerical	1267	15320	1869	-
Craft	1244	1786	1407	-
Exec/Managerial	891	1104	1072	-
Farm/Fish/Forest	2095	1568	1313	1289
Household Services	368	176	108	-

Laborer/Handler	884	870	805	-
Operative/Transport	876	746	578	-
Service, except Household	1708	1895	2552	-
Technical	54	155	251	-

Fort Pierce Fishing Demographics

Table 5.1.6-88. Number of Federal Permit by Type for Fort Pierce, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	88	64	81	100
Commercial King Mackerel	54	52	62	71
Commercial Spanish Mackerel	63	59	72	73
Commercial Spiny Lobster	10	8	9	11
Charter/Headboat for Coastal Pelagics	1	0	0	7
Charter/Headboat for Snapper Grouper	1	0	0	6
Snapper Grouper Class 1	5	13	17	18
Snapper Grouper Class 2	2	6	7	7
Swordfish	18	8	8	11
Shark	46	18	18	24
Rock Shrimp	0	0	0	0
Federal Dealers	4	3	4	2

Table 5.1.6-89. Employment in Fishing Related Industry for Fort Pierce, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	12
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	265
Fish and Seafoods	422460	7
Fish and Seafood Markets	445220	3
Marinas	713930	21
Total Fishing Employment		308

5.1.6.9 Jupiter (33458, 33468, 33469, 33477, 33478)

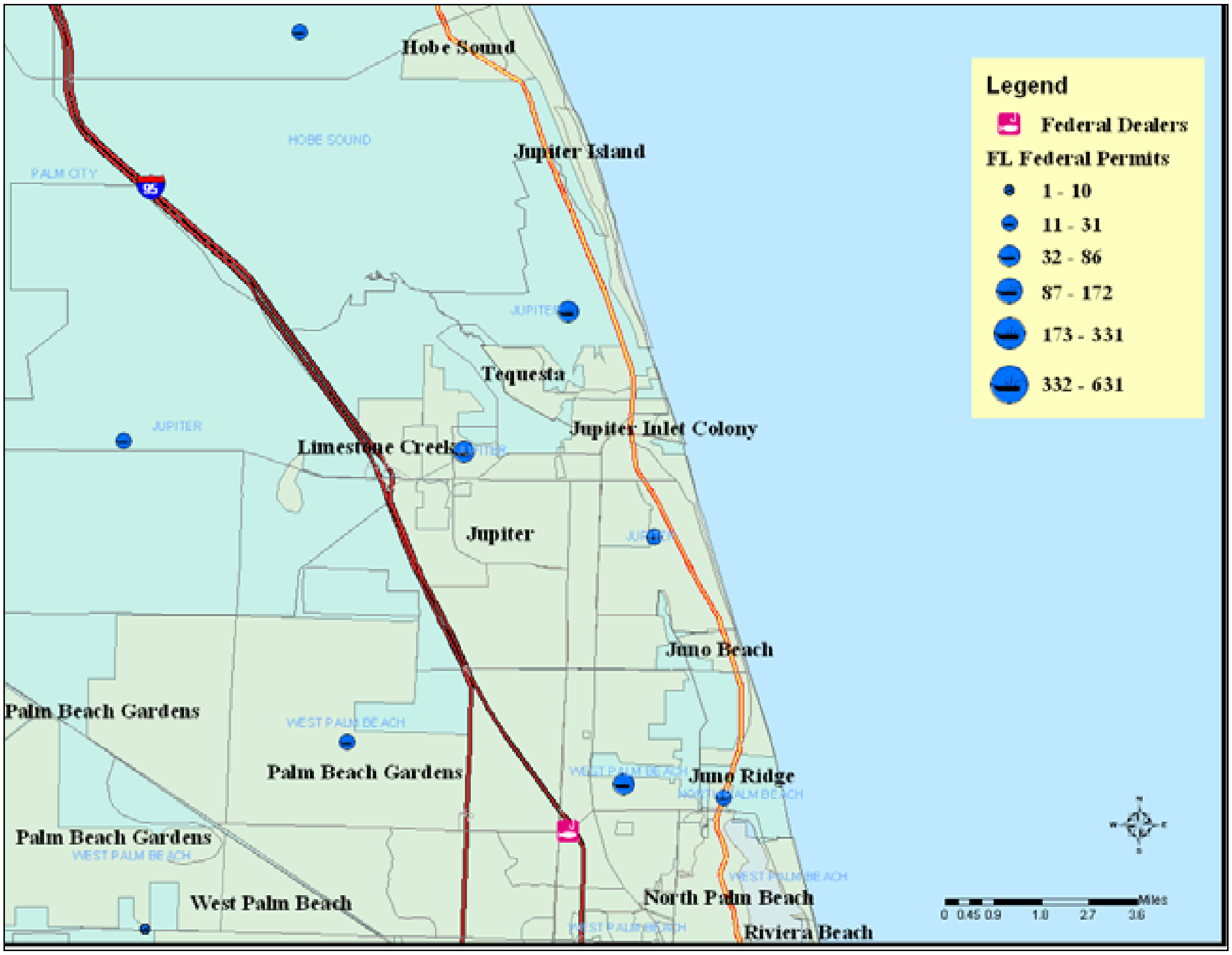


Figure 5.1.6-10. Jupiter, Florida.

The name Jupiter derives from the original inhabitants of the area, the Jeaga Indians. The Native Americans called themselves Jobe, so the Spanish explorers called the inlet the Jobe River. The English settlers who arrived in the 1760s thought the name was Jove, a mythological god also known as Jupiter. Jupiter first became famous when Jonathan Dickinson's boat the "Reformation" was shipwrecked along the coast in 1696. However, it was not until 1821 that real development of the area began. Eusebio Gomez was given 12,000 acres in a land grant in 1815. In 1821, he "started the real estate business on Jupiter Island by selling 8,000 of his acres for $8,000" (Reed, 1955).

Sport fishermen have been present in the Jupiter Island region since the 1800s. Stanley (1988) lists numerous species of fish that were and still are popular in Jupiter Island. Snook, tarpon, mangrove snapper, and jack crevalle were some of the most desired fish. Later, with the advancement of boat technology, species in the Gulf Stream, such as sailfish, dolphin, wahoo, and King mackerel became popular catches of the local fishermen.

Two events of the late 1920s decreased some of the fishing in the area. A hurricane struck Lake Okeechobee in 1928. The devastation it caused led to the Okeechobee Flood Control Project. The project created high levels of silt and mud around Jupiter Island, causing a severe decline in the snapper and grouper populations, "two of the most sought after food fish" (Stanley, 1988). However, this did not diminish the appeal of sport fishing. J.D. Bassett moved from Virginia to Palm Beach in 1925. He was one of the most avid fishermen in Jupiter. "He made the trip to and from Palm Beach so often that the captain of his boat said, 'Mr. Bassett, you come up here almost every day. Why don't you just move up here'" (Stanley, 1988). Bassett was not the only person drawn to Jupiter's waters.

Many of the fishermen in Jupiter practice catch and release. "In February 1986, three Palm Beach-based sportfishing boats caught and released 72 sailfish in a span of five hours five miles east of the Jupiter Island Beach Club" (Stanley, 1988). Many of those who enjoy fishing Jupiter Island today are said to be descended from those families that have been fishing the area for decades.

Jupiter has seen fairly steady population growth with its 2000 population reaching 39,314. The labor force has remained fairly constant with just over 60 percent of the population participating. Unemployment has also remained low at 3.3 percent for both 1990 and 2000. Average wage and salary have risen to a high of $54, 945 and the number of persons living under the poverty level has also climbed to a high of 1885 in 2000. The number of people working in farm, fish and forestry occupations and industry reached a peak in 1990 but has since declined dramatically in 2000. Jupiter has 77 vessels homeported with federal permits as shown in Table 5.9.3.1 and most of them have coastal pelagic permits with 20 holding snapper grouper class 1 permits. There is some fishing related employment according to Table 5.1.6-100 with 40 persons employed in the marinas sector and 16 in fish and seafood.

Jupiter Census Demographics

Population

Table 5.1.6-90. Total Persons and Persons by Age category for Jupiter, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	9868	24986	39314
Persons Age 0-5	.	655	1847	2619
Persons Age 6-15	.	1233	2568	4579
Persons Age 16-17	.	284	478	908
Persons Age 18-24	.	1160	1677	2018
Persons Age 25-34	.	1849	4609	4540
Persons Age 35-44	.	1115	4396	6868
Persons Age 45-54	.	902	2328	5939
Persons Age 55-64	.	994	2763	4469

Persons Age 65+	.	1533	4320	7374

Housing Tenure

Table 5.1.6-91. Housing Tenure for Jupiter, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	28.2	19.2
Percent Owner Occupied	**1990**	**2000**
	71.8	80.8

Residence in 1985 and 1995

Table 5.1.6-92. Residence in 1985 and 1995 for Jupiter, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	7270	8997
Same House	**1990**	**2000**
	7191	18257

Employment/Unemployment

Table 5.1.6-93. Employment and Unemployment for Jupiter, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	66.0	61.7
Percent unemployed	3.3	3.3

Race

Table 5.1.6-94. Race for Jupiter, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	90	242	461
Latino Black Persons	.	2	24	19
Latino Persons	.	128	668	2881
White Persons	.	9698	24550	35152
Latino White Persons	.	114	617	2155

Education

Table 5.1.6-95. Years of Education by Category for those 25 Years and Older for Jupiter, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	517	494	1153
25+ w/ 9-11 years education	.	1014	1826	2003
25+ w/ HS diploma	.	2712	5498	7725
25+ w/ 13-15 years. education	.	1164	4083	7407
25+ w/ College Degree	.	986	5020	13165
Drop outs	.	88	72	133

Income and Poverty

Table 5.1.6-96. Average Household Wage/Salary and Persons Below the Poverty Level for Jupiter, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$19706	$45280	$54945
Poverty Level				
Persons Below Poverty Level	.	506	1450	1885
Age 65+ Below Poverty Level	.	69	259	340
Households with Public Assistance	.	111	194	109

Industry

Table 5.1.6-97. Employment by Industry for Jupiter, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	96	286	45
Construction	.	727	1095	1386
Business Services	.	186	705	1686
Communication/Utilities	.	196	494	896
Manufacturing	.	866	1733	1389
Financial, Insurance & Real Estate	.	782	1471	1738
Services	.	542	1487	9725
Wholesale/Retail Trade	.	760	4321	4334
Transportation	.	882	2962	594

Occupation

Table 5.1.6-98. Employment by Occupation for Jupiter, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	536	2299	-
Clerical	.	8230	1758	-
Craft	.	919	1303	-

Exec/Managerial	.	461	1898	-
Farm/Fish/Forest	.	118	226	58
Household Services	.	6	46	-
Laborer/Handler	.	201	207	-
Operative/Transport	.	184	289	-
Service, except Household	.	579	1764	-
Technical	.	96	535	-

Jupiter Fishing Demographics

Table 5.1.6-99. Number of Federal Permit by Type for Jupiter, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	66	52	75	77
Commercial King Mackerel	43	46	64	61
Commercial Spanish Mackerel	41	43	57	53
Commercial Spiny Lobster	15	13	17	15
Charter/Headboat for Coastal Pelagics	13	6	9	17
Charter/Headboat for Snapper Grouper	6	4	5	7
Snapper Grouper Class 1	2	19	20	20
Snapper Grouper Class 2	2	8	10	8
Swordfish	10	0	0	0
Shark	20	3	3	4
Rock Shrimp	0	2	1	2
Federal Dealers	0	0	0	0

Table 5.1.6-100. Employment in Fishing Related Industry for Jupiter, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	6
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	15
Fish and Seafood Markets	445220	0
Marinas	713930	40
Total Fishing Employment		61

5.1.6.10 Palm Beach (33480)

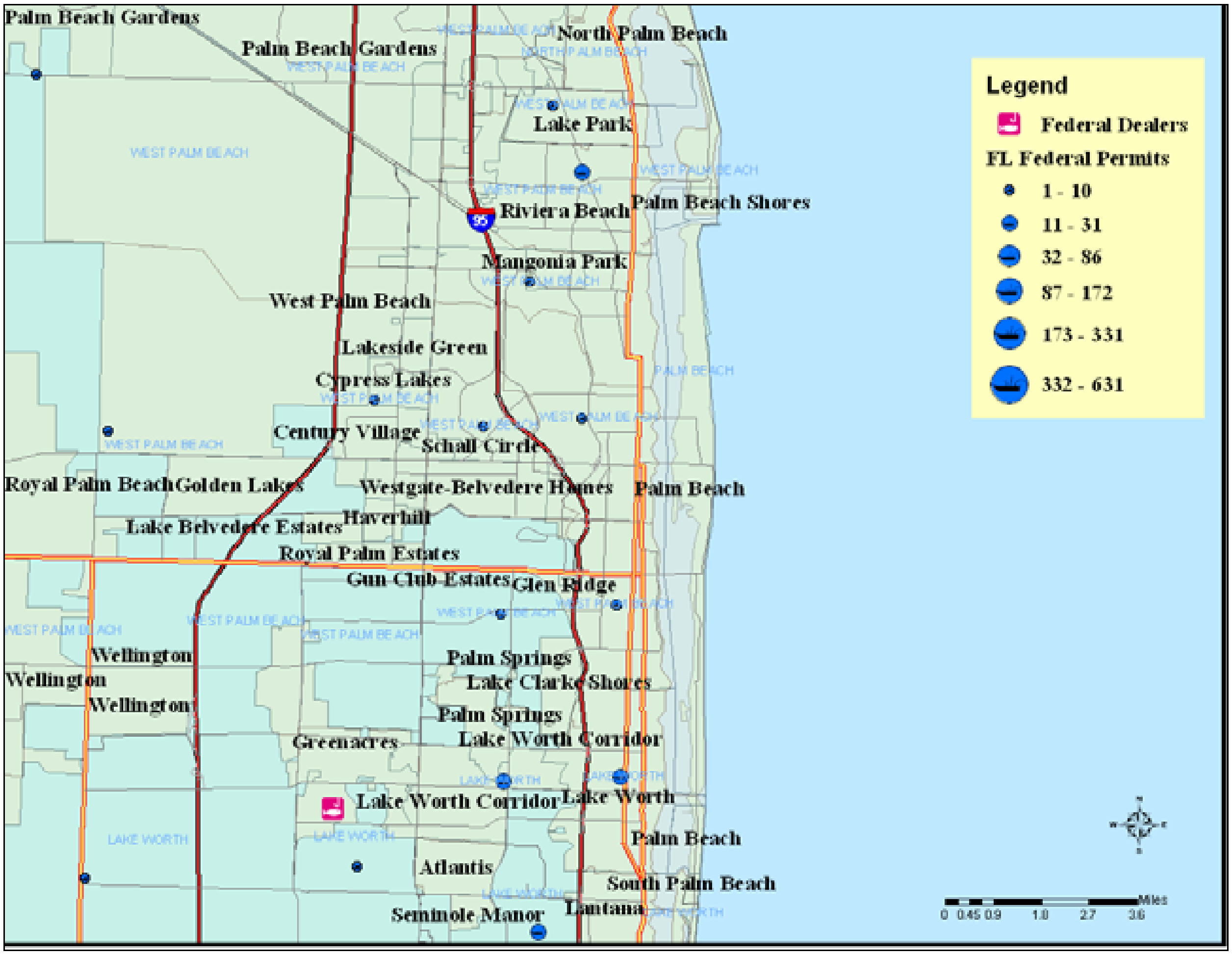


Figure 5.1.6-11. Palm Beach, Florida.

Palm Beach was originally known as Lake Worth. The name was changed to Palm Beach in the 1900s, when a man from Philadelphia noticed the coconut palm trees growing near the lake. In 1878, a ship named the “Providencia” was sailing from South America back to Barcelona with a shipment of coconuts. The ship wrecked on the beach and hundreds “of the coconuts washed ashore, embedded themselves in the sandy beaches, and sprouted into young trees” (Spencer, 1975).

Life for the early settlers was difficult. The only lumber available to build their homes was from wood washed ashore from shipwrecks. Residents of Palm Beach had to sail north to Titusville for supplies, such as flour, meal, and other staples (Spencer, 1975). Most of the original settlers, prior to 1900, were from Michigan, Illinois, Ohio, Iowa, and Wisconsin. A.O. Lang, a German horticulturist and one of the first residents of Palm Beach, planted numerous citrus fruit trees, such as limes, lemons, oranges, and pineapples (First Federal Savings and Loan Association of Lake Worth, 1967).

Citrus groves were not the only source of food and income for the residents of Palm Beach. Fish were plentiful for the early settlers. The importance of fish dates back to the

Native Americans who once inhabited the land. They partook in shark-fishing, using the teeth for cutting, the vertebrae as ornaments, and the rest for meat. Shellfish were an important part of the Indians diet as well (McGoun, 1998).

The western part of Palm Beach County was known for its catfish industry. The arrival of Henry Flagler's Florida East Coast Railroad assisted in increasing the profitability of the catfish industry in Palm Beach, making it easier to ship the fish northward (McGoun, 1998). However, during WWII, fishermen were not only retrieving fish from the waters. West Palm Beach was an embarkation point for the Air Force bomber crews. German submarines would sit offshore and sink US military vessels. "In the early days of the war, local fishermen would go out and pick up survivors from these ill-fated ships" (First Federal Savings and Loan Association of Lake Worth, 1967).

The Frontier days of 1873 to 1893, pioneers called the area from Jupiter to Hypoluxo the "Lake Worth Region" and traveled by boat from one homestead to another. H.F. Hammon was the first to claim a homestead in the area that is now Palm Beach. E.N. "Cap" Dimick was the most influential settler by being the first hotelier in Palm Beach and the first Mayor! Most of his family had settled in the area by 1876 and his descendants still remain.

Palm Beach has seen relatively slight population growth over the past two decades. It has a low percentage of its population in the labor force with only 31 percent and Unemployment is low at 3.3 percent. Average wage and salary is extremely high at $94,562 and the number of people living below the poverty line has remained fairly constant at 551. The number of persons working in farm, fish, and forestry occupation and industry has dropped considerably since 1990 as is the case for most coastal communities. Table 5.1.6-110 indicates there are 23 vessels with federal permits and about half of them are holding coastal pelagic permits. There is relatively little fishing related employment according to Table 5.1.6-111 with only 3 in the fishing sector and 3 in marinas.

Palm Beach Census Demographics

Population

Table 5.1.6-101. Total Persons and Persons by Age category for Palm Beach, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	9729	9814	10374
Persons Age 0-5	.	115	222	302
Persons Age 6-15	.	505	357	644
Persons Age 16-17	.	168	115	78
Persons Age 18-24	.	347	253	121
Persons Age 25-34	.	575	527	456
Persons Age 35-44	.	623	917	744

Persons Age 45-54	.	1148	812	1131
Persons Age 55-64	.	1682	1443	1414
Persons Age 65+	.	4530	5168	5484

Housing Tenure

Table 5.1.6-102. Housing Tenure for Palm Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	**1990**	**2000**
	22.5	16.1
Percent Owner Occupied	**1990**	**2000**
	77.5	83.9

Residence in 1985 and 1995

Table 5.1.6-103. Residence in 1985 and 1995 for Palm Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	1763	1826
Same House	**1990**	**2000**
	5853	6236

Employment/Unemployment

Table 5.1.6-104. Employment and Unemployment for Palm Beach, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	35.2	31.6
Percent unemployed	3.5	3.3

Race

Table 5.1.6-105. Race for Palm Beach, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	.	64	52	262
Latino Black Persons	.	7	6	7
Latino Persons	.	272	266	268
White Persons	.	9640	9456	9817
Latino White Persons	.	254	249	232

Education

Table 5.1.6-106. Years of Education by Category for those 25 Years and Older for Palm Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	381	148	62
25+ w/ 9-11 years education	.	503	360	319
25+ w/ HS diploma	.	2235	1736	1276
25+ w/ 13-15 years. education	.	2209	2293	2093
25+ w/ College Degree	.	3230	3827	5461
Drop outs	.	13	0	18

Income and Poverty

Table 5.1.6-107. Average Household Wage/Salary and Persons Below the Poverty Level for Palm Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$29092	$78972	$94562
Poverty Level				
Persons Below Poverty Level	.	484	577	551
Age 65+ Below Poverty Level	.	155	215	161
Households with Public Assistance	.	133	125	10

Industry

Table 5.1.6-108. Employment by Industry for Palm Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	47	16	18
Construction	.	100	121	86
Business Services	.	185	142	469
Communication/Utilities	.	21	11	80
Manufacturing	.	188	222	133
Financial, Insurance & Real Estate	.	100	97	807
Services	.	657	824	956
Wholesale/Retail Trade	.	984	1261	558
Transportation	.	627	596	26

Occupation

Table 5.1.6-109. Employment by Occupation for Palm Beach, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	659	785	-
Clerical	.	3060	200	-
Craft	.	96	117	-
Exec/Managerial	.	823	815	-
Farm/Fish/Forest	.	10	11	0
Household Services	.	235	157	-
Laborer/Handler	.	43	16	-
Operative/Transport	.	46	15	-
Service, except Household	.	537	361	-
Technical	.	40	46	-

Palm Beach Fishing Demographics

Table 5.1.6-110. Number of Federal Permit by Type for Palm Beach, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	23	12	17	23
Commercial King Mackerel	15	10	14	17
Commercial Spanish Mackerel	16	11	14	16
Commercial Spiny Lobster	6	1	0	1
Charter/Headboat for Coastal Pelagics	4	0	0	2
Charter/Headboat for Snapper Grouper	3	0	0	1
Snapper Grouper Class 1	1	6	5	6
Snapper Grouper Class 2	0	3	4	5
Swordfish	2	0	0	0
Shark	6	0	1	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.6-111. Employment in Fishing Related Industry for Palm Beach, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	3
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	0
Marinas	713930	3
Total Fishing Employment		6

5.1.6.11 Boca Raton (33487, 33431, 33486, 33496, 33432, 33434)

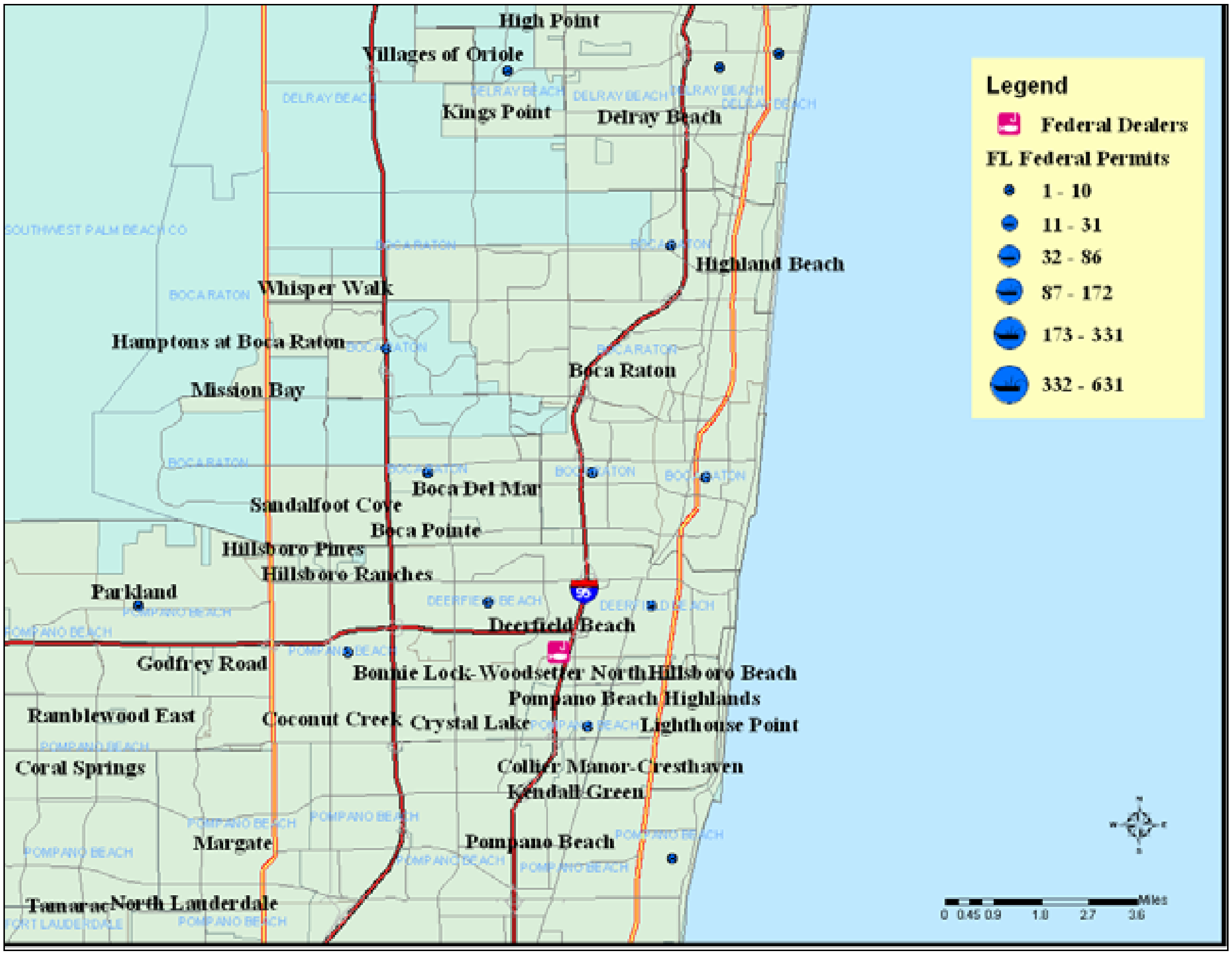


Figure 5.1.6-12. Boca Raton, Florida.

The area of current day Boca Raton was inhabited by Native Americans for nearly 1,000 years before the arrival of the Spanish. The original name given to the area by the Spanish explorers was “Boca de Ratones.” In nautical terms, “boca” denotes an inlet. Some of the translations include, “haulage inlet,” “inlet of mice,” “inlet of sharp-pointed rocks,” and “inlet of cowardly thieves.” “Rata,” not “raton” is the Spanish word for rat (Ashton, 1984).

Captain Thomas Moore Rickards, Sr. of Missouri was one of the first people who wanted to settle the area of Boca Raton. He arrived in Florida in 1876 and became a citrus farmer in Candler. The freeze of 1894-5 forced him farther south to Lake Boca Raton. A year later, the tracks for Henry Flagler’s East Coast Railroad were laid in Boca Raton, allowing for easier, faster shipping and more convenient modes of transportation. By the beginning of the 1900s, Boca Raton “came into existence as a little agricultural center of orchards and farms” (Ashton, 1984).

In 1904, a Japanese immigrant, Joseph Sakai, established a Japanese farming community of pineapple farmers in Boca Raton. He named the area Yamato.

The land boom of the 1920s and the arrival of famous architect Addison Mizner helped Boca Raton gain the image it still retains today as that of a luxurious resort town. He had already helped build up Palm Beach and was now aiding in the development of the areas to its south (Ashton, 1984).

Boca Raton has experienced fairly steady population growth reaching 75,594 in 2000 (Table 5.1.6-112). Unemployment has risen slightly in 2000 from 1990 but the percentage of the population in the labor force has remained around 59 percent (Table 5.1.6-115). The average wage and salary is high being above $60,000 yet the number of persons living below the poverty level has grown steadily since 1970 (Table 5.1.6-118). The number of persons employed in farm, fish and forestry occupations and industry dropped dramatically in 2000 from a high in 1990. There are 8 vessels with federal permits listed in Table 5.1.6-121 but there are no federal dealers in Boca Raton. As far as fishing related employment there are 21 people listed in the fish and seafood sector according to Table 5.1.6-122.

Boca Raton Census Demographics

Population

Table 5.1.6-112. Total Persons and Persons by Age category for Boca Raton, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	28542	49505	61491	75594
Persons Age 0-5	1443	1650	3573	4282
Persons Age 6-15	4321	5681	5589	8325
Persons Age 16-17	701	1668	1334	1566
Persons Age 18-24	2901	5249	5241	6284
Persons Age 25-34	2709	5943	9418	7859
Persons Age 35-44	2794	5654	9377	9536
Persons Age 45-54	2835	5173	7155	11508
Persons Age 55-64	3900	6313	6592	8564
Persons Age 65+	6622	11789	13212	15016

Housing Tenure

Table 5.1.6-113. Housing Tenure for Boca Raton, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	25.6	24.3
Percent Owner Occupied	**1990**	**2000**
	74.4	75.7

Residence in 1985 and 1995

Table 5.1.6-114. Residence in 1985 and 1995 for Boca Raton, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	11678	15372
Same House	**1990**	**2000**
	26473	35856

Employment/Unemployment

Table 5.1.6-115. Employment and Unemployment for Boca Raton, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	60.1	59.1
Percent unemployed	3.3	5.8

Race

Table 5.1.6-116. Race for Boca Raton, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	730	992	1734	2725
Latino Black Persons	0	22	31	85
Latino Persons	690	2167	3378	6359
White Persons	27781	47930	58008	62925
Latino White Persons	690	2047	2880	4926

Education

Table 5.1.6-117. Years of Education by Category for those 25 Years and Older for Boca Raton, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	2464	2493	1672	1436
25+ w/ 9-11 years education	2591	2982	3615	3988
25+ w/ HS diploma	6051	11947	10984	12037
25+ w/ 13-15 years. education	3720	7748	10352	12509
25+ w/ College Degree	4034	9702	15952	29350
Drop outs	144	320	94	351

Income and Poverty

Table 5.1.6-118. Average Household Wage/Salary and Persons Below the Poverty Level for Boca Raton, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN

Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$11409	$24986	$54959	$60248
Poverty Level				
Persons Below Poverty Level	1763	2458	3282	4886
Age 65+ Below Poverty Level	399	530	541	716
Households with Public Assistance	120	517	592	389

Industry

Table 5.1.6-119. Employment by Industry for Boca Raton, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	148	437	731	60
Construction	764	1775	1889	1875
Business Services	313	1334	1384	3854
Communication/Utilities	223	583	768	1845
Manufacturing	1726	2803	2429	2205
Financial, Insurance & Real Estate	1565	2168	1605	4648
Services	812	2552	4014	16276
Wholesale/Retail Trade	3537	4486	10629	8583
Transportation	1784	4864	8070	821

Occupation

Table 5.1.6-120. Employment by Occupation for Boca Raton, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	965	3613	6048	-
Clerical	1754	31030	4074	-
Craft	1012	2226	2183	-
Exec/Managerial	1339	3370	5692	-
Farm/Fish/Forest	51	395	477	43
Household Services	193	158	251	-
Laborer/Handler	280	402	516	-
Operative/Transport	310	541	376	-
Service, except Household	1242	2906	3518	-
Technical	150	834	1203	-

Boca Raton Fishing Demographics

Table 5.1.6-121. Number of Federal Permit by Type for Boca Raton, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	7	2	4	8
Commercial King Mackerel	3	2	3	5
Commercial Spanish Mackerel	3	2	1	2
Commercial Spiny Lobster	1	1	1	1
Charter/Headboat for Coastal Pelagics	2	0	1	4
Charter/Headboat for Snapper Grouper	2	1	1	2
Snapper Grouper Class 1	0	0	0	1
Snapper Grouper Class 2	0	2	2	3
Swordfish	2	0	0	0
Shark	2	0	0	0
Rock Shrimp	0	0	0	0
Federal Dealers	0	0	0	0

Table 5.1.6-122. Employment in Fishing Related Industry for Boca Raton, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	3
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	21
Fish and Seafood Markets	445220	6
Marinas	713930	9
Total Fishing Employment		39

5.1.6.12 Key Largo (33037)

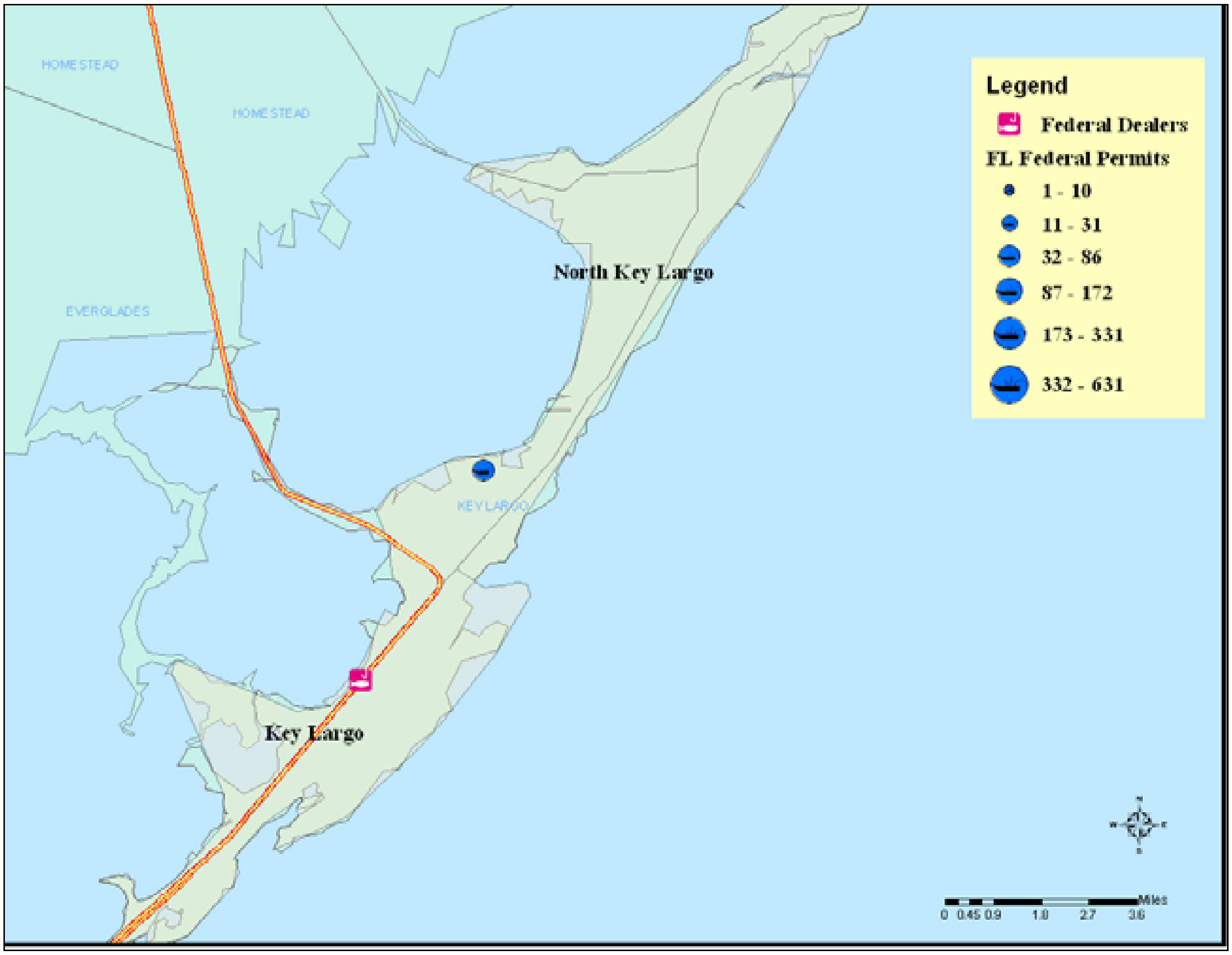


Figure 5.1.6-13. Key Largo, Florida.

The Florida Keys were first discovered by Juan Ponce de Leon in 1513. He named them Los Martires, the martyrs, "because they seemed twisted and tortured" (Williams, 1991). The first permanent European settlement did not occur until the mid-1800s; however, the Keys were inhabited by the Calusa Indians for thousands of years. Williams (1991) notes that the first people to establish permanent homes in the Upper Keys—Key Largo and Islamorada—were Methodist fishermen and farmers. Ben Baker established pineapple farming in Key Largo, the longest Key and oldest named site in Florida, in 1866. He shipped his fruit on small boats to Key West, where the produce was loaded onto larger vessels for shipment to the northern states.

Key Largo Census Demographics

Population

Table 5.1.6-123. Total Persons and Persons by Age category for Key Largo, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	2866	7447	11350	11980
Persons Age 0-5	217	333	624	584
Persons Age 6-15	467	844	1018	1503
Persons Age 16-17	57	144	213	282
Persons Age 18-24	195	537	660	656
Persons Age 25-34	271	1045	1789	1384
Persons Age 35-44	307	738	1833	2199
Persons Age 45-54	411	1127	1491	2160
Persons Age 55-64	455	1279	1697	1451
Persons Age 65+	468	1360	2025	1761

Housing Tenure

Table 5.1.6-124. Housing Tenure for Key Largo, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	26.4	28.8
Percent Owner Occupied	**1990**	**2000**
	73.6	71.2

Residence in 1985 and 1995

Table 5.1.6-125. Residence in 1985 and 1995 for Key Largo, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	1937	2518
Same House	**1990**	**2000**
	5124	5490

Employment/Unemployment

Table 5.1.6-126. Employment and Unemployment for Key Largo, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	62.7	63.1
Percent unemployed	3.9	3.5

Race

Table 5.1.6-127. Race for Key Largo, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	270	276	336	227
Latino Black Persons	0	0	26	16

Latino Persons	89	265	1062	1979
White Persons	2596	7054	10758	9,446
Latino White Persons	89	257	896	1772

Education

Table 5.1.6-128. Years of Education by Category for those 25 Years and Older for Key Largo, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	535	479	598	360
25+ w/ 9-11 years education	447	1072	1333	1230
25+ w/ HS diploma	735	2048	2772	3059
25+ w/ 13-15 years. education	95	1227	1758	2528
25+ w/ College Degree	100	723	1776	2992
Drop outs	32	32	93	34

Income and Poverty

Table 5.1.6-129. Average Household Wage/Salary and Persons Below the Poverty Level for Key Largo, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	$6860	$14893	$38138	$42577
Poverty Level				
Persons Below Poverty Level	477	643	1233	996
Age 65+ Below Poverty Level	125	151	149	138
Households with Public Assistance	40	97	192	86

Industry

Table 5.1.6-130. Employment by Industry for Key Largo, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	60	199	175	136
Construction	124	450	524	680
Business Services	49	110	365	302
Communication/Utilities	42	191	268	243
Manufacturing	14	221	419	160
Financial, Insurance & Real Estate	0	135	317	449
Services	25	218	454	2108
Wholesale/Retail Trade	335	530	1912	2021
Transportation	284	612	1403	281

Occupation

Table 5.1.6-131. Employment by Occupation for Key Largo, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	79	240	740	-
Clerical	145	4710	785	-
Craft	142	544	946	-
Exec/Managerial	141	315	685	-
Farm/Fish/Forest	0	195	174	129
Household Services	30	41	44	-
Laborer/Handler	90	147	223	-
Operative/Transport	67	131	126	-
Service, except Household	226	559	1053	-
Technical	0	68	242	-

Key Largo Fishing Demographics

Table 5.1.6-132. Number of Federal Permit by Type for Key Largo, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	59	40	48	57
Commercial King Mackerel	19	19	21	20
Commercial Spanish Mackerel	21	19	20	18
Commercial Spiny Lobster	7	5	6	6
Charter/Headboat for Coastal Pelagics	14	5	5	20
Charter/Headboat for Snapper Grouper	9	3	2	15
Snapper Grouper Class 1	1	28	35	33
Snapper Grouper Class 2	1	6	8	7
Swordfish	11	1	1	1
Shark	17	3	4	6
Rock Shrimp	1	1	1	0
Federal Dealers	1	1	1	1

Table 5.1.6-133. Employment in Fishing Related Industry for Key Largo, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	6
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	6
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	0
Marinas	713930	37
Total Fishing Employment		49

5.1.6.13 Islamorada (33070, 33036)

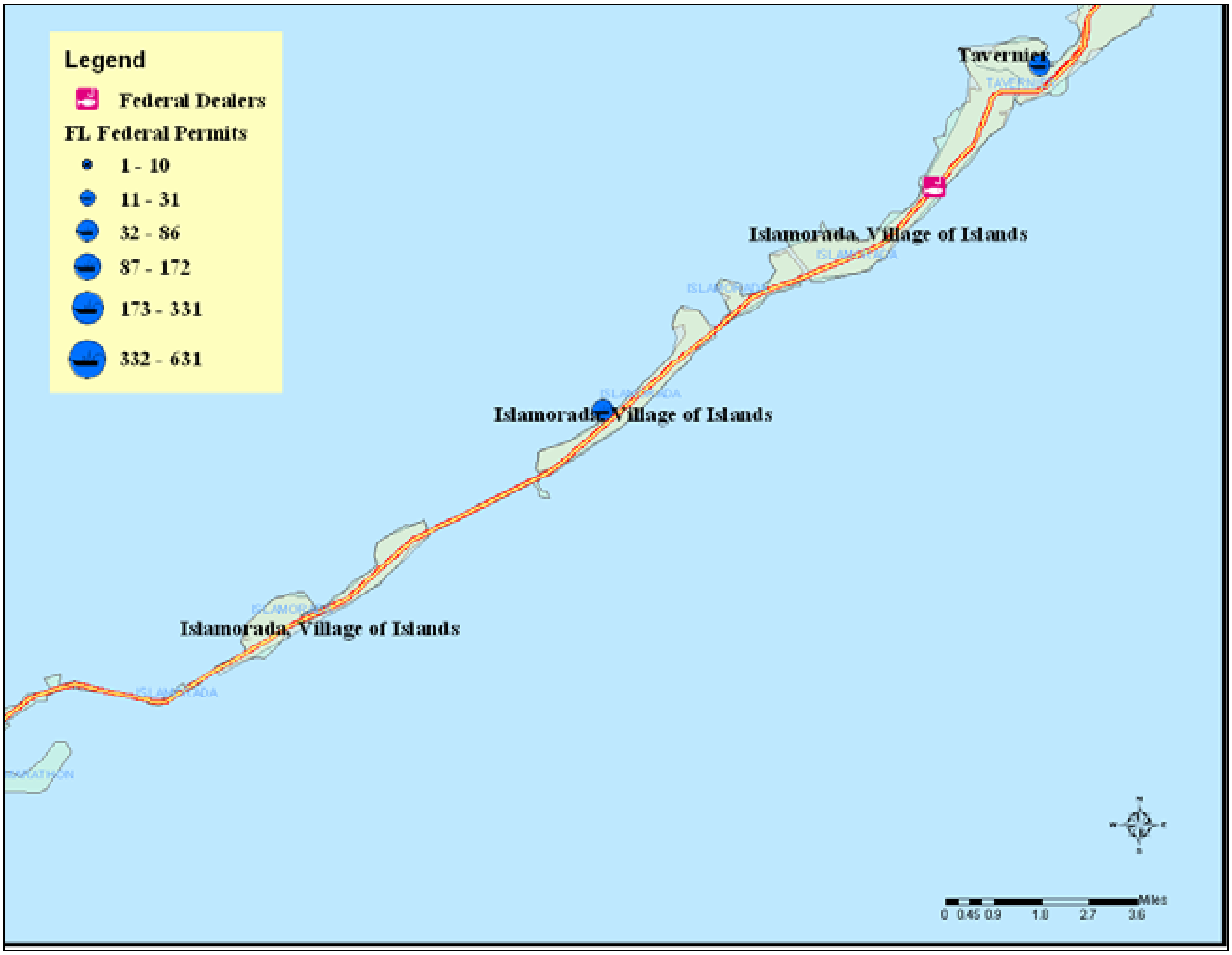


Figure 5.1.6-14. Islamorada, Florida.

Incorporated in 1997 and officially named Islamorada, Village of Islands, the community includes the islands of Upper and Lower Matecumba Keys, Plantation Key and Windley Key. The first settlers were Conchs who were of British descent by way of the Bahamas. They fished and raised fruits and vegetables to survive. In the early 1930s wealthy Americans began to vacation in this area, particularly for the sport fishing. It has remained an important sport fishing center and self proclaimed “Sportfishing Capital of the World.” It has been estimated that there are over 100 charter fishing vessels in Islamorada. In addition to offshore charters there are probably just as many guide boats that fish the nearshore and inshore waters. The community supports a large tourist economy that is centered on the charter fishing industry and has at least 24 marinas and approximately 45 hotels/motels to cater to fishermen. There are at least 6 air fill stations where divers can fill their tanks and several marinas offer dive trips. There are a few commercial operations in the community but not many with most supporting a retail wholesale operation with a restaurant.

The community has seen substantial population growth because of its recent incorporation. Employment and unemployment have not changed dramatically. Average wage and salary have increased and so has the number of persons living below the poverty level. Both may be artifacts of the incorporation. This community is one of the few that has seen an increase in the number of persons working in farm, fish and forestry according to Table 5.1.6-141 and fishing related employment is spread out among marinas, fish and seafood and boat building (Table 5.1.6-144).

Islamorada Census Demographics

Population

Table 5.1.6-134. Total Persons and Persons by Age category for Islamorada, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	1482	1293	6847
Persons Age 0-5	.	49	46	344
Persons Age 6-15	.	149	95	590
Persons Age 16-17	.	23	7	149
Persons Age 18-24	.	144	58	313
Persons Age 25-34	.	259	148	459
Persons Age 35-44	.	148	346	1442
Persons Age 45-54	.	254	107	1377
Persons Age 55-64	.	214	238	992
Persons Age 65+	.	235	248	1181

Housing Tenure

Table 5.1.6-135. Housing Tenure for Islamorada, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	34.1	28.9
Percent Owner Occupied	**1990**	**2000**
	65.9	71.1

Residence in 1985 and 1995

Table 5.1.6-136. Residence in 1985 and 1995 for Islamorada, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	331	1171
Same House	**1990**	**2000**
	564	3614

Employment/Unemployment

Table 5.1.6-137. Employment and Unemployment for Islamorada, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	74.0	62.9
Percent unemployed	1.2	3.7

Race

Table 5.1.6-138. Race for Islamorada, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	0	11	12
Latino Black Persons	.	0	0	5
Latino Persons	.	177	109	66
White Persons	.	1482	1232	1137
Latino White Persons	.	177	59	42

Education

Table 5.1.6-139. Years of Education by Category for those 25 Years and Older for Islamorada, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	226	104	158
25+ w/ 9-11 years education	.	153	137	354
25+ w/ HS diploma	.	412	222	1726
25+ w/ 13-15 years. education	.	175	322	1538
25+ w/ College Degree	.	144	249	2054
Drop outs	.	6	6	29

Income and Poverty

Table 5.1.6-140. Average Household Wage/Salary and Persons Below the Poverty Level for Islamorada, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$17848	$35041	$41522
Poverty Level				
Persons Below Poverty Level	.	200	117	466
Age 65+ Below Poverty Level	.	26	20	50
Households with Public Assistance	.	29	13	65

Industry

Table 5.1.6-141. Employment by Industry for Islamorada, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	134	57	129
Construction	.	69	32	232
Business Services	.	19	18	196
Communication/Utilities	.	57	26	88
Manufacturing	.	36	38	66
Financial, Insurance & Real Estate	.	36	23	193
Services	.	51	48	1345
Wholesale/Retail Trade	.	247	216	1283
Transportation	.	192	353	222

Occupation

Table 5.1.6-142. Employment by Occupation for Islamorada, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	81	153	-
Clerical	.	770	79	-
Craft	.	66	66	-
Exec/Managerial	.	192	153	-
Farm/Fish/Forest	.	162	65	138
Household Services	.	8	7	-
Laborer/Handler	.	29	19	-
Operative/Transport	.	8	7	-
Service, except Household	.	129	194	-
Technical	.	8	24	-

Islamorada Fishing Demographics

Table 5.1.6-143. Number of Federal Permit by Type for Islamorada, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permits	88	28	36	83
Commercial King Mackerel	24	19	20	18
Commercial Spanish Mackerel	26	13	14	12
Commercial Spiny Lobster	10	5	6	6
Charter/Headboat for Coastal Pelagics	52	5	5	54
Charter/Headboat for Snapper Grouper	36	5	7	40
Snapper Grouper Class 1	7	19	21	21
Snapper Grouper Class 2	1	5	7	5
Swordfish	12	0	0	0
Shark	15	1	1	1

Rock Shrimp	0	0	0	0
Federal Dealers	2	2	3	1

Table 5.1.6-144. Employment in Fishing Related Industry for Islamorada, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	3
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	10
Fish and Seafoods	422460	25
Fish and Seafood Markets	445220	0
Marinas	713930	33
Total Fishing Employment		71

5.1.6.14 Marathon (33050)

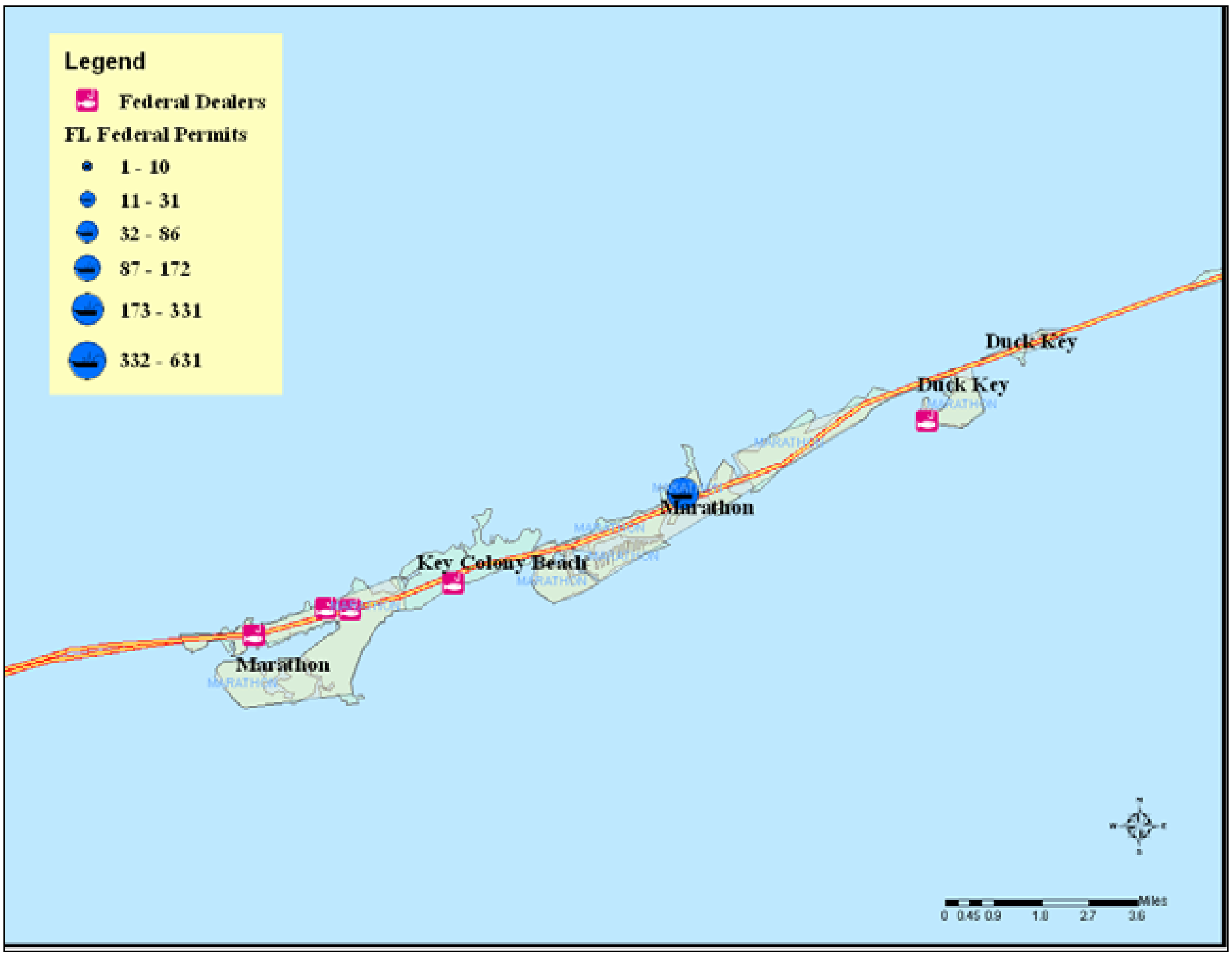


Figure 5.1.6-15. Marathon, Florida.

Marathon, or Key Vaca as it was called by the Spanish, was originally settled in the early 1800s by a group of Bahamians and numerous families from Mystic, Connecticut involved in fishing. Salvaging cargo from the Spanish Galleons in the area was also steeped in this key's history as well. Marathon has seen steady growth in its population since 1970. The percentage of the population employed in the labor force along with unemployment has remained constant over the past ten years. Average wage and salary have also slowly increased over the years, but the number of individuals living under the poverty level has also climbed to over 1400 persons. The number of persons working in occupations or industry sector of farm, fish and forestry has dropped since 1990 but still remains high at over 200 persons. There are over 180 vessels with federal permits and the majority of those have coastal pelagic permits (Table 5.1.6-154). Over 50 of those vessels have charter permits for either coastal pelagics or snapper grouper. Other permits that are held by over 40 vessels include spiny lobster, snapper grouper class 1 and 2. There are also 7 federal dealers in Marathon. According to Table 5.1.6-155 there are 92 persons employed in the fish and seafood sector of fishing related employment. There are 39 in the fishing sector and 47 in marinas.

Marathon Census Demographics

<u>Population</u>

Table 5.1.6-145. Total Persons and Persons by Age category for Marathon, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	4461	7568	8857	10194
Persons Age 0-5	284	267	585	482
Persons Age 6-15	740	945	864	1002
Persons Age 16-17	100	190	196	194
Persons Age 18-24	358	801	509	643
Persons Age 25-34	520	1262	1275	1198
Persons Age 35-44	482	833	1397	1778
Persons Age 45-54	620	870	1237	1961
Persons Age 55-64	686	1196	1223	1349
Persons Age 65+	589	1149	1571	1587

<u>Housing Tenure</u>

Table 5.1.6-146. Housing Tenure for Marathon, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	34.5	36.7
Percent Owner Occupied	**1990**	**2000**
	65.5	63.3

<u>Residence in 1985 and 1995</u>

Table 5.1.6-147. Residence in 1985 and 1995 for Marathon, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	**1990**	**2000**
	2103	1898
Same House	**1990**	**2000**
	3184	5029

Employment/Unemployment

Table 5.1.6-148. Employment and Unemployment for Marathon, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	**1990**	**2000**
Percent in labor force	59.0	63.7
Percent unemployed	3.9	3.5

Race

Table 5.1.6-149. Race for Marathon, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	**1970**	**1980**	**1990**	**2000**
Black Persons	351	274	586	449
Latino Black Persons	0	0	85	28
Latino Persons	49	302	1075	2095
White Persons	4110	7076	8001	7,513
Latino White Persons	49	244	802	1828

Education

Table 5.1.6-150. Years of Education by Category for those 25 Years and Older for Marathon, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	**1970**	**1980**	**1990**	**2000**
25+ w/ 0-8 years education	586	668	635	445
25+ w/ 9-11 years education	629	859	1241	1316
25+ w/ HS diploma	931	2095	1908	2696
25+ w/ 13-15 years. education	505	918	1423	2240
25+ w/ College Degree	246	770	1080	2222
Drop outs	78	62	33	19

Income and Poverty

Table 5.1.6-151. Average Household Wage/Salary and Persons Below the Poverty Level for Marathon, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN

Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	$6745	$15495	$28609	$36010
Poverty Level				
Persons Below Poverty Level	677	959	1313	1422
Age 65+ Below Poverty Level	102	126	114	205
Households with Public Assistance	52	155	178	99

Industry

Table 5.1.6-152. Employment by Industry for Marathon, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	217	319	379	217
Construction	242	477	300	619
Business Services	85	96	157	227
Communication/Utilities	24	152	141	165
Manufacturing	69	174	184	110
Financial, Insurance & Real Estate	41	90	121	267
Services	49	146	274	1800
Wholesale/Retail Trade	601	705	1332	2003
Transportation	453	920	1278	233

Occupation

Table 5.1.6-153. Employment by Occupation for Marathon, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	144	353	617	-
Clerical	195	4580	364	-
Craft	324	476	537	-
Exec/Managerial	244	441	553	-
Farm/Fish/Forest	59	328	365	217
Household Services	32	16	18	-
Laborer/Handler	166	171	156	-
Operative/Transport	104	158	137	-
Service, except Household	339	525	958	-
Technical	46	55	81	-

Marathon Fishing Demographics

Table 5.1.6-154. Number of Federal Permit by Type for Marathon, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permits	194	128	159	189
Commercial King Mackerel	83	70	91	82
Commercial Spanish Mackerel	106	93	113	103
Commercial Spiny Lobster	53	44	48	40
Charter/Headboat for Coastal Pelagics	32	10	14	52
Charter/Headboat for Snapper Grouper	36	16	22	57
Snapper Grouper Class 1	8	45	55	51
Snapper Grouper Class 2	4	39	46	41
Swordfish	21	2	2	4
Shark	47	2	3	0
Rock Shrimp	2	3	4	2
Federal Dealers	8	7	7	7

Table 5.1.6-155. Employment in Fishing Related Industry for Marathon, Florida. (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	39
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	92
Fish and Seafood Markets	445220	6
Marinas	713930	47
Total Fishing Employment		184

5.1.6.15 Big Pine Key (33042, 33043)

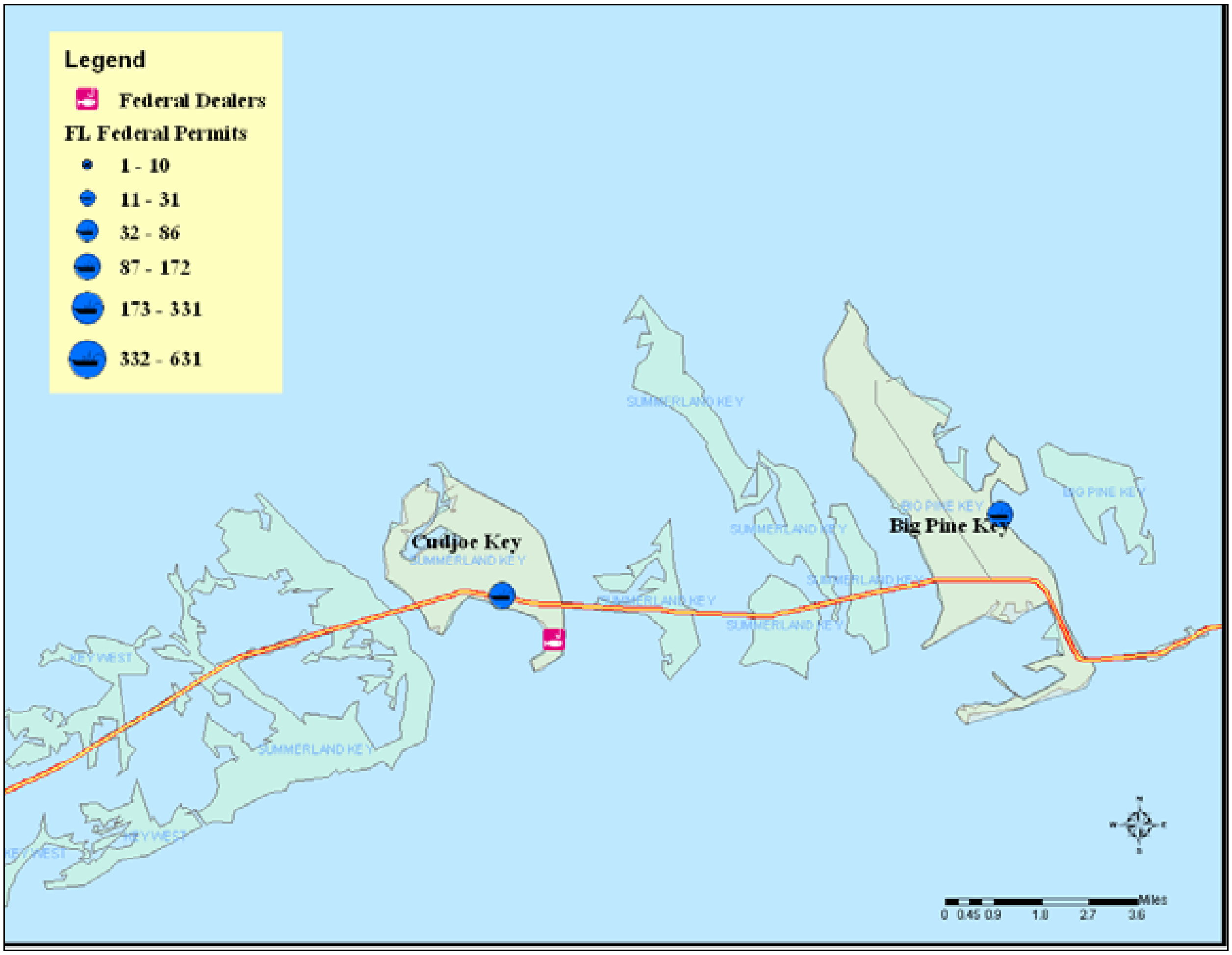


Figure 5.1.6-16. Big Pine Key, Florida.

Big Pine Key, located in the Lower Keys, does not have a true history of its own. Settlement was sparse well into the twentieth century. The 1870 census for Big Pine Key lists only one inhabitant, George Wilson. Wilson was a charcoal burner, providing his product for residents of Key West before the days of electricity. A shark processing plant was established on Big Pine in 1923 by Hydenoil Products. The sharks were harvested for their leather and liver oil. The company averaged 100 sharks a day in 1930. The fishermen caught mostly hammerhead, sand, nurse, dusky, leopard, sawfish sharks. Even with this seeming success, the plant was shutdown in 1931 because of possible financial difficulty.

Big Pine Key and Cudjoe Key are included in tables for fishing demographics but the census demographics include only Big Pine Key. The population for this area has seen steady growth, while the percent of the population in the labor force and unemployment have remained fairly constant over the years with unemployment fairly low at 2.1 percent. Average wage and salary have increased steadily along with the number of persons living under the poverty level. The number of person working in the farm, fish and forestry occupation has dropped since 1990 but still remains high compared to other coastal communities. There are over 100 vessels with federal permits and they are spread out among the different types with most holding coastal pelagic permits but many with snapper grouper also (Table 5.1.6-165). According to Table 5.1.6-166 there are 50 people employed in the fishing sector and another 27 in the marinas sector.

Big Pine Key Census Demographics

Population

Table 5.1.6-156. Total Persons and Persons by Age category for Big Pine Key, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	.	2321	4124	5049
Persons Age 0-5	.	64	260	206
Persons Age 6-15	.	260	270	524
Persons Age 16-17	.	36	60	96
Persons Age 18-24	.	218	206	157
Persons Age 25-34	.	359	678	622
Persons Age 35-44	.	252	714	759
Persons Age 45-54	.	288	603	1033
Persons Age 55-64	.	417	603	707
Persons Age 65+	.	427	730	752

Housing Tenure

Table 5.1.6-157. Housing Tenure for Big Pine Key, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	22.1	23.0
Percent Owner Occupied	**1990**	**2000**
	77.9	77.0

Residence in 1985 and 1995

Table 5.1.6-158. Residence in 1985 and 1995 for Big Pine Key, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	1015	777
Same House	**1990**	**2000**
	1530	2743

Employment/Unemployment

Table 5.1.6-159. Employment and Unemployment for Big Pine Key, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	54.5	62.3
Percent unemployed	2.4	2.1

Race

Table 5.1.6-160. Race for Big Pine Key, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	.	49	49	51
Latino Black Persons	.	0	0	4
Latino Persons	.	49	144	338
White Persons	.	2256	4033	4,496
Latino White Persons	.	49	136	276

Education

Table 5.1.6-161. Years of Education by Category for those 25 Years and Older for Big Pine Key, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	.	236	125	102
25+ w/ 9-11 years education	.	299	477	479
25+ w/ HS diploma	.	628	1011	1475
25+ w/ 13-15 years. education	.	334	842	1006
25+ w/ College Degree	.	246	659	1453
Drop outs	.	30	0	8

Income and Poverty

Table 5.1.6-162. Average Household Wage/Salary and Persons Below the Poverty Level for Big Pine Key, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	1970	1980	1990	2000
Average Household Wage/Salary Income (dollars)	.	$16176	$29418	$44514
Poverty Level				
Persons Below Poverty Level	.	204	330	472
Age 65+ Below Poverty Level	.	52	61	53
Households with Public Assistance	.	19	33	67

Industry

Table 5.1.6-163. Employment by Industry for Big Pine Key, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	1970	1980	1990	2000
Agriculture, Fishing, Mining	.	74	195	105
Construction	.	152	174	253
Business Services	.	36	73	151
Communication/Utilities	.	23	65	111
Manufacturing	.	32	61	22
Financial, Insurance & Real Estate	.	16	43	284
Services	.	39	125	806
Wholesale/Retail Trade	.	168	627	650
Transportation	.	194	385	111

Occupation

Table 5.1.6-164. Employment by Occupation for Big Pine Key, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	1970	1980	1990	2000
Sales	.	132	248	-
Clerical	.	860	284	-
Craft	.	177	217	-
Exec/Managerial	.	55	191	-
Farm/Fish/Forest	.	93	177	81
Household Services	.	3	0	-
Laborer/Handler	.	36	61	-
Operative/Transport	.	0	24	-
Service, except Household	.	144	313	-
Technical	.	0	32	-

Big Pine Key Fishing Demographics

Table 5.1.6-165. Number of Federal Permit by Type for Big Pine Key, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permitted vessels	141	91	99	101
Commercial King Mackerel	62	49	54	48
Commercial Spanish Mackerel	68	42	45	32
Commercial Spiny Lobster	25	17	18	14
Charter/Headboat for Coastal Pelagics	16	7	6	23
Charter/Headboat for Snapper Grouper	18	12	12	22
Snapper Grouper Class 1	12	46	48	44
Snapper Grouper Class 2	10	25	28	29
Swordfish	7	1	1	1
Shark	26	2	2	5
Rock Shrimp	0	0	1	1

Federal Dealers	0	0	0	0

Table 5.1.6-166. Employment in Fishing Related Industry for Big Pine Key, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	50
Seafood Canning	311711	7
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	9
Fish and Seafood Markets	445220	0
Marinas	713930	21
Total Fishing Employment		87

5.1.6.16 Key West (33040, 33041, 33045)

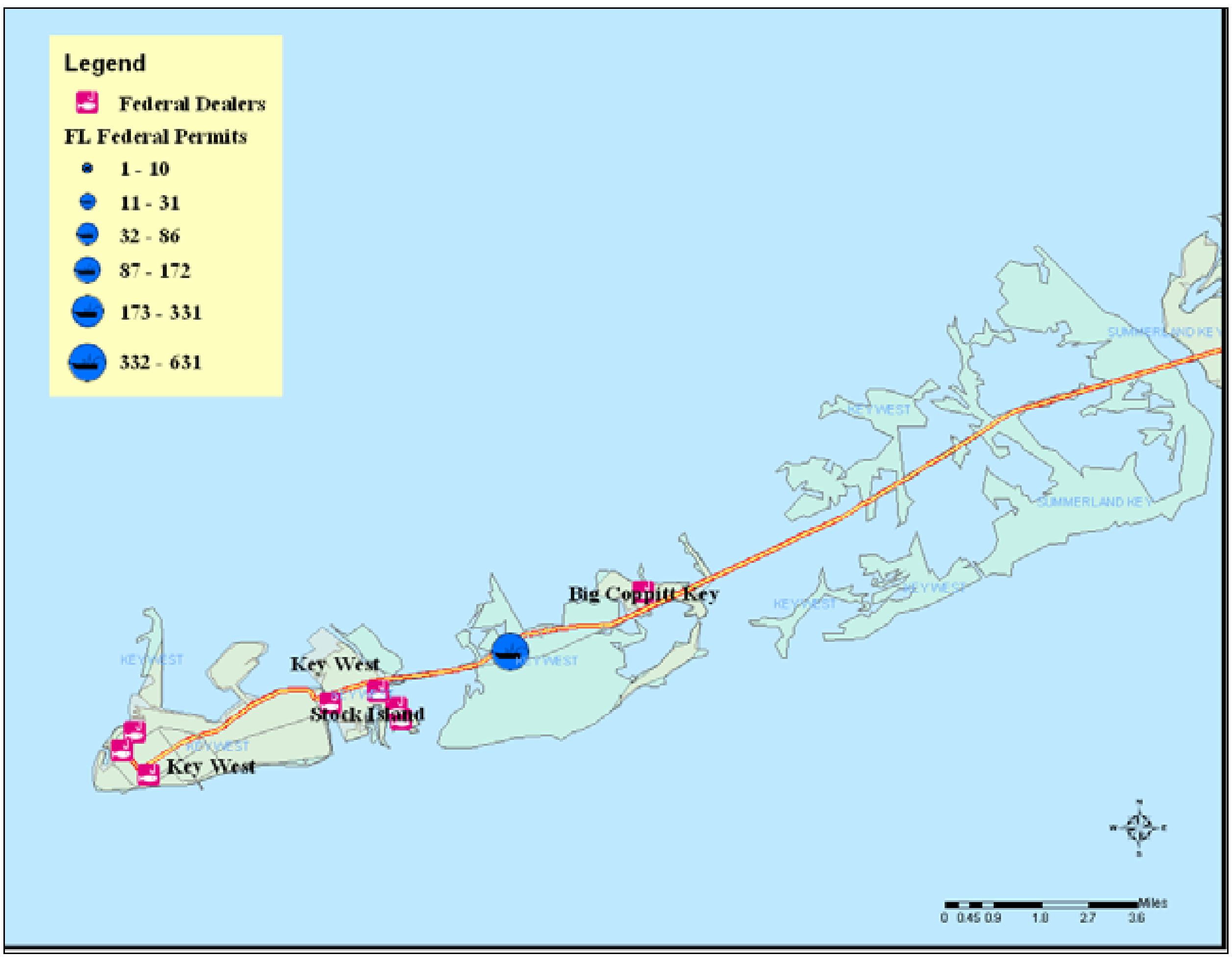


Figure 5.1.6-17. Key West, Florida.

Spanish explorer Juan Ponce de Leon and chronicler Antonio de Herrera were the first Europeans to set eyes upon Key West on May 15, 1513. It has the distinction of being the oldest city in south Florida (Williams, 1991). They called the island Cayo Hueso (Isle of Bones) because of the numerous bones they found on what was either a Calusa Indian burial ground or battlefield. It is believed that the English thought the Spanish meant "oeste" (west) and changed the name to Key West. However, the first permanent occupancy of Key West did not occur until 1822. In 1822, Spaniard Juan Salas sold the city of Key West to a Mobile, Alabama businessman named John Simonton for $2,000. Naval Commodore David Porter was sent to establish a naval post to help rid the area of pirates in that same year. They also established a port in order to open the shipping lanes from the Gulf of Mexico, the Caribbean, and the Atlantic. A Customs House was established later that year. By 1830, the pirates were gone; however, hurricanes and the fear of running aground on the coral reefs still plagued boat captains. These boating difficulties gave way to one of the first profitable ventures in Key West—salvaging of shipwrecks (Williams, 1991).

When salvaging was no longer profitable, sponging and Cuban cigar manufacturing became the mainstays of Key West's economy (Williams, 1991). The people of Key West, or conchs as they are commonly known, began the sponge trade in Florida, and by the 1890s, they made Key West "the commercial sponging capital of the world." Nevertheless, fishing was a primary source of income and survival since the very beginning. Before permanent settlement of Key West, fishermen from New England and the Bahamas would come to take advantage of the species the waters of Key West had to offer. Similarly, in the early 1900s, fishermen from St. Augustine would fish in Key West and sell their catch in Havana. Since the beginning, grouper and spiny lobster have been the most profitable species of the Key West fishing industry.

Shrimp has been another important species for the Key West fishing community. John Salvador, a son of one of the original fishing families in St. Augustine, discovered rich shrimping grounds in the Dry Tortugas in 1950. The rush to harvest the shrimp has been related to the gold rush of 1849, naming the shrimp "pink gold." "Currently, Key West pink shrimp make up almost 50% of the total Monroe County shrimp landings." The marine resources have been the key to survival and income for conchs for nearly 200 years. Today, the port in Key West is famous for its scuba diving, sport fishing, and yachting opportunities.

The population of Key West has not grown much over the past three decades. The percent of the population in the labor force and unemployment have both remained fairly constant since 1990. Average wage and salary has grown over the years while the number of people living under the poverty level has decreased overall. Key West has the greatest number of persons working in the farm, fish and forestry categories of any coastal community with over 300 in both occupation and industry. Table 5.1.6-176 shows over 360 vessels with federal permits that homeport in the community. The majority of those vessels have coastal pelagic permits but other permits are also held by many of these vessels. There are 15 dealers with federal permits in the community also. Given so many fishing vessels the number of persons employed in fishing related employment seems low with only 18 in the fishing sector and 49 in marinas.

The city of Key West boasts more than two dozen fishing charters in its area. Most of the boats can support between two and six anglers. Half and full-day trips seem to be the most popular, with many offering swordfish fishing excursions at night as well. Some of the most popular species for offshore sport fishing adventures in the waters off Key West include sailfish, tuna, wahoo, and dolphin. Many of the fishermen offer reef and wreck fishing trips, allowing anglers to catch various species of snapper and grouper. Some of the more popular targeted species include red snapper, yellowtail snapper, mutton snapper, black grouper, and mangrove snapper. There are about half a dozen headboats that fish the waters of Key West as well. These boats can accommodate far more fisherman. Trips usually last for about four hours. Some of these boats specifically target snappers and groupers.

Tournaments are also an important part of the recreational fishing sector in Key West. One of the largest tournaments in the area, The Key West Fishing Tournament, lasts from April through November; this is the tournament's thirty-eighth year. Forty-four species of fish are fished, six of which are groupers and six species of snappers. Other longstanding tournaments in the area include the Mercury Redbone at Large Key West Classic and the Mercury S.L.A.M (Southernmost Light tackle Anglers Masters) held in April and September, respectively. These tournaments are an opportunity for the recreational fishing boat owners to make money as well as many of them rent their boats to tournament participants who do not have vessels of their own.

Marinas and bait and tackle shops are important to the recreational sector as well as the commercial industry. Key West has more than half a dozen marinas, many of which are full service marinas. For example, the Sunset and Oceanside Marinas offer boat repairs, fuel, storage, and repairs. Many of the recreational fishermen in the area are docked at either Garrison Bight Marina or at Amberjack Pier at the City Marina.

Key West Census Demographics

Population

Table 5.1.6-167. Total Persons and Persons by Age category for Key West, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Total Persons and Age Category	1970	1980	1990	2000
Total Persons	27323	24382	24832	25480
Persons Age 0-5	2441	1425	2135	1373
Persons Age 6-15	4902	3279	2333	2322
Persons Age 16-17	825	599	383	339
Persons Age 18-24	4717	3308	2565	2062
Persons Age 25-34	3992	5007	5659	4558
Persons Age 35-44	3045	2749	4515	4944
Persons Age 45-54	2828	2321	2452	4357
Persons Age 55-64	2054	2638	1904	2574
Persons Age 65+	1986	2795	2886	2951

Housing Tenure

Table 5.1.6-168. Housing Tenure for Key West, Florida 1990-2000. (Source: U.S. Census Bureau).

Percent Renter Occupied	1990	2000
	57.9	54.4
Percent Owner Occupied	**1990**	**2000**
	42.1	45.6

Residence in 1985 and 1995

Table 5.1.6-169. Residence in 1985 and 1995 for Key West, Florida 1990-2000. (Source: U.S. Census Bureau).

Different House Same County	1990	2000
	4471	5572
Same House	**1990**	**2000**
	8742	9569

Employment/Unemployment

Table 5.1.6-170. Employment and Unemployment for Key West, Florida 1990-2000. (Source: U.S. Census Bureau).

Persons 16 yrs and over	1990	2000
Percent in labor force	73.7	70.1
Percent unemployed	3.3	3.0

Race

Table 5.1.6-171. Race for Key West, Florida 1970-2000. (Source U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Race	1970	1980	1990	2000
Black Persons	3224	2790	2584	2237
Latino Black Persons	191	280	91	128
Latino Persons	3293	4959	3951	4215
White Persons	23795	20679	21361	18195
Latino White Persons	3102	4360	3402	3447

Education

Table 5.1.6-172. Years of Education by Category for those 25 Years and Older for Key West, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Education	1970	1980	1990	2000
25+ w/ 0-8 years education	4005	2721	1646	1196

25+ w/ 9-11 years education	2792	2199	1863	2192
25+ w/ HS diploma	4628	5462	4831	5598
25+ w/ 13-15 years. education	1232	2634	4102	5491
25+ w/ College Degree	1248	2494	3630	7080
Drop outs	697	233	132	286

Income and Poverty

Table 5.1.6-173. Average Household Wage/Salary and Persons Below the Poverty Level for Key West, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Wage or Salary	**1970**	**1980**	**1990**	**2000**
Average Household Wage/Salary Income (dollars)	$6949	$15039	$32320	$43021
Poverty Level				
Persons Below Poverty Level	4747	3760	2507	2535
Age 65+ Below Poverty Level	678	554	505	318
Households with Public Assistance	355	470	555	169

Industry

Table 5.1.6-174. Employment by Industry for Key West, Florida 1970-2000. (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Industry	**1970**	**1980**	**1990**	**2000**
Agriculture, Fishing, Mining	352	589	296	319
Construction	442	860	865	1123
Business Services	165	401	581	682
Communication/Utilities	393	433	366	463
Manufacturing	312	558	365	231
Financial, Insurance & Real Estate	101	210	150	917
Services	273	673	718	4738
Wholesale/Retail Trade	2183	1995	4176	5069
Transportation	1971	2655	4011	487

Occupation

Table 5.1.6-175. Employment by Occupation for Key West, Florida 1970-2000 (Source: U.S. Census Bureau & MARFIN Sociodemographic Database. Louisiana Population Data Center & National Marine Fisheries Service).

Occupation	**1970**	**1980**	**1990**	**2000**
Sales	595	1246	1888	-
Clerical	1555	16130	1908	-
Craft	1029	1375	1229	-
Exec/Managerial	717	1348	1541	-
Farm/Fish/Forest	67	505	265	301

Household Services	141	63	51	-
Laborer/Handler	582	353	347	-
Operative/Transport	361	268	177	-
Service, except Household	1483	2226	3003	-
Technical	59	209	314	-

Key West Fishing Demographics

Table 5.1.6-176. Number of Federal Permit by Type for Key West, Florida (Source: NMFS 2002).

Type of Permit	1998	1999	2000	2001
Total permits	344	247	295	361
Commercial King Mackerel	193	171	205	207
Commercial Spanish Mackerel	219	171	203	200
Commercial Spiny Lobster	125	116	134	137
Charter/Headboat for Coastal Pelagics	73	43	59	128
Charter/Headboat for Snapper Grouper	62	47	64	123
Snapper Grouper Class 1	15	127	159	157
Snapper Grouper Class 2	5	38	37	41
Swordfish	42	3	2	3
Shark	89	12	12	12
Rock Shrimp	11	7	7	7
Federal Dealers	13	12	13	12

Table 5.1.6-177. Employment in Fishing Related Industry for Key West, Florida (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC Code	Number Employed
Fishing	114100	18
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	3
Fish and Seafoods	422460	7
Fish and Seafood Markets	445220	0
Marinas	713930	49
Total Fishing Employment		77

5.1.6.17 Florida Fishing Infrastructure and Community Characterization

The following tables provide a general view of the presence or absence of fishing infrastructure located within the coastal communities of Florida with substantial fishing activity. It should be noted that there are many other attributes that might have been included in this table, however, because of inconsistency in rapid appraisal for all communities, these items were selected as the most consistently reported or had secondary data available to determine presence or absence. It should also be noted that in some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. Table 5.1.6-178 offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 5.1.6-178. Fishing Infrastructure Table for Florida Potential Fishing Communities.

Community	Federal Commercial Permits (5+)	State Commercial Licenses (10+)	Federal Charter Permits (5+)	Seafood Landings	Seafood retail markets	Fish processors, Wholesale fish house	Recreational docks / marinas	Recreational Fishing Tournaments	Total
Atlantic Beach	-	+	-	+	+	+	+	-	5
Big Pine Key	+	+	+	+	+	+	+	-	7
Boca Raton	+	+	-	-	+	-	+	-	4
Cape Canaveral	+	+	-	+	+	+	+	+	7
Fernandina Beach	+	+	+	+	+	+	+	+	8
Fort Pierce	+	+	+	+	+	+	+	+	8
Islamorada	+	+	+	+	+	+	+	+	8
Jupiter	+	+	+	+	+	+	+	+	8
Key Largo	+	+	+	+	+	+	+	+	8
Key West	+	+	+	+	+	+	+	+	8
Marathon	+	+	+	+	+	+	+	+	8
Merritt Island	+	+	-	+	+	+	+	-	6
Palm Beach	+	+	-	+	+	-	+	+	6
Ponce Inlet	+	+	+	+	+	+	+	+	8
Sebastian	+	+	+	+	+	+	+	+	8
St. Augustine	+	+	+	+	+	+	+	+	8

In attempting a preliminary characterization of potential fishing communities in Table 5.1.6-179, we have provided a grouping of communities that appear to have more involvement in various fishing enterprises and therefore are classified as primarily involved. These communities have considerable fishing infrastructure, but also have a history and culture surrounding both commercial and recreational fishing that contributes to an appearance and perception of being a fishing community in the mind of residents and others. The communities are not ranked in any particular order, this is merely a categorization.

Table 5.1.6-179. Preliminary Characterization of Potential Fishing Communities in Florida.

Primarily-Involved	Secondarily-Involved
Fernandina Beach	Atlantic Beach
Fort Pierce	Boca Raton
Islamorada	Palm Beach
Jupiter	
Key Largo	
Key West	
Marathon	
Fernandina Beach	
Fort Pierce	

Islamorada	

Many of these communities are in transition due to various social and demographic changes from coastal development, growing populations, increasing tourism, changing regulations, etc. This preliminary characterization is just that and should not be considered a definite designation as fishing community, but a general guide for locating communities that may warrant consideration as a potential fishing community.

5.2 Fisheries under SAFMC Management

5.2.1 Penaeid Shrimp

5.2.1.1 Description of fishing practices, vessels and gear

Commercial food shrimp fishery

Otter trawl

The otter trawl is the most common gear used to harvest these shrimp species and consists of: (1) a cone-shaped bag in which the shrimp are gathered into the tail or cod end; (2) wings on each side of the net for herding shrimp into the bag; (3) trawl doors at the extreme end of each wing for holding the wings apart and holding the mouth of the net open; and (4) two lines attached to the trawl doors and fastened to the vessel. A ground line extends from door to door on the bottom of the wings and mouth of the net while a float line is similarly extended at the top of the wings and mouth of the net. A flat net is more often used when fishing for brown shrimp since they burrow into the bottom to escape the trawl. This net has a wider horizontal spread than other designs and is believed to be more effective at capturing brown and pink shrimp. In areas where white shrimp are the main target, trawls used in the fishery have been modified to increase the efficiency in the capture of white shrimp. The tongue trawl or high-rise trawl, was designed to fish higher in the water column making it more effective in catching the more active white shrimp (SAFMC 1996b). Most trawl vessels are rigged for towing two to four nets simultaneously. In Florida, this is only the case for vessels operating in offshore waters. In inland and nearshore waters, Florida trawlers are restricted to no more than two nets each having a maximum surface area not to exceed 500 square feet. The double-rigged shrimp trawler has two outrigger booms from whose ends, through a block, the cable from the winch drum is run to the two nets. Some vessels use twin trawls, which are essentially two trawls on a single set of doors, joined together at the head and foot ropes to a neutral door connected to a third bridle leg. Thus, instead of towing two 70 foot nets the vessel tows four 40 foot nets. This rig has some advantages in ease of handling and increased efficiency. The quad trawl net configuration allows faster towing speed and wider net spread compared to double-rigged trawls. In South Carolina, it is unlawful to have onboard a vessel or to trawl with any trawl or trawls having a total foot rope length of two hundred and twenty feet or greater, not including try nets or nets bundled below deck.

Trawlers operating in Georgia and South Carolina waters are restricted to a combined maximum length of 220 feet of foot rope, defined as the measure from brail line to brail line, first tie to last tie on the bottom line, but not to include a try net up to 16 feet in length. Trawling accounts for more than 95% of the food shrimp landed in Georgia. Georgia's fleet is comprised of large trawl vessels, with 66% in excess of 40 feet in length. Hand-retrieved trawls, those with no mechanical retrieval capabilities and typically less than 25 feet in length, account for approximately 28% of all vessels harvesting food shrimp. Their minimal size restricts their effective fishing range to shallow, near-shore areas close to the shoreline. In 1977, Georgia's sounds were closed to shrimp trawling. Since that time, the sounds have been opened only five times. Each opening lasted less than seven days. Most hand-retrieved trawl fishery participants do so for personal consumption or for supplemental income.

The duration of tows varies depending on many factors including amount of bycatch species and concentration of shrimp. Small boats fishing in inshore waters make much shorter drags than the larger, offshore vessels whose tows generally last several hours (SAFMC 1993).

Wing net
In Biscayne Bay, Florida, food production shrimp are harvested with wing nets. A wing net is a net in the form of an elongated bag kept open by a rigid frame that is attached to either side of a vessel and is not towed behind a vessel or dragged along the bottom. Vessels are equipped with two such nets each with a perimeter no greater than 28 feet and a surface area not exceeding 500 square feet. This is a top water fishery and shrimp are harvested as they leave the bay. Roller frame trawls are also allowed; however, these are not used in the food shrimp fishery on the Atlantic coast.

Cast net
In Georgia, cast netting is the second most popular means of commercially harvesting food shrimp. Like the hand-retrieval fishery, most individuals who are commercially licensed utilize this fishery recreationally or as a form of supplemental income. Operating under the same season as that of the trawl fisheries, but without area restrictions, participants typically target shrimp in waters within the estuary proper, frequently fishing near or adjacent to sounds and tidal river mouths. During the initial years of its existence, the commercial cast net fishery in Georgia operated under minimal restrictions; however, regulatory changes in 1998 created gear restrictions and catch limits. Currently, the commercial catch limit for the cast net fishery is 50 quarts of shrimp at any one time, no more than 10 percent of which may be dead. Cast nets must be constructed of uniform mesh and material from the thimble or horn, to the lead line, with a minimum of ¾ pound of lead per radius. Commercial nets must have a minimum mesh size of 5/8 inch and cannot exceed a radius of 12 feet.

Channel net
In some areas, primarily North and South Carolina, channel nets are also used for commercial shrimping. Channel nets are essentially anchored shrimp trawls that fish almost the entire water column as they are held open by currents. In South Carolina channel nets are required to have top-opening turtle excluder devices (TEDs).

Other gear

In North Carolina, skimmer trawls are used in shallow tributaries. This gear is attached to frames that can be raised and lowered into the water on either side of the vessel. The tailbag can be retrieved and dumped without stopping and "hauling back." Butterfly nets, rectangular nets held open by a frame and attached to the side of the vessel, are used in a few areas. Haul or beach seines are also used to a minor extent for commercial fishing in some areas. The use of non-trawl gear, especially in North Carolina inshore waters is on the increase. Landings from these methods of fishing (e.g., beam trawls and chopstick gear) have increased from 137,000 lb in 1993 to 827,000 lb in 2002. In Georgia, seines 12 feet or less, with a maximum depth of 4 feet and maximum stretched mesh of 1 inch may be used any time in state waters. Seines less than 100 feet in length, with minimum stretched mesh size of 1 ¼ in, may be used on any sand beach or on any barrier island in Georgia but are prohibited in inlets or tidal sloughs. Seines 100-300 feet in length are allowed only on the oceanfront sides of beaches and must have a minimum stretched mesh of 2 ½ in.

Fishing area

The commercial fishing area for penaeid shrimp (white, brown and pink) species in the South Atlantic is mainly concentrated from Pamlico Sound and Ocracoke Inlet, North Carolina to Fort Pierce, Florida. There is another fishery off the Florida Keys where the main target is pink shrimp. Commercial shrimp catches in all four states are taken from internal waters, state waters out to three miles and from the EEZ. Most of the shrimp in these states are caught by otter trawls (SAFMC 1996b).

In North Carolina, the important shrimping areas are Pamlico Sound, Core Sound, major rivers and off the southern coast, south of Ocracoke Inlet. The brown shrimp fishery is the most important fishery followed by the white shrimp fishery in the fall and the pink shrimp fishery in the spring. Vessels operate night and day in Pamlico Sound, Neuse River, Bay River, Core Sound, Newport River, North River, White Oak River, New River and the Intercoastal Waterway in the southern portion of the state as well as the ocean off the central and southern coasts. Daytime shrimping in North Carolina takes place along the southern coast and in the New River during the fall.

South Carolina's major food shrimp trawling area is continuous in the Atlantic Ocean from the entrance of Winyah Bay near Georgetown southwestward to the South Carolina - Georgia state line near Savannah, Georgia, including the mouths of three sounds. Effort occurs to a lesser extent in state waters northwest of the Winyah Bay entrance to the South Carolina-North Carolina state line at Little River. Trawling often occurs in the EEZ off South Carolina prior to the opening of the territorial sea and during the open state trawling season. The summer to winter white shrimp fishery is the most important shrimp fishery for South Carolina vessels. Trawling occurs in the daylight hours in response to activity of the primary target species, white shrimp. The season generally runs from mid-May through December. The channel net fishery is prosecuted in inshore waters of North Santee Bay near Cape Romain and in Winyah Bay near Georgetown from generally from mid-September through November.

In Georgia, shrimping takes place along the entire coast. Shrimp are harvested in estuarine and nearshore waters of each coastal county. Georgia law allows for state waters to be opened for the harvest of food shrimp from May 15 until December 31. At the discretion of the Commissioner of the Department of Natural Resources, the season can be extended through the last day in February. All decisions regarding the opening and closing of the state's waters to the harvest of food shrimp are based on current, sound principles of wildlife research and management. On average, Georgia waters are open from Mid-June through January. In Georgia, white shrimp comprise the largest annual portion of the commercial catch, yielding approximately 80% of all harvested shrimp and is the most economically valuable. This species is primarily harvested in state waters during the late summer, fall, winter and spring months, though it may be caught year round in federal waters adjacent to Georgia. The brown shrimp comprises approximately 18% of the total annual catch. During the summer months, when it is most prevalent in state waters, brown shrimp may comprise upwards of 70% of the total harvested shrimp. Pink shrimp makes up less than 2% of the total and is rarely if ever targeted.

The most important fishing area along Florida's east coast is the northeastern part of the state, between Fernandina Beach and Melbourne, just south of Cape Canaveral. Along Florida's east coast, the shrimp fishery is characterized by brown shrimp dominating the summer fishery and white shrimp dominating the fall and winter fisheries. Pink shrimp are harvested in Biscayne Bay generally during the period November through May.

Commercial bait shrimp fishery

The commercial bait shrimp fishery is much larger in Florida than in the other South Atlantic states. Live shrimp for bait are caught in Dade County and in six counties around the St. Johns River. A variety of gear is used in this fishery, but otter trawls (St. Johns) and roller frame trawls (Biscayne Bay) are the most commonly used. Wing nets are used in Volusia County for live bait shrimp harvest. There is very little effort directed specifically for commercial bait shrimp in either North or South Carolina.

In Georgia, however, the commercial bait shrimp fishery is the state's fourth most valuable commercial fishery. Targeting smaller shrimp than the food shrimp industry, the commercial bait shrimp fishery is restricted to designated zones inside the estuary. Prior to 1978, bait shrimp fishermen had no restrictions on area; however, as a result of consecutive freezes in the winters of 1977 and 1978, and the subsequent depletion of overwintering stocks of white shrimp, experimental "bait zones" were developed in an effort to protect nursery grounds and facilitate law enforcement (Music, Georgia DNR, pers. comm., 2003). As a result, both recreational and commercial bait fishermen are restricted to fishing in these designated zones, which are located throughout coastal Georgia in tidal creeks and rivers. Commercial bait harvesters may possess up to 50 quarts of shrimp, no more than ten percent of which can be dead. Vessels participating in the commercial bait shrimp fishery in Georgia are generally 25 feet in length or less, are equipped with large live wells and are powered by outboard motors. Typically, these vessels employ either a mongoose or flat/box net, with the headrope not to exceed 20 feet in length.

Recreational fishery

Recreational shrimp harvest in the South Atlantic occurs almost exclusively in state waters and is comprised mostly of penaeid shrimp (white, brown and pink) species. A variety of gear types are employed for recreational food shrimp activities and recreational shrimping for bait.

Licensing requirements are not consistent across all states and not all recreational shrimp fishermen are required to obtain a state permit or license to fish for penaeid shrimp species. In North Carolina, a person must obtain a Recreational Commercial Gear License (RCGL) to shrimp trawl for recreational purposes (i.e., not sell). The license holder can only trawl in open areas and must use a shrimp trawl with a maximum headrope length of 26 ft. The shrimp trawl must be equipped with a bycatch reduction device (BRD) and the use of mechanical methods for retrieval is prohibited. According to the RCGL data, recreational shrimping (trawling) takes place from the Pamlico District south. Areas of high activity are the tributaries of Pamlico Sound, most notably the Neuse River, Pamlico River and their tributaries. Recreational fishermen in North Carolina do not require a license to use seines and cast nets.

In South Carolina, a license to cast net for shrimp over bait during a regulated recreational season has been required since 1988. The season is restricted to 60 days during the white shrimp season generally between mid-September to mid-November. In Georgia, a Recreational Fishing License is required to engage in the not-for-sale harvest of shrimp with a cast net, seine and for the not-for-sale harvest of bait shrimp with a trawl.

The major areas for recreational shrimping in North Carolina are from Carteret County south to the state line and to a lesser extent in the tributaries of Pamlico Sound. In South Carolina, recreational shrimping takes place along the entire coast, with most activity from Winyah Bay southward to the South Carolina-Georgia state line. Georgia's sport bait trawling zones occur throughout the coastal area. Recreational beach seining is concentrated on Tybee, Sapelo, St. Simons, Jekyll and Cumberland Islands. In Florida, major sport shrimping areas are the St. Johns River area, the area around Ponce De Leon Inlet and in the southern part of the state in Biscayne Bay (SAFMC 1993).

In South Carolina, shrimp seines may be used year-round. Also, if the catch is kept for personal (non-commercial) use, a shrimp cast net not thrown over bait (without shrimp bait) can be used from May 1 through December 15 with a 48 quart limit, and 12 dozen limit from December 16 to April 30. A study conducted in South Carolina showed that shrimping over bait produces relatively little finfish bycatch compared to traditional cast netting for shrimp (Whitaker 1992).

In Georgia, cast netting for shrimp is the most popular recreational shrimping activity. Currently, the recreational catch limit in Georgia is 48 quarts of heads-on shrimp (30 quarts of shrimp tails) per day per boat. Also, certain estuarine zones are open for recreational live bait shrimping with single 10 foot trawl nets. Persons engaged in recreational, or sport, bait shrimping are limited to two quarts of bait per person, with no more than ½ pint dead, or four quarts per boat, with no more than one pint dead. Recreationally caught bait shrimp cannot be sold or consumed. Harvesting is restricted to the period ½ hour before official sunrise until ½ hour after official sunset.

Gear used by the recreational shrimp fishery in Florida consists of dip, drop and bridge nets, seines and cast nets. Cast nets and seines can be used by recreational fishermen in specified inside waters with no size restrictions.

Allowable Gear

The Shrimp Fishery Management Plan allows North and South Carolina, Georgia and east Florida to request a closure in federal waters adjacent to closed state waters for brown, pink or white shrimp following severe cold weather that results in an 80% or greater reduction in the population of white shrimp (whiting, royal red and rock shrimp fisheries are exempt from a federal closure for white shrimp).

During a federal closure, a buffer zone is established extending seaward from shore to 25 nautical miles, inside of which no trawling is allowed with a net having less than 4" stretch mesh. Vessels trawling inside this buffer zone cannot have a shrimp net aboard (i.e., a net with less than 4" stretch mesh) in the closed portion of the federal zone. Transit of the closed federal zone with less than 4" stretch mesh aboard while in possession of penaeid (white, brown and pink) species will be allowed provided that the nets are in an unfishable condition, which is defined as stowed below deck.

Bycatch reduction Devices (BRDs) - On a penaeid shrimp trawler in the South Atlantic EEZ, each trawl net that is rigged for fishing and has a mesh size less than 2.5", as measured between the centers of opposite knots when pulled taut, and each try net that is rigged for fishing and has a headrope length longer than 16.0 ft. must have a certified BRD installed. The following BRDs are certified for use by penaeid shrimp trawlers in the South Atlantic EEZ: extended funnel, expanded mesh and fisheye.

Turtle Excluder Devices (TEDs) are required in the penaeid shrimp fishery.

5.2.1.2 Economic description of the fishery

Commercial fishery

This section is divided into several topic areas. The first subsection presents an overall economic profile of the South Atlantic shrimp fishery that highlights major trends and discusses the economic structure of this industry. This is followed by a section on imported shrimp and its effect on ex-vessel prices for domestic shrimp. Next, there is a profile of the shrimp fishery for each state. There is a separate subsection on vessel economics and heterogeneity as these analyses as required by the Regulatory Flexibility Act.

The South Atlantic shrimp fishery

The South Atlantic shrimp fishery generates the most revenue for the commercial harvesting sector in this region. In 2001 and 2002, shrimp harvested in the South Atlantic generated an average of $63.56 million annually Table 5.2.1-1. In comparison, the overall revenue from landings of all seafood in the South Atlantic averaged $175 million during those years (NOAA Fisheries 2003b). Historically, since 1950, shrimp landings in the South Atlantic states fluctuated considerably and reached a peak of around 39 million pounds in 1995.

Overall landings in the South Atlantic did not show an increasing trend as observed in the Gulf of Mexico during this period. Historical price trend data indicates that the real average ex-vessel price for all shrimp species increased during the 1950s through to the late 1970s, fluctuated in the 1980s with no discernible trend and dropped substantially in the 1990s. Most of this decline was attributed to the increased market supply from imports (Vondruska 2001).

During 1997 through 2000 the ex-vessel value of shrimp landings averaged $93.57 million annually (Table 5.2.1-1). In comparison, average ex-vessel revenue in 2001 and 2002 decreased by 32%. Even though landings and effort during 2001and 2002 decreased, a large portion of this revenue loss can be attributed to the decline in ex-vessel prices. The average ex-vessel price for shrimp declined from a high of $2.71 per pound in 1997 to a low of $1.95 per pound in 2002. These figures represent average prices calculated for all shrimp species (heads on) and size categories. Thus, the magnitude of this price decline may not reflect trends for all species and size categories. However, these overall statistics highlight the current economic hardship faced by a majority of fishermen in the shrimp harvesting sector.

Shrimp ex-vessel prices in the South Atlantic are determined by a number of factors. The most important factors include shrimp imports, regional and local shrimp landings, consumer preferences and the state of the U.S. economy (as reflected in personal income). It must be noted that some fishermen have changed their mode of operation and marketing strategies in response to this economic downturn. Some of these fishermen have developed “niche” markets for their product and have not experienced these severe price declines. In addition, there are those who sell directly to retail outlets and processors thereby capturing profit margins that would have gone to dealers and wholesalers in the industry.

Some vessels in the South Atlantic shrimp fishery also operate in the Gulf of Mexico. Similarly, a number of vessels home ported in the Gulf of Mexico operate in the South Atlantic penaeid and rock shrimp fisheries. Data sets from the South Atlantic states and Gulf of Mexico shrimp database were utilized in deriving industry catch and participation statistics.

Table 5.2.1-1. Shrimp harvested in the South Atlantic: annual landings, ex-vessel revenue and effort.

Item	1997	1998	1999	2000	2001	2002
Landings (lb)	34,751,409	35,596,541	39,313,132	39,167,937	28,867,334	32,632,752
Ex-vessel revenue	$94,108,498	$84,888,798	$97,632,615	$97,648,407	$63,446,943	$63,681,721
Real ex-vessel	$105,502,800	$93,696,245	$105,434,789	$102,035,953	$64,478,601	$63,681,721

revenue in $2002*						
Price/lb	$2.71	$2.38	$2.48	$2.49	$2.20	$1.95
Real price/lb $2002*	$3.04	$2.63	$2.68	$2.61	$2.23	$1.95
Number of trips (excludes South Carolina)	46,988	41,372	44,347	40,396	31,556	37,596
Number of vessels				2,129	1,835	1,731
Proportion of harvest in the EEZ				19%	20%	21%
Number of dealers	610	545	596	589	544	669
Number of processors	19	21	17	15	16	14
Number of vessels operating exclusively in inshore areas				599	468	488

The number of vessels that participated in the South Atlantic shrimp fishery appears to have declined from 2,129 in 2000 to 1,731 in 2002 (Table 5.2.1-1). This trend may not be completely accurate since there was no vessel identification information associated with a large proportion of reported shrimp landings. It is expected that there would be some contraction in the shrimp harvesting sector due to the declining trend in dockside shrimp prices and continuously increasing prices for inputs such as fuel (Table 5.2.1-2), which would decrease aggregate profitability. Changes in vessel level profits would also depend on the number of vessels active in the fishery for a given year and other vessel specific costs detailed in Table 5.2.1-2.

Table 5.2.1-2. Expenditures, effort, revenue, net returns and cash flow for South Carolina shrimp vessels in 1999 (Henry et al. 2001).

Item	Small 15-30 Feet	Medium 31 – 60 Feet	Large 61-100 Feet
Days	47	153	198
Fuel costs	$980	$7,117	$14,036
Repair and maintenance	$776	$5,128	$16,657
BRDs	$13	$113	$173
TEDs	$50	$424	$973
Other equipment replacement costs	$366	$3,038	$6,335
Other operating costs	$1,602	$10,725	$28,365
Total variable costs	**$3,787**	**$26,546**	**$66,539**
Variable cost per day	**$81**	**$174**	**$336**
Captain costs	$1,886	$12,207	$27,949
Crew costs	$1,415	$14,411	$37,550
Crew share after expenses for fuel, ice, groceries	13%	20%	23%

Captain's Share	18%	17%	17%
Total labor costs	**$3,301**	**$26,618**	**$65,499**
Labor cost per day	**$70**	**$174**	**$331**
Number of crew members including captain	2	2	3
Labor cost per crew member per day	**$35**	**$87**	**$110**
Fixed costs 1 - includes depreciation and interest	$1,061	$8,307	$23,408
Fixed costs 2 - does not include depreciation and interest	$381	$3,402	$11,428
Net annual returns (all costs including depreciation and interest)	$1,833	$5,180	-$3,342
Net cash flow - does not include depreciation and interest	$2,533	$10,086	$8,639

Overall annual harvest in the South Atlantic is dominated by white and brown shrimp species. Annual landings of the three penaeid species vary considerably from year to year Table 5.2.1-3. These fluctuations have been attributed to environmental influences. For example, white shrimp landings are much lower in years following severe winter weather (SAFMC 1993). This could explain the low level of white shrimp landings in 2001. Fluctuation in landings is also tied to the level of effort in the fishery, which in turn is influenced by expected market prices.

The trend in brown shrimp landings is somewhat misleading. It appears that landings suddenly increased by more than 5 million pounds in 1999. However, during the years prior to 1999 North Carolina classified a large portion of their brown and white shrimp harvest in the marine shrimp category. Beginning in 1999 the state took steps to separate these species out of the marine shrimp grouping Table 5.2.1-3.

Table 5.2.1-3. Shrimp species harvested in the South Atlantic 1997-2002 (pounds).

Species	1997	1998	1999	2000	2001	2002
White shrimp	13,885,793	14,155,682	19,191,188	14,989,596	8,145,370	13,925,709
Brown shrimp	3,041,158	2,502,550	8,562,007	9,442,316	9,070,087	9,787,284
Marine shrimp*	6,988,243	4,635,189	1,411,088	469,137	255,580	545,562
Pink shrimp	5,990,537	9,262,157	4,699,501	4,371,593	4,389,640	6,326,684
Rock shrimp	3,530,305	3,960,560	4,265,196	8,180,124	6,095,654	834,962
Other species	416,012	238,054	225,400	167,127	199,411	209,661
Royal red shrimp	266,958	154,452	373,958	694,433	242,273	466,022
Bait shrimp	632,403	687,897	584,795	853,610	469,318	536,868

*This category is comprised of white and brown shrimp landings principally in North Carolina.

White shrimp generates the greatest revenue in the South Atlantic shrimp fishery. Ex-vessel revenue from this species declined in recent years (2001 and 2002) due, in part, to lower prices (Table 5.2.1-4, Table 5.2.1-5). In fact, the value of white shrimp harvested in 2002 was 46.6% lower that the value of the harvest in 1999. The decrease in the brown shrimp revenue has not been as substantial. In comparison to the 2000 landings value, ex-vessel revenue for brown shrimp dropped by 26.2% in 2002. During this period (1999 to 2000), commercial fisheries in states such as Georgia that are mostly dependent on the white shrimp fishery would have experienced greater revenue losses than fisheries in states such as North Carolina that are more reliant on brown shrimp.

Table 5.2.1-4. Annual ex-vessel revenue by shrimp species for the South Atlantic.

Species	1997	1998	1999	2000	2001	2002
White shrimp	$41,755,998	$39,301,469	$53,580,350	$44,243,943	$20,575,382	$28,605,790
Brown shrimp	$8,749,986	$5,382,330	$17,883,516	$23,614,771	$19,690,278	$17,426,588
Marine shrimp	$18,202,774	$10,857,720	$3,190,068	$956,077	$653,619	$1,061,875
Pink shrimp	$17,920,788	$21,049,873	$12,120,339	$12,499,279	$11,950,636	$11,849,452
Rock shrimp	$3,617,206	$5,336,844	$7,719,324	$12,146,227	$7,858,454	$1,529,435
Other species	$1,614,935	$944,498	$914,573	$792,477	$789,937	$815,456
Royal red shrimp	$613,237	$391,047	$721,632	$1,486,824	$483,732	$690,536
Bait shrimp	$1,633,573	$1,625,018	$1,502,815	$1,908,809	$1,444,906	$1,702,589

As reflected in the overall average price for shrimp in the South Atlantic, there has been a substantial decrease in ex-vessels prices for all shrimp species during 2001 and 2002 (Table 5.2.1-5). Similar price declines during this period were observed in all states in the Gulf of Mexico (Antozzi 2002). This decreasing price trend has been linked to the corresponding increase in imports, which has had and continues to have a substantial effect on the fisheries operating in the South Atlantic and Gulf of Mexico.

Table 5.2.1-5. Annual ex-vessel price per pound of shrimp species harvested in the South Atlantic.

Species	1997	1998	1999	2000	2001	2002
White shrimp	$3.01	$2.78	$2.79	$2.95	$2.53	$2.05
Brown shrimp	$2.88	$2.15	$2.09	$2.50	$2.17	$1.78
Marine shrimp	$2.60	$2.34	$2.26	$2.04	$2.56	$1.95
Pink shrimp	$2.99	$2.27	$2.58	$2.86	$2.72	$1.87
Rock shrimp	$1.02	$1.35	$1.81	$1.48	$1.29	$1.83
Other species	$3.88	$3.97	$4.06	$4.74	$3.96	$3.89
Royal red shrimp	$2.30	$2.53	$1.93	$2.14	$2.00	$1.48
Bait shrimp	$2.58	$2.36	$2.57	$2.24	$3.08	$3.17

Apart from the vessels that operate in this fishery, there are a number of processors and dealers in this industry whose businesses are located not only in the South Atlantic but also in the Gulf of Mexico. Shrimp is the primary product for the South Atlantic processing industry and in the 1990s constituted 80% of the total edible production activities by value for Southeast processors (Keithly et al. 2002). Keithly et al. (1991) found that there was a decline in the number of shrimp processors in the South Atlantic and Gulf of Mexico during the period 1973 to 1990 which was accompanied by a large increase in the productivity per firm due to an increase in peeling activity. These researchers also observed a decrease in price per pound of output, a declining trend in input prices for raw materials and increased product output during this time period. These trends can be explained by the fact that the increased supply of imported raw material allowed the processing sector to become progressively more specialized so that most firms began operating year round; previously they operated on a seasonal basis (Keithly et al. 1991).

The number of shrimp processors appears to have declined in the South Atlantic from 1998 through 2002 (Table 5.2.1-1). This phenomenon could be a response to the downturn in the domestic shrimp harvesting sector or reflective of consolidation within the processing sector. Shrimp processors also handle other species such as clams, oysters and scallops. Changes in the supply of these products would affect the economic performance of processing firms and could partly explain the decline in the number of processors observed. An increasing supply of final demand imported products could also be partly responsible for contractions in the processing sector. Another study by Keithly et al. (2002) indicated that profit margins for shrimp processors have been declining since the 1980s and attributed to the increase in imports of value-added peeled products (Keithly et al. 2002).

Global shrimp supply trends

Shrimp is produced throughout the world with more than 100 countries reporting production in 2003. United States shrimp imports expanded from about 260 million pounds (headless, shell-on basis) in 1980, to 563 million pounds in 1989 and 579 million pounds in 1990 (Vondruska 1991). Imports continued to steadily increase and reached 721 million pounds in 1996. Subsequently, this growth continued at a more rapid rate and in 2000 imported shrimp products, converted to shell-on headless weight, was estimated at 1.024 billion pounds (Haby et al. 2003).

During 2000 to 2003 the quantity of imports of all product forms increased (Table 3.2-3a). It must be noted that these imports are not converted to equivalent shell-on weight and are not directly comparable to the statistics referenced in the previous paragraph. The cost of shrimp imports was $3.7 billion in 2003 (http://www.st.nmfs.gov/st1.html). The increase in the breaded/frozen shrimp category more than quadrupled during 2000 to 2003, and is noted because of its possible negative impact on the segment of the domestic processing sector which relies on adding value through breading. While the breaded fraction of total shrimp imports has increased from 4.2 million pounds in 2000 to 19.3 million pounds in 2003, breaded shrimp represented only 1.7 percent of total shrimp imports in 2003 (Table 5.2.1-6).

Table 5.2.1-6. Shrimp imported into the United States by product category (pounds): 2000-2003. Source: NOAA Fisheries web site (http://www.st.nmfs.gov/st1.html).

Product	2000	2001	2002	2003
SHRIMP PEELED FROZEN	283,800,134	274,297,936	274,997,820	329,397,233
SHRIMP FROZEN OTHER PREPARATIONS	124,487,832	147,616,830	190,631,863	194,407,195
SHRIMP SHELL-ON FROZEN < 15	35,983,449	46,605,838	54,675,513	51,967,520
SHRIMP SHELL-ON FROZEN 15/20	36,553,966	49,782,207	50,037,537	56,548,153
SHRIMP SHELL-ON FROZEN 26/30	34,857,537	58,077,008	43,040,523	66,132,673
SHRIMP SHELL-ON FROZEN 21/25	30,872,448	47,142,663	43,713,870	53,565,679
SHRIMP SHELL-ON FROZEN 31/40	63,811,647	78,559,023	71,370,922	101,764,370
SHRIMP OTHER PREPARATIONS	3,150,572	4,852,335	6,281,385	9,403,112
SHRIMP SHELL-ON FROZEN 41/50	36,241,889	45,483,346	48,317,238	63,575,934
SHRIMP SHELL-ON FROZEN > 70	45,590,547	43,897,454	50,568,874	45,767,088
SHRIMP SHELL-ON FROZEN 51/60	31,005,095	40,938,412	52,062,503	62,632,671
SHRIMP BREADED FROZEN	4,221,615	7,086,717	9,931,684	19,265,613
SHRIMP CANNED	3,647,941	4,263,618	4,067,351	3,899,007
SHRIMP SHELL-ON FROZEN 61/70	21,217,935	28,431,315	39,693,969	44,940,694
SHRIMP PEELED FRESH/DRIED/SALTED/BRINE	1,366,952	1,642,337	2,140,470	2,012,435
SHRIMP FROZEN IN ATC	463,804	325,336	1,567,852	3,811,361
SHRIMP SHELL-ON FRESH/DRIED/SALTED/BRINE	1,895,674	1,739,278	1,366,631	797,331
Total	759,169,037	880,741,653	944,466,006	1,109,888,072

When the fraction of total U.S. shrimp supplies attributable to domestic landings as opposed to imports is calculated using shell-on, headless values for domestic landings but product weights for imported shrimp, imports represent only about 70% of the total U.S. shrimp supply (i.e., the domestic market share is approximately 30%). Total domestic shrimp landings in 2001 and 2002 averaged 366.3 million pounds (http://www.st.nmfs.gov/st1.html). This quantity represents both warm water and cold water domestic shrimp harvests. However, as would be expected, the domestic market share estimate drops by approximately 15% when imports are converted from product weights to a shell-on, headless equivalent (Haby et al. 2003). Thus, imports comprise at least 85% of the U.S. shrimp supply. Determining the most appropriate market form (e.g., live weight, shell-on, headless, etc.) depends on the purpose for which the information is to be used. For example, Fisheries of the United States expresses commercial shrimp landings in two different market forms: round or live weight and shell-on, headless weight. Live or round weight is typically used when comparing the biomass of different species. However, since shell-on headless weight is the customary market form packed by primary processors, it is the more appropriate market form to use when determining the contribution of domestic landings to U.S. shrimp supplies. Further, although shrimp imports are expressed in actual product weights in the foreign trade segment of Fisheries of the United States, these weights are converted into shell-on, headless equivalents when determining the contribution of imports to U.S. shrimp supplies.

Much of the increase in shrimp imports to the United States since the 1980s came from farm-raised production. During the early 1980s, the growth in imports was attributed to farm raised production in Ecuador. Currently, most of the production and supply to the U.S. market originates from Asian countries led by Thailand and China. In fact, imports of shrimp products from Thailand are at about the same level as domestic landings from the Gulf of Mexico and South Atlantic states (Table 5.2.1-7).

Table 5.2.1-7. Top countries exporting shrimp to the United States (pounds): 2000-2003.

Country	2000	2001	2002	2003
THAILAND	278,185,622	299,372,465	253,229,970	293,084,816
CHINA	40,046,222	61,637,979	108,916,491	178,224,354
VIET NAM	34,580,060	73,189,541	98,309,902	126,230,784
INDIA	62,425,031	72,334,764	97,338,450	100,031,232
ECUADOR	42,013,398	58,871,089	65,372,600	74,864,117
MEXICO	63,963,757	66,036,705	53,453,631	56,086,708
BRAZIL	12,970,445	21,600,880	39,012,701	47,923,539
INDONESIA	36,865,176	34,864,806	38,361,213	47,658,378

The continual trend for increased imports has also resulted in decreased prices for imported shrimp products and is observed for all product forms (Table 5.2.1-6). Ex-vessel prices for domestic production declined in the South Atlantic during 2000 to 2003 (Table 5.2.1-5). The price of imports will also be affected by the demand for shrimp in the other major markets of Japan and Europe. Import restrictions or an economic recession in either of these countries would have a downward influence on U.S. import prices for shrimp products.

Table 5.2.1-8. Average price (per pound) of shrimp imported into the United States by product category: 2000-2003.

Product	2000	2001	2002	2003
SHRIMP PEELED FROZEN	$4.47	$4.38	$3.64	$3.06
SHRIMP FROZEN OTHER PREPARATIONS	$3.74	$3.47	$2.92	$2.85
SHRIMP SHELL-ON FROZEN < 15	$7.23	$6.96	$6.82	$6.92
SHRIMP SHELL-ON FROZEN 15/20	$6.65	$6.27	$5.63	$5.30
SHRIMP SHELL-ON FROZEN 26/30	$5.61	$4.68	$4.01	$3.94
SHRIMP SHELL-ON FROZEN 21/25	$6.23	$5.41	$4.66	$4.57
SHRIMP SHELL-ON FROZEN 31/40	$4.95	$4.15	$3.45	$3.27
SHRIMP OTHER PREPARATIONS	$4.29	$5.35	$4.53	$4.48
SHRIMP SHELL-ON FROZEN 41/50	$4.36	$3.38	$2.72	$2.61
SHRIMP SHELL-ON FROZEN > 70	$3.00	$3.01	$2.23	$2.24
SHRIMP SHELL-ON FROZEN 51/60	$3.94	$3.23	$2.63	$2.30
SHRIMP BREADED FROZEN	$3.76	$3.48	$2.99	$3.03
SHRIMP CANNED	$3.03	$2.87	$2.65	$2.51
SHRIMP SHELL-ON FROZEN 61/70	$3.44	$2.84	$2.39	$2.24

SHRIMP PEELED FRESH/DRIED/SALTED/BRINE	$5.94	$5.25	$5.00	$6.02
SHRIMP FROZEN IN ATC	$2.20	$2.52	$1.56	$2.75
SHRIMP SHELL-ON FRESH/DRIED/SALTED/BRINE	$6.17	$5.07	$4.67	$4.72

A more detailed examination of domestic prices in South Carolina indicates that since 2000 price per pound has decreased for all domestic shrimp count sizes by at least 28% (Table 5.2.1-9).

Table 5.2.1-9. Average price (per pound) of shrimp by count size for South Carolina.

	Size category (count per pound)										
Year	**21**	**31**	**41**	**51**	**52**	**61**	**62**	**71**	**72**	**81**	**91**
1997	$6.94	$6.13	$5.70	$4.98	$4.72	$4.15	$3.89	$3.41	$3.11	$2.80	$1.99
1998	$6.86	$5.83	$5.14	$4.03	$3.37	$2.78	$2.72	$2.24	$2.21	$1.86	$1.35
1999	$6.69	$5.81	$5.07	$4.09	$3.75	$3.35	$3.37	$2.76	$2.80	$2.22	$1.89
2000	$7.36	$6.21	$5.03	$4.69	$4.51	$3.81	$3.93	$3.43	$3.12	$2.95	$2.33
2001	$6.67	$5.08	$4.63	$3.74	$3.10	$2.73	$2.67	$2.42	$2.15	$1.97	$1.84
2002	$4.33	$4.47	$3.47	$2.97	$3.17	$2.61	$2.74	$2.32	$1.95	$1.88	$1.61
Price change 2000 to 2002	-41%	-28%	-31%	-37%	-30%	-32%	-30%	-33%	-38%	-36%	-31%
Real price change 2000 to 2002 *	-44%	-31%	-34%	-39%	-33%	-34%	-33%	-35%	-40%	-39%	-34%

*These changes are based on prices that were adjusted for inflation using the CPI.

A study conducted in 1988 examined the economic consequences of shrimp imports to shrimp harvesters in the South Atlantic and Gulf of Mexico (Keithly et al. 1989). Results of this econometric model demonstrated that farm raised shrimp elevated U.S. import levels by about 175 million pounds. At that time (1989) 563 million pounds of shrimp were imported. This model also indicated that import prices and domestic dockside prices would have been about 70% higher in the short run in the absence of imports of farm-raised shrimp. The authors suggested, however, that any rise in domestic warm water ex-vessel prices brought about by a reduction in U.S. shrimp imports would encourage additional effort in the domestic shrimp fleet and this would dissipate initial gains in profits as well as increase total harvest costs for the industry. Ward (1992) found that there was an asymmetrical response between change in vessel profits and entry/exit behavior in the Gulf of Mexico shrimp fishery. There is a higher probability that vessels will enter the fishery if profits increase while for the same magnitude in decreased profits fewer vessels will exit the industry.

Another econometric study directly evaluated the impact of shrimp imports on prices to South Atlantic shrimpers (Houston and Nieto 1988). Results suggest that shrimp imports have a different effect on regional markets. There was a significantly greater impact on South Atlantic shrimp prices, than on Gulf of Mexico, West Coast or New England markets. Although the authors concluded that restricting imports of shrimp would increase dockside prices in the short run, the merits of that action are debatable because new entrants would be expected to dissipate any economic rents derived from the fishery in the long run.

From the point of view of shrimp fishermen, imports decrease benefits by depressing dockside prices as demonstrated by Keithly et al. (1989). However, imports increase the aggregate U.S. supply of shrimp leading to lower retail prices for consumers (Anderson 1986). Thus, consumers in this country clearly benefit from imports although there are also balance of trade considerations with imports, which affect the buying power of U.S. consumers in the long run. Import restrictions would probably raise both dockside and retail prices and increased retail prices would decrease benefits to consumers. In addition, import restrictions would also impact U.S. wholesalers and retailers who currently depend on imports for a substantial portion of their sales volume.

Profile of the shrimp fishery in the South Atlantic states

Information from previous amendment documents and more recent databases showed that the contribution of each species to total landings varies in a relatively consistent pattern among the four southeastern states. In North Carolina, brown shrimp dominates total harvest, and generates more than 60% of overall revenue. In contrast to other South Atlantic states, white shrimp makes up a smaller component of the overall catch. In some years, pink shrimp catches in North Carolina can exceed 500,000 pounds (Table 5.2.1-10).

In South Carolina and Georgia, there are virtually no pink shrimp in the landings which are dominated by white shrimp. In 2002, white shrimp accounted for nearly 80% of the revenue from all shrimp species in Georgia and nearly 75% of the revenue from all species in South Carolina (Table 5.2.1-12, Table 5.2.1-11). The relative contribution of brown shrimp to the catch varies yearly, but rarely exceeds the catch of white shrimp. Nevertheless, this species is somewhat important to the shrimp industry in these two states. Most of the pink shrimp harvest on the east coast of Florida comes from the offshore areas around the Dry Tortugas and the Florida Keys. In northeast Florida, some pink shrimp enter the catch primarily as a bycatch of the rock shrimp fishery. Overall shrimp revenue in Florida's South Atlantic fishery is not dominated by the harvest and sale of any one species (Table 5.2.1-13). White shrimp is probably the most important species in terms of overall revenue in the northeast Florida shrimp fishery (SAFMC 1993). In some years, rock shrimp accounted for the dominant share of ex-vessel value (Table 5.2.1-13).

Table 5.2.1-10. Ex-vessel value of shrimp landings in North Carolina by species.

Species	1999	2000	2001	2002
Brown	$8,490,294	$16,060,844	$8,870,166	$11,155,906
Pink	$206,931	$315,852	$407,901	$1,242,744
White	$9,859,193	$8,067,399	$1,976,753	$4,877,140

Other	$3,190,179	$956,077	$653,742	$1,061,887
Total	$21,746,596	$25,400,172	$11,908,561	$18,337,677

Table 5.2.1-11. Ex-vessel value of shrimp landed in South Carolina by species.

Species	1999	2000	2001	2002
Brown	$3,070,695	$3,063,183	$3,928,255	$2,253,873
White	$15,270,512	$12,429,765	$4,746,388	$6,723,195
Other	$227,049	$179,767	$190,510	$85,282
Total	$18,568,256	$15,672,714	$8,865,152	$9,062,350

Table 5.2.1-12. Ex-vessel value of shrimp landings in Georgia by species.

Species	1999	2000	2001	2002
Brown	$2,432,979	$2,116,366	$3,323,971	$1,668,970
White	$15,706,844	$14,954,395	$6,690,629	$9,257,364
Other	$890,785	$700,191	$748,235	$745,235
Total	$19,030,608	$17,770,952	$10,762,834	$11,671,569

Table 5.2.1-13. Ex-vessel value of shrimp harvested in Florida by species.

Species	1999	2000	2001	2002
Brown	$3,735,373	$2,256,383	$3,537,742	$2,074,932
Pink	$11,861,145	$12,177,794	$11,468,843	$10,523,606
White	$11,947,840	$8,695,483	$6,927,633	$7,419,840
Other	$9,128,031	$15,098,190	$9,552,743	$3,670,227
Total	$36,672,390	$38,227,850	$31,486,961	$23,688,605

Data presented in previous amendments indicated that in North Carolina almost all of the shrimp catch comes from internal waters. In South Carolina, it was estimated that about 5 to 10% of the shrimp catch is taken in the EEZ. In Georgia, because of extensive nearshore shoaling, significant effort is expended beyond three miles, and a higher percentage of the catch was reportedly taken from the EEZ (SAFMC 1996b). In Florida, it was estimated that 12 to 15% of the non-rock shrimp catch came from the EEZ. The more recent data used in Amendment 6 to the Shrimp FMP confirms that a substantial quantity of the shrimp harvest is taken in state waters. An average of 20% of the shrimp catch in the South Atlantic was recorded as harvested within Federal waters (Table 5.2.1-1). This may not represent the total harvest taken from Federal waters. Tows on a single shrimp trip could traverse several locations or statistical reporting areas yet only one location is reported for each trip on the data reporting form. Thus, harvest from several locations could be attributed to one area especially in the case of multi-day trips.

In terms of the ex-vessel revenue generated, the states of North Carolina and Florida are more important to the South Atlantic shrimp industry (Table 5.2.1-10, Table 5.2.1-13). The revenue generated by the shrimp industry in Georgia and South Carolina is fairly comparable. It must be noted that the sum of landings and value in these four states will be less than the same statistics presented in Table 5.2.1-1 for the entire South Atlantic. This is due to the fact that the shrimp profile for the entire South Atlantic also includes statistics on shrimp caught in the South Atlantic and landed at Gulf of Mexico ports and shrimp landings in the Atlantic where the area caught or state landed was unknown.

The industry in all four states faced lower prices in 2001 and 2002 compared to previous years. For the three states where vessel level landings are available it appears that vessel identification information is not always reported or it is not possible to link landings to a particular vessel. Compliance with this reporting requirement in the states of Georgia and North Carolina appears to have improved over time. Of concern are the data from Florida. For 2002, it was not possible to identify the vessels that landed 1.31 million pounds of shrimp in Florida (Table 5.2.1-14).

There are two ways to represent shrimp catches on the east coast of Florida. The first table contains the data on shrimp harvested on the east coast of Florida some of which was landed at ports on the west coast of Florida (Table 5.2.1-14). The second table contains data on shrimp catches landed at east coast Florida ports (Table 5.2.1-15).

Table 5.2.1-14. Shrimp harvested from the east coast of Florida (South Atlantic): annual landings, ex-vessel revenue and effort.

Year	1997	1998	1999	2000	2001	2002
Landings (lb)	12,564,991	16,875,159	14,598,511	16,829,921	14,538,855	11,601,699
Ex-vessel revenue	$32,254,006	$37,605,629	$36,672,390	$38,227,850	$31,486,961	$23,688,605
Real revenue in $2002	$36,159,200	$41,507,317	$39,603,013	$39,945,507	$31,998,944	$23,688,605
Price/lb	$2.57	$2.23	$2.51	$2.27	$2.17	$2.04
Real price/lb $2002	$2.88	$2.46	$2.71	$2.37	$2.21	$2.04
Number of trips	15,169	15,782	14,750	13,276	11,745	11,771
Number of Dealers	176	156	153	155	145	144
Landings (lb) without information on vessel id	567,544	1,086,470	529,735	306,671	707,739	1,311,951
Number of Vessels	840	831	755	759	625	573
Vessel fishing exclusively in inshore areas				134	101	101

Includes harvest taken from area 0029 for all years.

Table 5.2.1-15. Shrimp landings on the east coast of Florida: annual landings, ex-vessel revenue and effort.

Year	1997	1998	1999	2000	2001	2002
Landings (lb)	6,271,129	6,898,796	8,148,395	10,894,135	10,413,789	6,176,387
Ex-vessel revenue	$14,032,122	$15,736,525	$20,712,380	$23,054,217	$20,198,256	$13,180,214

Real revenue in $2002	$15,731,078	$17,369,233	$22,367,581	$24,090,091	$20,526,683	$13,180,214
Price/lb	$2.24	$2.28	$2.54	$2.12	$1.94	$2.13
Real price/lb $2002	$2.51	$2.52	$2.74	$2.22	$1.97	$2.13

The value of all seafood landed on the east coast of Florida amounted to $48.14 million in 2001 and $38.9 million in 2002 (NOAA Fisheries 2003b). The average dockside value of shrimp landings in those years amounted to $16.69 million (using data presented in Table 5.2.1-15). Therefore, east coast shrimp landings comprised an average of 38% of the value of seafood sold at the dock in the past two years. In comparison, for South Carolina the total ex-vessel value of commercial landings was $23.9 million and $20.8 million dollars in 2001 and 2002 respectively (NOAA Fisheries 2003b). Shrimp comprised an average of 40% of the total value for those two years. Shrimp harvests comprised an average of 75% of the total ex-vessel revenue of landings in Georgia during the years 2001 and 2002. Reported commercial landings for the state of Georgia were $14.8 million and $15.1 million in 2001 and 2002 respectively (NOAA Fisheries 2003b). In contrast, North Carolina's shrimp harvesting sector is relatively less important to the entire commercial industry in this state.

The ex-vessel value of shrimp comprised 16% of the average overall value of commercial landings in 2001 and 2002 ($94.6 million) (NOAA Fisheries 2003b).

In North Carolina, brown shrimp and white shrimp landings were lower than normal in 2001 (Table 5.2.1-16). This 5.1 million pound decline coupled with lower prices decreased overall shrimp revenue by $13.5 million compared to 2000. Revenue and landings increased in 2002. However, average prices decreased in 2002 even though the supply increased by 4.7 million pounds over the harvest in 2001 (Table 5.2.1-16).

North Carolina and Florida have the largest fleets in the South Atlantic shrimp harvesting sector. Vessels in these states' shrimp fishery tend to be more diverse. Many vessels participate in other non-shrimp fisheries, and shrimp species comprise a smaller proportion of their overall revenue base compared to vessel firms in other states. Also, many of the restrictions that apply to shrimp trawling in inshore areas of other states do not exist in North Carolina. This provides more opportunities for smaller vessels to participate in the North Carolina shrimp fishery. As a result of these differences in operations, catch per vessel may not be directly comparable across all states.

Table 5.2.1-16. Shrimp landings in North Carolina: annual landings, ex-vessel revenue and effort.

Year	1997	1998	1999	2000	2001	2002
Landings (lb)	6,988,826	4,636,343	9,004,430	10,334,916	5,254,214	9,954,785
Ex-vessel revenue	$18,203,357	$10,858,874	$21,746,596	$25,400,172	$11,908,561	$18,337,677
Real revenue in $2002	$20,407,351	$11,985,512	$23,484,445	$26,541,455	$12,102,196	$18,337,677
Price/lb	$2.60	$2.34	$2.42	$2.46	$2.27	$1.84

Real price/lb $2002	$2.91	$2.58	$2.61	$2.57	$2.31	$1.84
Number of trips	18,974	14,130	19,179	18,474	14,084	18,394
Number of dealers	248	234	272	254	225	283
Landings without information on vessel id			2,407,572	6,649	5,009	2,166
Number of vessels				773	595	585
Vessels fishing in inshore areas				465	337	322

The decrease in shrimp landings in South Carolina and Georgia during 2002 and 2001 is reflective of a reduction in white shrimp harvest in both states (Table 5.2.1-17., Table 5.2.1-18). In North Carolina, average ex-vessel prices were lower in 2002 and 2001 even though supply declined. In the Georgia fishery, there has been a steady decline in number of trips from 1997 through 2001. In contrast, the number of trips harvesting shrimp fluctuated during this time period with no distinct trend for North Carolina (Table 5.2.1-16).

It was not possible to determine the actual number of vessels that operated in the South Carolina shrimp fishery since this state recently implemented a trip ticket program in 2003. The number of trawler licenses sold may not equate to the number of vessels participating in this fishery as some vessel owners may purchase a license in a given year but not go shrimping. However, the marked decrease in license sales indicates a reduced demand for shrimp fishing in 2001 and 2002 (Table 5.2.1-17).

It would be misleading to interpret the observed trend of increased vessel participation with actual changes in fleet size in the Georgia fishery because there is a large portion of shrimp landings not associated with any vessel in years prior to 2002. Compliance with the vessel identification reporting requirement improved substantially in 2002 compared to previous years. Other data from commercial shrimp license sales may provide a better indicator of participation trends in the Georgia shrimp fishery. License sales data for fiscal year 1998/99 through 2003/04 are 496, 467, 469, 484, 407 and 362 respectively. There is a noticeable decrease in license sales during the last two years compared to previous years. There may also have been a shift in the composition of the fleet during this period as the number of Coast Guard registered vessels has consistently declined throughout the entire time period while the number of state registered boats actually increased in fiscal years 2000/01 and 2001/02, before dropping sharply in 2002/03 (Travis, NOAA Fisheries, pers. comm. 2004).

Table 5.2.1-17. Shrimp landings in South Carolina: annual landings, ex-vessel revenue and effort.

Year	1997	1998	1999	2000	2001	2002
Landings (lb)	6,904,351	6,402,768	8,062,014	6,112,047	4,497,780	5,238,237
Ex-vessel revenue	$19,288,432	$15,641,722	$18,568,256	$15,672,714	$8,865,152	$9,062,350
Real revenue in $2002	$21,623,803	$17,264,594	$20,052,112	$16,376,922	$9,009,301	$9,062,350

Price/lb	$2.79	$2.44	$2.30	$2.56	$1.97	$1.73
Real price/lb $2002	$3.13	$2.69	$2.48	$2.68	$2.00	$1.73
Number of dealers	104	89	93	82	93	94
Number of trawler vessel licenses**	887	922	884	915	693	720

**These data are available by fiscal year and not calendar year.

Table 5.2.1-18. Shrimp landings in Georgia: annual landings, ex-vessel revenue and effort.

	1997	1998	1999	2000	2001	2002
Landings (lb)	7,301,864	6,996,499	7,013,620	5,629,096	4,379,989	5,412,940
Ex-vessel revenue	$22,933,018	$19,714,697	$19,030,608	$17,770,952	$10,762,834	$11,671,569
Real revenue in $2002	$25,709,661	$21,760,151	$20,551,413	$18,569,438	$10,937,839	$11,671,569
Price/lb	$3.14	$2.82	$2.71	$3.16	$2.46	$2.16
Real price/lb $2002	$3.52	$3.11	$2.93	$3.30	$2.50	$2.16
Number of trips	12,845	11,460	10,418	8,620	5,696	7,387
Number of dealers	78	66	77	89	74	136
Landings without information on vessel id						
Number of vessels**	287	312	280	268	289	340
Vessel that only operate in the inshore areas					30	65

** These data are somewhat misleading since there was a fair amount of landings reported without corresponding vessel identification information. Reporting compliance increased over time. Note: License sales data for fiscal year 1998/99 through 2003/04 are 496, 467, 469, 484, 407 and 362 respectively.

In 2001 the State of Georgia began requiring all commercial castnet shrimpers to report as dealers. Castnet shrimpers often sell directly to the consumer and/or split their catch between several small markets. By requiring all castnetters to report as dealers, Georgia is able to collect more reliable trip level data. The marked increase in shrimp dealers in 2002 can be attributed to two factors: more castnetters selling their catch rather than keeping it for personal consumption; and more shrimp trawl owners marketing their own catch rather than selling to a shrimp packing house. For reporting purposes, those vessel owners are considered dealers. In the past, it was very unusual for vessel owners to market their entire catch directly to final consumers and retail outlets. With shrimp prices at an all-time low, vessel owners are employing non-traditional marketing methods in an attempt to command higher prices than the packing house can offer. Thus, there has not been an actual increase in the number of shrimp docks in Georgia but there was an increased number of individuals acting as dealers. For the other states there is a definite increase in the number of dealers in 2002 compared to 2000.

Seafood dealer operations are usually diverse in that they depend on more that one type of seafood product. For example, dealers in the shrimp industry may also handle clams, oysters and finfish. The relative health of these separate seafood markets would determine the financial viability of dealer operations or fish houses. Some dealers and vessel owners may also operate processing facilities where there is considerable value added to the final shrimp product.

The declining trend in prices and ex-vessel revenue in the shrimp harvesting sector, observed across all states, could play a major role in the financial solvency of dealers and fish houses that depend on shrimp. These businesses would be especially vulnerable if they are not able to transition to alternative sources of revenue from other fisheries.

Reduced revenues in the shrimp harvesting sector would also result in reduced economic activity to the sectors of the economy that are directly and indirectly associated with the shrimp industry in the South Atlantic. If vessels respond to lower revenues by reducing input costs, there would be negative effects on the sectors that supply inputs such as fuel and gear. If there is a reduction in the number of vessels, there would be further direct economic losses to impacted industries since annual and fixed expenditures would not be incurred. Apart from the direct effects there will also be indirect and induced effects on other sectors of the economy (the multiplier effect) which could have far reaching implications in the short-term. Assuming the economy is operating at full employment, economists theorize that these economic losses are distributional, and unlike net revenue to commercial fishermen there is no resulting changes in national GDP (gross domestic product). It is assumed that these monetary resources would be redirected to purchases that increase economic activity in other industries/sectors. The economy will adjust to these changes in the long run but there could be sectoral and regional shifts in the number of jobs, wages and business revenue.

<u>Seasonal harvest patterns</u>

Shrimp landings vary seasonally in each state governed primarily by the life cycle of the species targeted. The summer brown shrimp fishery occurs principally from June through September in North Carolina. September represents the transition month to the fall pink and white shrimp fisheries (SAFMC 1996b). The summer shrimp fishery generally occurs between June through August with June being a transition month dominated by white shrimp landings. In Georgia, the shrimp trawl season extends from June through December. If no winter freeze occurs the season is extended through January or February. The South Carolina shrimp trawl fishery opens May 15 and closes December 31 through state statute.

<u>Vessel economics and heterogeneity in the harvesting sector</u>

The diversity in the penaeid shrimp and rock shrimp fisheries can be described primarily by firm size, level of economic dependence on shrimp and vessel length and horse power (indicators of vessel capacity). There is a certain degree of diversity in the shrimp fishery in terms of firm size and the structure of the industry. Information from public hearings and the Shrimp Advisory Panels indicate that some firms own processing plants and a number of these firms are also affiliated with marketing and distribution interests. At the other end of the spectrum is the individual vessel firm where the owner is the operator and is solely employed in the harvesting sector. At this time it is not possible to trace ownership of all shrimp vessels back to the firm since data on corporate identification is not collected by the Coast Guard vessel information system or state licensing agencies. As a result, each vessel is considered to be a separate firm.

Fleet characteristics

This section describes the length composition of active vessels in the South Atlantic shrimp fleet where data are available. Vessel length is often correlated with the capacity of individual harvesting platforms, crew size and fixed and operating costs. Most, 59%, of the vessels that were active in the Georgia shrimp fishery in 2002 ranged in length from 41 to 80 feet (Table 3.2-11a). Also, there appears to be a larger number of vessels in the larger size categories in 2002 compared to previous years. This apparent trend could also be explained by the increased compliance with the reporting of vessel identification information in 2002.

Table 5.2.1-19. Proportion of vessels in each length category in the Georgia shrimp fishery.

Vessel length category (feet)	2000	2001	2002
Less than 21	0%	11%	12%
21-30	0%	4%	3%
31-40	2%	4%	1%
41-50	13%	11%	5%
51-60	21%	16%	11%
61-70	34%	29%	20%
71-80	26%	22%	23%
81-90	3%	2%	14%
90-100	0%	0%	7%
Greater than 100	0%	0%	3%

In contrast to the composition of the Georgia fishery, the North Carolina shrimp fishery is comprised of a larger proportion of smaller vessels. In 2002 the proportion of active boats less that 40 feet in length amounted to 61%, and 39% of these boats were under 30 feet in length. In North Carolina, there were no vessels larger than 90 feet in the shrimp fishery (Table 3.2-11b).

Table 5.2.1-20. Proportion of vessels in each length category in the North Carolina shrimp fishery.

Vessel length category (feet)	1999	2000	2001	2002
Less than 21	23%	24%	20%	16%
21-30	24%	22%	20%	23%
31-40	17%	19%	20%	22%
41-50	10%	10%	11%	11%
51-60	7%	7%	8%	7%
61-70	7%	8%	9%	9%
71-80	10%	9%	10%	11%

81-90	1%	1%	2%	2%

As expected, the majority of vessels that traverse between the Gulf of Mexico and South Atlantic shrimp fishery are larger craft. During the period 2000 through 2002, at least 87% of the fleet in both regions' shrimp fishery was comprised of vessels greater than 60 feet in length (Table 5.2.1-21).

Table 5.2.1-21. Proportion of vessels in each length category operating in both the Gulf of Mexico and South Atlantic shrimp fishery.

Vessel length category (feet)	2000	2001	2002
21-30	1%	0%	<1%
31-40	4%	4%	2%
41-50	3%	3%	3%
51-60	6%	6%	6%
61-70	56%	55%	52%
71-80	23%	24%	25%
81-90	7%	7%	10%
90-100	1%	<1%	1%

As observed in the North Carolina shrimp fishery, the shrimp fishery in the State of Florida is comprised of a large proportion of small boats. During the three years, 2000, 2001 and 2002, at least 42% of the active Florida shrimp fleet was comprised of boats under 40 feet in length, and at least 30% of these boats were under 30 feet in length (Table 5.2.1-22).

Table 5.2.1-22. Proportion of vessels in each length category in the Florida shrimp fishery.

Vessel length category (feet)	2000	2001	2002
11-20	11%	8%	9%
21-30	27%	22%	27%
31-40	10%	12%	11%
41-50	2%	3%	1%
51-60	4%	5%	3%
61-70	31%	34%	34%
71-80	12%	13%	11%
81-90	4%	3%	4%
90-100	<1%	<1%	<1%

Data on active vessels in the South Carolina shrimp fishery were derived from a list of applications submitted for disaster relief aid in 2003. Most of the vessels in the active trawl fleet are in the larger size categories (Table 5.2.1-22). Even though there is a closure of inshore areas to shrimp trawling in South Carolina, the absence of vessels less than 30 feet in this database is somewhat surprising since a 1999 Clemson cost and earnings study reported active commercial shrimp trawlers in the smaller size categories

(Table 5.2.1-22; Henry et al. 2001). Perhaps the smaller shrimp vessels did not apply for disaster relief aid. The 1999 Clemson study estimated that 38% of the vessels in the South Carolina shrimp fishery was comprised of boats under 31 feet; 35% of these vessels were in the 31 to 60 foot length category and 27% of these vessels were larger than 60 feet (Henry et al. 2001).

Table 5.2.1-23. Proportion of vessels in each length category in the South Carolina shrimp fishery based on information from the 2003 South Carolina disaster relief applicants.

Vessel length category (feet)	2000	2001	2002
30-40	1%	5%	15%
41-50	7%	0%	15%
51-60	20%	23%	18%
61-70	19%	18%	15%
71-80	39%	41%	26%
81-90	14%	14%	12%
90-100	1%	5%	15%

Participation in other fisheries and economic dependence on the shrimp fishery
Information on participation in and economic dependence on all fisheries would result in a better understanding of the impacts of management regulations on shrimp vessels. Some participants in the commercial penaeid shrimp fishery are involved in a wide variety of other fisheries. Small boats may be involved in virtually any inshore fishery from clamming and oystering to crab trap fishing and a variety of net fisheries. Larger vessels often participate in other trawl fisheries including rock shrimp and calico scallop as well as hook and line fisheries for bottom fishes. In addition to participating in fisheries for other species, many of the larger shrimp vessels in the region are very mobile within the shrimp fishery and may move anywhere throughout the South Atlantic states and the Gulf of Mexico (SAFMC 1996b).

More recent data from the ACCSP and Florida's trip ticket program indicate that the shrimp harvesting sector in North Carolina depends on non-shrimp species to a larger extent than harvesting sectors operating in Florida and Georgia. During the period 2000 to 2002 an average of 38% of total revenue earned by North Carolina shrimpers came from other species caught on the shrimp trip or other trips that targeted non-shrimp species (Table 5.2.1-24).

Table 5.2.1-24. Revenue earned from non-shrimp species in the shrimp harvesting sector and percent of total annual revenue (from shrimp and non-shrimp species).

State	Item	2000	2001	2002
Georgia	Revenue	$250,641	$413,256	$289,810
	% of total revenue	1%	4%	2%
North Carolina	Revenue	$10,841,444	$10,479,661	$12,169,948
	% of total revenue	30%	47%	40%

Florida	Revenue	$429,792	$343,460	$284,341
	% of total revenue	1%	1%	1%

There was no information available for South Carolina to afford a similar comparison since the trip ticket program only began in 2003.

Cost and earnings in the shrimp fishery

One way to evaluate profitability of the shrimp fleet rigorously would involve collecting current cost and earnings data specifically for each South Atlantic state (the shrimp fishery in this region differs by state as to the species targeted, seasonality, number of boats and other factors). From cost and earnings data, an indirect cost function (Ward 1992) could be developed to analyze harvester profit levels. Unfortunately, the cost and earnings data necessary to build such an equation system are not available at this time. It is expected that costs and revenue vary widely among vessels in this fishery and are correlated with vessel length, hull material and age. This section summarizes some of the existing studies on cost and revenue relevant to the South Atlantic shrimp fishery. An extensive study of profitability and mobility of South Atlantic shrimp fishing firms was undertaken in 1979 (Liao 1979). This study found that mobility of vessels in the South Atlantic shrimp fishery was positively correlated to vessel size and horsepower. Also, vessels tended to fish away from home ports and home states if the captain expected higher prices and catch rates at these new locations. Average daily productivity was found to be higher for vessels that were more mobile in this fishery. Mobility class II vessels were 58 to 64 feet in length and mobility class III vessels were in the range of 65 to 73 feet. Net revenue per vessel ranged from $5,208 to $25,293 after all variable costs and captain and crew shares were deducted from gross revenue. At that time the captain's share was $12,707 and $17,369 annually for the two mobility classes. Crew shares were $26,144 and $44,190 for the vessels in mobility classes II and III (Liao 1979).

Cost and earnings information for the commercial shrimp fishery in South Atlantic waters was collected for 1987 by the South Carolina Wildlife and Marine Resources Department, Marine Resources Division. However, a greater number of small vessels were active in the fishery during 1987, prior to the permanent closure of bay and sound areas to shrimp trawling (SAFMC 1993). Analysts developed cost and earnings profiles using responses from vessels greater than 37 feet in length. In 1987, these vessels fished an average of 120 days in South Carolina waters and an average of 75 days in other states. An average number of eight days was reported fishing for species other than shrimp, with the majority of respondents reporting zero days. There was considerable variability in reported trip costs, which indicates that vessels had very different cost structures and requirements because of their gear specifications, differences in vessel types or differences in travel distances to and from fishing grounds. Net revenue before taxes was estimated by subtracting the sum of variable (exclusive of crew share) and fixed costs (exclusive of depreciation) from total annual revenue reported by a given respondent. The average vessel landed roughly 24,000 pounds of shrimp (heads off) in 1987 and received an average of $3.20 per pound. Total revenue from the average vessel's annual landings was roughly $74,000. Net revenue to owner/operator (or owner and operator), crew and vessel (before taxes) was estimated to be $38,750. Net returns ranged from slightly negative values to as large as $75,200. Median net revenue was $35,900. Finally, reported revenues from sales of species other than shrimp by commercial shrimpers were relatively low. The average shrimp trawler received less than $1,500 from sales of bycatch in 1987. The reported high value was $2,800 and the reported low was zero.

There are more recent data on operating costs from studies on the penaeid shrimp fisheries in the Gulf of Mexico and South Carolina. These cost estimates could be applicable to vessels in the rock shrimp and penaeid shrimp fisheries in the South Atlantic. Rock shrimp vessels traditionally participate in the penaeid shrimp fishery, and both penaeid shrimp and rock shrimp could be targeted on different days during the same multi-day trip. In particular, it is expected that costs and average rates of return for penaeid shrimp vessels 60 feet and larger should be similar to operating costs of vessels in the rock shrimp fishery.

One study of the Gulf shrimp fishery revealed that vessels in the 60-foot and larger size range showed the smallest revenue over cash cost (6.2%). In addition, large vessels had the least flexibility in substituting and adjusting inputs in response to poor conditions in the fishery. They require skilled crew to operate the vessel and are not able to reduce labor costs as readily as vessels in the smaller size categories. Also, these vessels had the largest number of years with revenue losses. Furthermore, households are more dependent on income from these vessels as compared to vessels less than 45 feet in length (Funk 1998).

A study on the penaeid shrimp fishery off South Carolina during 1999 indicated that many vessels were operating on break-even levels of activity (Henry et al. 2001). The South Carolina penaeid shrimp fishery was classified into three size categories based on differences in operating costs, profit margins and ability of the vessel owner to make input substitutions as follows:

- Category 1. Small vessels less than 31 feet in length. Owners usually operated these vessels and tend to be part-time shrimpers. The market value of these vessels averaged $9,416 per year. Average effort in the shrimp fishery was about 3 days per week and 47 days per year.
- Category 2. Medium sized vessels between 31 and 60 feet usually have one or two crew members. These vessels are more dependent on shrimp and less dependent on other fisheries compared to category 1 vessels. The market value of these vessels averaged $62,964 per year. Average effort in the shrimp fishery was about 5 days per week and 153 days per year.
- Category 3. Large vessels between 60 and 100 feet were characterized by different operating costs from category 2 vessels. There is little flexibility in making changes to another fishery and vessels are not able to fish in inshore areas. These vessels are more able to travel longer distances and remain at sea for longer periods compared to Category 1 and 2 vessels. Vessel income is primarily dependent on shrimp. The market value of these vessels averaged $125,234 per

year. Average effort in the shrimp fishery was about 6 days per week and 198 days per year.

Results of this cost and earnings study are summarized in Table 5.2.1-25. The annual total operating costs of vessels in the 60-100 ft range was $166,067 in 1999 (Henry et al. 2001). On average the number of days fished was 198 per year (average per day cost of $837). For all vessel categories, the largest operating cost items were crew and captain wages, routine repair and maintenance expenses and fuel expenses (Table 5.2.1-25).

Table 5.2.1-25. Expenditures, effort, revenue, net returns and cash flow for South Carolina shrimp vessels in 1999 (Henry et al. 2001).

Item	Small 15-30 Feet	Medium 31 – 60 Feet	Large 61-100 Feet
Days	47	153	198
Fuel costs	$980	$7,117	$14,036
Repair and maintenance	$776	$5,128	$16,657
BRDs	$13	$113	$173
TEDs	$50	$424	$973
Other equipment replacement costs	$366	$3,038	$6,335
Other operating costs	$1,602	$10,725	$28,365
Total variable costs	**$3,787**	**$26,546**	**$66,539**
Variable cost per day	**$81**	**$174**	**$336**
Captain costs	$1,886	$12,207	$27,949
Crew costs	$1,415	$14,411	$37,550
Crew share after expenses for fuel, ice, groceries	13%	20%	23%
Captain's Share	18%	17%	17%
Total labor costs	**$3,301**	**$26,618**	**$65,499**
Labor cost per day	**$70**	**$174**	**$331**
Number of crew members including captain	2	2	3
Labor cost per crew member per day	**$35**	**$87**	**$110**
Fixed costs 1 - includes depreciation and interest	$1,061	$8,307	$23,408
Fixed costs 2 - does not include depreciation and interest	$381	$3,402	$11,428
Net annual returns (all costs including depreciation and interest)	$1,833	$5,180	-$3,342

Net cash flow - does not include depreciation and interest	$2,533	$10,086	$8,639

The study also indicated that about 25% of all vessel owners have revenues above $150,000, and the average rate of return on investment was 3% on vessels larger than 60 feet. It is unknown to what extent these study results are reflective of the vessels currently operating in the penaeid shrimp fishery.

In addition, the degree to which economic returns to South Carolina shrimpers reflect conditions in other states, and as such are an adequate proxy, is not known precisely. In general, however, the shrimp fishery in South Carolina is probably similar to the shrimp fishery in Georgia (SAFMC 1993).

These authors surmised that if catches were at their 1999 levels or lower during the next five to ten years then 20% of the large (greater than 60 feet) vessels and 2% of the mid-sized (31 to 60 feet) vessels could be forced to exit the industry. Vessels in these categories were much more vulnerable than smaller vessels as revenue decreased by several scales. It appears that for these large categories, most of the vessel revenue and household income of captains come from shrimping. This analysis also showed that a price decline of $0.25 per pound from 1999 prices of $3.85 resulted in a 10.2% decline in the number of Category 2 vessels and a 26.6% decline in the number of Category 3 vessels.

As documented in Section 5.2.1.2, since 1999 ex-vessel prices have declined substantially. Also fuel cost has continued to increase. Historically, fuel prices increased steadily until 1981 and subsequently declined by about one third. From 1999 to 2000 fuel prices increased by 33%, declined in 2001 and 2002 by about 6% annually and increased continually in 2003 and 2004 (Table 5.2.1-26).

Table 5.2.1-26. The fuel price index for diesel during the period 1999-2004. Source: Department of Energy.

Year	Fuel price index (diesel)	Annual % change in price from the previous year
1999	112.00	
2000	149.32	33.3%
2001	140.40	-6.0%
2002	131.52	-6.3%
2003	150.83	14.7%
2004*	158.75	5.3%

*The fuel price index in 2004 only reflects the trend calculated through March 2004.

Various studies have shown that fuel costs tend to represent 20-25% of a shrimp vessel's total operating costs. Considerable increases in fuel prices will significantly increase total costs and, in turn, significantly reduce profits (Travis and Griffin 2004).

It is expected that these factors (fuel prices and decreased shrimp prices) have had an extreme negative effect on vessel level profitability (NOAA Fisheries 2001b) and current profit margins are expected to be lower than represented in the 1999 South Carolina study.

As profit margins have declined vessel owners have employed a number of cost cutting measures to maintain a positive cash flow and continue participation in this fishery. As reported by industry sources, vessel owners have reduced the numbers of crew and restructured crew share arrangements that lower crew wages. The are some constraints on the ability of larger vessels to reduce labor costs to the same degree as smaller vessels in the fishery, since the former require more skilled crew to operate the vessel and gear. It appears that average crew size has decreased by 1 crew member in the South Atlantic shrimp harvesting sector between 1997 and 2002 (Travis, NOAA Fisheries, pers. comm. 2004).

Other cost cutting measures include the failure to obtain or renew vessel and personal and indemnity insurance. Repair and maintenance costs have also been reduced. These measures could jeopardize the future viability of the vessel firm. Fish house operations provide services to shrimpers that dock at their facilities such as fuel, ice, repair parts, gear and supplies. In many cases, these fish houses have extended credit to vessel owners with negative cash flow problems.

Even with some of these cost cutting measures, the economic downturn in this industry has been so severe that at times some shrimpers could not afford the operating trips costs and remained at the dock. In extreme situations some vessels have been repossessed by lending agencies and auctioned off to other owners (See Appendix I in SAFMC Shrimp Amendment 6).

The future outlook for the industry will depend on several factors. Recently, relief programs provided shrimpers in the South Atlantic with financial aid through special congressional appropriations. Congress appropriated $17.5 million to South Atlantic states specifically to assist the shrimp industry in offsetting some of the diminishing value of the domestic catch. This money was disbursed to shrimpers in 2003. In addition, shrimpers in the South Atlantic were also successful in their petition for USDA Trade Adjustment Assistance in 2003.

The Southern Shrimp Alliance, an organization that represents domestic shrimpers from states in the Gulf of Mexico and South Atlantic, filed antidumping petitions claiming that imports from six countries (China, Thailand, Ecuador, Vietnam, India and Brazil) materially damaged the domestic shrimp industry. The Department of Commerce is evaluated the extent of this injury and tariffs were imposed in 2003. Should they rule in favor of tariffs it is likely that the industry outlook would improve in the future. Little improvement in the overall price of shrimp was realized as other countries that were not subject to tariffs increased their production. The domestic shrimp industry will have to restructure (i.e. expand limited access programs and cooperatives) to ensure long-term viability of the shrimp harvesting sector. The extent of further changes in the profitability of commercial shrimp fishing will depend on the levels and price of shrimp imports, changes in prices of variable and fixed cost items to shrimp producers and global economic trends (Vondruska 1991).

A comprehensive cost and earnings study of the shrimp industry is needed to describe the changes and adaptive behavior that has occurred in this industry since 1999. Also, the information generated from such a study would greatly assist the Council in evaluation of a limited access program for the South Atlantic shrimp fishery.

Revenue profiles for the South Atlantic shrimp fishery

Revenue profiles were developed for vessels in the South Atlantic shrimp fleet during 2000 and 2001 (Table 5.2.1-27). Revenue categories represent income earned from all fisheries. As discussed previously these shrimp vessels participate in other fisheries.
It would appear that a large number of shrimp boats earn less than $5,000 annually (Table 5.2.1-27). It is likely that some of these vessel owners are part-time fishermen and go fishing infrequently or that the vessel was dry docked during a large portion of the fishing year. There were reports that because of the current economic downturn, some vessel owners could not afford the trip costs to fully participate in this fishery. Another reason to explain this observation is the large quantity of reported landings with no associated vessel identification information. If some of these catches were landed by any of the identified vessels (and not assigned to that vessel), the frequency distributions would shift in the direction of the lower revenue classes. Also, the true average revenue per vessel would be higher than the figure(s) reported in Table 5.2.1-27.

Table 5.2.1-27. Distribution of ex-vessel revenue within the South Atlantic shrimp fleet. Ex-vessel revenue represents income from all fisheries including shrimp.

	Number			Percent		
Revenue category	2000	2001	2002	2000	2001	2002
Less than $5,000	658	572	525	31%	31%	30%
$5,000 - $29,999	475	436	406	22%	24%	23%
$30,000 - $49,999	173	186	128	8%	10%	7%
$50,000 - $99,999	266	215	220	12%	12%	13%
$100,000 - $149,999	163	118	158	8%	6%	9%
$150,000 - $199,999	109	99	117	5%	5%	7%
$200,000 - $299,999	160	135	138	8%	7%	8%
$300,000 - $399,999	83	44	29	4%	2%	2%
$400,000 - $875,000	42	30	10	2%	2%	1%
Total number of vessels	2,129	1,835	1,731			
Average revenue per vessel	$76,879	$67,706	$66,853			

There is a wide distribution of income reported for the South Atlantic shrimp fleet as observed in Table 5.2.1-27. To explore the heterogeneity in this fleet, the distribution of fishing income was separated into three vessel size classes: small (less than 30 feet in length); medium (30 to 60 feet in length) and large (greater than 60 feet in length) (Table 5.2.1-28). This classification was chosen to reflect groupings in the South Carolina cost and earnings study (Henry et al. 2001). During 2000 the active fleet in the South Atlantic was about evenly distributed among the three different size categories (Table 5.2.1-28). In 2000, almost all (99%) of the small vessels earned less than $30,000, 88% of the medium sized vessels earned less than $100,000 and 71% earned less than $50,000 (Table 5.2.1-28). As expected, most (85%) of the large vessels earned more than $50,000 and gross revenue for 67% of these vessels exceeded $100,000 (Table 5.2.1-28).

Table 5.2.1-28. Distribution of ex-vessel revenue within the South Atlantic shrimp fleet by vessel size category in 2000.

Revenue category	Small (<30 feet)	Medium (30 to 60 feet)	Large (>60 feet)
Less than $5,000	73%	23%	2%
$5,000 - $29,000	25%	31%	8%
$30,000 - $49,999	2%	16%	5%
$50,000 - $99,999		19%	18%
$100,000 - $149,999		8%	15%
$150,000 - $199,999		2%	13%
$200,000 - $299,999		1%	22%
$300,000 - $399,999			11%
$400,000 - $850,000			5%
Percent of total fleet	33%	30%	37%
Average revenue per vessel	$4,801	$39,017	$180,154

Length data were not available for all vessels in the data set.

Recreational fishery

Data on the number of recreational shrimp fishermen and recreational shrimp catches are not routinely collected throughout the South Atlantic region. Recreational licenses are only required for certain gear types and licensing requirements are not consistent across all states making it somewhat difficult to estimate total participation. However, there have been a number of ad hoc studies conducted to provide estimates of catch, participation and effort information on these recreational fisheries. Some of these studies are dated and estimates of catch and participation may not reflect current activity levels or recreational harvest of penaeid shrimp.

In South Carolina, sales for shrimp baiting permits increased from 5,509 in 1988 to a record high of 17,497 in 1998. After 1998, there was a decline in permit sales (Table 5.2.1-29). South Carolina conducts a post-season annual survey of these license holders to collect information on participation, effort and catches. Recreational shrimp harvests have fluctuated over time but ranged from a low of 0.91 million pounds in 2000 (an unusually poor year) to a high of 3.63 million pounds in 1997. In certain years, the recreational harvest by shrimp baiters comprised a large proportion of the total fall shrimp harvest (Table 5.2.1-29). The estimates from this survey does not represent the total recreational shrimp catch in South Carolina since landings of all shrimp species caught by recreational shrimpers using other gear are not recorded.

Table 5.2.1-29. Summary of results from the annual shrimp baiting surveys in South Carolina (Low 2002).

Year	Permits issued	Participants	Trips	Pounds (heads on) million	Pounds/ participants
1987		21,735	40,101	1.80	83
1988	5,509	17,749	35,609	1.16	65
1989	6,644	17,171	31,624	1.25	73
1990	9,703	34,662	71,153	2.75	79
1991	12,005	34,821	71,034	2.14	61
1992	11,571	31,812	62,459	2.35	74
1993	12,984	40,620	80,709	2.72	67
1994	13,366	38,081	70,429	1.91	50
1995	13,919	41,971	81,632	3.40	81
1996	14,156	38,932	68,927	1.73	44
1997	15,488	48,544	94,154	3.63	75
1998	17,497	50,436	92,484	2.91	58
1999	15,895	39,514	66,396	2.02	51
2000	15,929	38,622	61,445	0.91	24
2001	13,698	38,699	69,847	2.09	54
2002	13,901	32,038	54,610	1.11	35
2003	12,465	28,028	58,530	1.87	67
2004	10,617	19,668	39,893	0.99	50
2005	9,004	20,753	31,238	1.09	52

It has been speculated that shrimp baiting could reduce the catches of commercial shrimp trawlers in South Carolina in the fall season (Henry et al. 2001). In fact, the findings from this cost and earnings study indicated that commercial shrimp vessels in the larger size categories could exit the industry if the harvest declined. This would reduce economic benefits in the commercial harvesting sector. However, recreational shrimp baiting also generates economic activity within the State of South Carolina from expenditures on travel, fuel, poles, bait and other items to participate in this sport.

From a survey conducted in North Carolina it was estimated that recreational shrimpers caught 91,000 pounds of shrimp, or less than 3% of the reported commercial catch in 1979 (Maiolo and Faison 1980). A more recent survey of recreational/commercial gear license holders conducted by the North Carolina Division of Marine Fisheries during 2002 estimated that this group made 5,035 trips. Shrimp accounted for 101,154 pounds of the 118,468 pounds captured by the use of shrimp trawls. Blue crab and flounders were the only other species contributing greater than 1,000 pounds to the overall shrimp trawl harvest (NCDNR 2003). A combined telephone/intercept access survey was carried out in coastal Georgia during 1989 to estimate recreational shrimp catch and effort. Total cast netting participation was estimated at 47,723 and 23,298 individuals during the summer and fall waves respectively. These cast netters were estimated to have taken 184,887 total trips and to have caught 576,000 pounds of shrimp, most of which were white shrimp (Williams 1990). There are no estimates of recreational shrimp catches for Florida, but it is believed that the recreational catch is substantial.

5.2.1.3 Social and cultural environment

More than an industry, commercial shrimping is a way of life for many of the individuals. Through long, historic participation in the shrimp industry by fishermen, fish dealers, gear suppliers, etc., shrimping has become tradition and a part of group identity in many coastal communities (Sabella et al. 1979). In a very real sense, shrimping and shrimp boats are the common denominator for fishing communities in the South Atlantic.

Shrimping communities are fishing communities, and in the South Atlantic at least for now, a fishing community is a shrimping community. There are of course exceptions to this, but they are rare. There is little complete information on the shrimp fishery itself in the South Atlantic. What do exist are bits and pieces of anecdotal data, usually reported for a state or a single community, but there is a great need for a broader, consistent assessment of the fishery from a social science perspective. There have been some compelling changes in the composition of crews, packing house labor, dealers and processors and shrimp boat owners. There have been changes in technology and regulations and changes in the marketplace and in the coastal communities where shrimpers reside. Much of this change is occurring at a rapid pace and those in charge of collecting such data need to move fast before all has faded before them.

Modern day shrimping can be traced to the early 1900s and Sicilian and Portuguese immigrants that settled in northeast Florida in the areas of Fernandina Beach on Amelia Island and the smaller settlement of Mayport, Florida. By the 1920s, the otter trawl had been invented and was becoming more widely adopted. Simultaneously with the trawl gear development, offshore trawling became possible with motorized vessels. In the 1930s, shrimp trawling technology spread north from Fernandina Beach, through North and South Carolina and Georgia. With changes in the technology, there came changes in fishing behavior, which will be touched on below.

In North Carolina, Brunswick County was the center of that state’s shrimp industry in the 1920s and thirties. According to Maiolo (2004):

In Southport alone, sixty-two boats, along with those coming from other areas, were in the harvesting sector in 1932. This generated employment for somewhere between five and six hundred people, including more than two hundred seasonal and part-time workers in the packinghouse…shrimping had become the community’s most important industry and began to dominate its way of life…

By the mid-1930s, those living in Carteret County began to shrimp in earnest. Shrimping came as an alternative to slackened activity in other fisheries and in farming. This was also the time of the Depression, and many were impoverished and looked for a way out of the lean times. According to Maiolo (2004), those from Carteret County traveled to Brunswick County to learn shrimping skills and buy the necessary gear to carry on shrimping activity further north. While not mentioned directly by Maiolo, it is surmised that at that time, some of the first ties of friendship and partnerships were struck that would later serve fishermen well as the fishery became more mobile (Johnson and Orbach 1990). Maiolo (2004) also notes that it was during the 1930s and in the more inshore, [Pamlico]sound shrimp fishery that shrimping became entrenched in what anthropologists call the "annual round:"

Fishing and other activities became organized around the shrimping season. This included work in non-fishing jobs, later including government work for those employed at the Cherry Point Marine Corps Air Station, the Division of Marine Fisheries in Morehead, and the NOAA Fisheries station in Beaufort. Vacation time, sick leave, and person-leave days were scheduled to take advantage of the peak abundance periods for those who had grown up in fishing families and saw fishing activity as an important supplement to their incomes, as well as an important feature of their culture. For the fulltime commercial fishermen, boat building or repairs, farming, home repairs, and even community political activity began to revolve around the increasingly lucrative shrimp harvest, processing and marketing.

As the industry grew, "shrimpers from Florida, South Carolina, North Carolina and Georgia would gather in Southport, North Carolina for the late summer shrimp season (Maiolo 2004). As the seasons progressed, the larger boats would move southward towards Cape Canaveral and the Florida Keys, following the annual peaks in shrimp species (white, brown and pink).

In South Carolina, the shrimp industry developed along a similar track, with the Port Royal/Beaufort area and Hilton Head being centers of the nascent industry. Here, some immigrants from Italy and Portugal who had settled in Fernandina Beach, Florida relocated to South Carolina, at first just shrimping off South Carolina's shores and unloading shrimp to be shipped to Savannah, Georgia in barges. Starting in the Port Royal and Beaufort area, then elsewhere, people worked at shrimping, and alternated with the harvest of oysters and blue crab (Jakubiak 2001). Here the annual round was also evident in shrimping activity in the spring and early summer, giving way to crabbing, and then finfishing in the late summer and early fall.

In Georgia the pattern of development for shrimping was similar to other locations, but Darien and Brunswick stood out as places having a high concentration of shrimpers.

It should be noted that the geographic coastal configurations along the coasts often allowed – and still do – shrimpers to sail their vessels up into the rivers and creeks, docking their boats close to or at their own homes. Therefore there might be a high number of fishermen in one county, but all scattered in diverse locations. The community ties of shrimpers were forged not at a homeport per se, but rather at packing houses and along their annual migratory trips north and south along the coasts.

By World War II, traveling to follow the shrimp became common, taking fishermen to the northern coasts of South America and to the Yucatan Peninsula of Mexico. This was particularly true with the "discovery" of pink shrimp in south Florida and in the Tortugas (Iversen and Idyll 1959). At this time Fernandina, Florida lost its prominence in shrimping to other areas further south in Florida and to the Gulf of Mexico. Shrimping in the South Atlantic probably peaked in stature (landings, profits, number of employed) in the late 1970s. As regulations increased, such as for TEDS or the state closures of inshore sounds to trawling in the 1980s, other events in the world came to impact the present-day viability of the South Atlantic shrimp fleet. The two most significant events, discussed in the economic description of the fishery (Section 3.2.3), are the rise in fuel prices and the decline in prices for domestic shrimp in light of increased foreign imports of the same to the United States.

Overall, shrimpers remain mobile, and this tendency to follow the shrimp remains to this day. Many shrimpers are gone from home for long stretches of time, traveling from, for example, Georgia to Key West, Florida or into the Gulf of Mexico. However, there are some other shrimpers that perhaps for personal reasons or their age, have decided to shrimp only in waters close to home. These shrimpers might possess smaller boats; those with larger boats may have more debt and hence more reason to continue to shrimp as much as possible.

According to a 2001 study of South Carolina shrimpers, the larger the vessel owned, the more days were spent shrimping each week (Henry et al. 2001). Boats averaging less than 30 feet LOA fished only an average of 47 days per year, while boats 31-60 feet and those 61-100 feet LOA fished 153 and 198 days per year, respectively. This observation would lead one to predict that the larger boats must travel far from their home port in order to shrimp for so many days out of the year. This increase in days shrimping is also related to the larger expenditures demanded by the larger vessels.

Additionally, smaller boats are more prone to being affected by bad weather conditions, and so might stay in port more often than larger vessels. The size, structure and functions of crews employed in commercial shrimping vary somewhat from vessel to vessel, but several variables appear to be fairly universal throughout the fishery. Small boats (18-35 ft) typically are run by the captain alone and perhaps one other crew member, while larger boats have crews of one to four. The number of crew members is adjusted depending on what the captain believes the catch and profits to be like. Many captains have told me that they have cut back on their crew size recently due to dropping prices for shrimp. This may pose safety problems and is a problem faced not only in the shrimp industry (ICSF 2003).

Henry et al. (2001) determined that in South Carolina at least, about one half of all crew members are family of the owner or captain (Table 5.2.1-30). In the past, crews were frequently recruited from the shrimp fishermen's relatives (Johnson and Orbach 1990; Sabella et al. 1979). However, that practice may be changing, as some shrimpers interviewed in the past two years (Kitner 2001) have claimed to be hiring more Hispanic immigrants, and one owner-operator employs crew through a firm that finds Mexican workers for the HB2 Visa program.

Table 5.2.1-30. Captain and crew characteristics, 1999. From Henry et al. (2001).

Selected fishermen's characteristics			
	15-30 feet (standard error) No. of observations	31 – 60 feet (standard error) No. of observations	61-100 feet (standard error) No. of observations
Years of captain's experience	12 (1.7) [27]	20 (1.9) [33]	27 (2.4) [30]
No. of crew (including captain)	2 (0.2) [29]	2 (0.1) [36]	3 (0.1) [32]
# Family in crew	1 (0.2) [25]	2 (1.4) [32]	1 (0.3) [27]
% Striker's share[1]	15% (4.5) [18]	24% (2.6) [29]	27% (2.9%) [30]
% Household income from shrimping	17% (5.3) [22]	63% (6.4) [32]	72% (6.1) [30]

[1] Total share of all strikers in crew before expense deductions.

Tasks performed by the crew include rigging and repairing the boat and equipment, setting and hauling the nets, cooking meals on board and culling, icing and heading the shrimp. The crew is typically paid through a share system. The share system divides the costs for fuel, groceries and other expenses among the captain and crew, then goes on to divide the profits from the catch in the following manner: a certain percentage up front goes to the captain, a certain percentage to the owner of the boat and the crew and captain divide the rest among themselves (Bradley M. P. Fellows 1992). In 2001, the crew share for a vessel 30 feet and under was 15% of the total share before expenses, while for boats 31 feet and larger, the share was between 24 and 27%.

The ethnic composition of the crew will vary, but most shrimp boat owners are white males, and so is their crew. Some owners and crew may be African American, although Blount documented the drastic decline of African American ownership of shrimp vessels in the years leading up to WWII (Blount 2000). Vietnamese appear to crew on boats belonging to other Vietnamese; the South Atlantic does not have as large a Vietnamese population as do communities in the Gulf of Mexico.

Along with the crew, another group that is potentially affected by new regulation or other events outside of the immediate community is the labor force that works at the packing houses, heading and packing the fresh shrimp (along with other seafood species, such as blue crab and scallops, in different seasons).

In the recent past, according to Griffith (2003), most packing and processing workers were African American; however, since about 1990 the demographics of this sector of the seafood industry have changed (as African American women took advantage of better, more stable employment opportunities), and there are many Hispanic/Latino women now employed in the packing houses and plants of North Carolina. According to the North Carolina Institute of Medicine (NCIOM 2003), almost eight percent of all Hispanics in North Carolina are employed in the farming/fishing/forestry category. The NCIOM admits that this is most likely an undercount by the Census, as the Census is conducted in April when migrant workers are not present in the state and furthermore, there is difficulty in counting temporary housing and/or illegal immigrants. However, it may be that at different times of the year, reflecting migrant flows, the composition of the workforce at packing houses and processors changes.

In turn, the number of number of processors in the South Atlantic/Southeast has decreased from 103 processors in 1997 to 64 in 2001 – a decrease of almost 38% - the last year for which we have data.

While these data refer to seafood processors in the Southeast region that have voluntarily filled out a survey, and not only shrimp processors, it still illustrates one of the problems faced by another part of the shrimping sector: a trend towards consolidation and globalization of primary production and the continuing gentrification of the coast. These trends do have a negative impact on the communities where shrimp boat owners, crew and other laborers live. Maiolo (2004) based on his and other studies, divides dealer/processors into three categories – large, medium and small – each with their own general characteristics and business behaviors. Large dealers are characterized as doing business with the largest vessels in the fleet, owning their own fleets, unloading out of state vessels and conducting interstate commerce and sometimes international trade in seafood products. Medium size dealers work more with smaller shrimping vessels – those that fish closer to shore and in the sounds and travel less often away from their homeport. The smaller dealers are described as "… [running] the gamut from seasonal sales from backs of trucks to modest, permanent facilities catering to a local market or reselling to large dealers," (Maiolo 2004:119).

Shrimping communities in the South Atlantic

All of the above mentioned sectors come together in different geographical locations, either temporarily or permanently, to form community associations. Shrimping is most often but one activity that keeps these communities going; many areas depend on different species throughout the year in order to sustain themselves.

In the case of the shrimp industry in the South Atlantic, this activity is fairly similar in gear, practice and also in social structure. The divergence from a community "norm", could one be said to exist, would come in the State of North Carolina where distinct ecological/geographical differences exist in comparison to the other southeastern states. These differences are based on the vast sounds in North Carolina, the Pamlico and Albemarle. Both of these sounds have allowed for the development and maintenance of shrimping by small vessels, creating a smaller-scale shrimp fishery that operates alongside the larger, ocean-going trawlers.

In order to identify shrimping communities in the South Atlantic, shrimp landings from 1996/97 through 2002 were examined, and those communities (identified through dealer addresses) recording more than 50,000 pounds in shrimp landed per year were chosen to be listed. While some communities had landings approaching 50,000 pounds, the landings were inconsistent throughout the chosen time frame. Furthermore, when compared with current analysis on the identification of fishing communities in the South Atlantic, those "outlier" communities did not show up on other scales (number of federal permits, state permits and other fisheries). These communities have been "ground-truthed" using past interviews and field visits.

All species of shrimp were lumped together, as there is little analytical utility at this point of looking at "pink shrimp communities" versus "brown shrimp" communities. Furthermore, each state had different ways of recording the landings data for the years of 1996/97 through 2002, and to attempt consistency in the analysis, all species of shrimp were counted as one.

What do the landings data tell us about communities where shrimping occurs? First, there is the phenomenon of shrimping being a backdrop, or core activity, to most of what might be considered fishing communities. In the South Atlantic, shrimp boats are present in almost every community that has commercial fishing as an activity.

It is important to note that while our data are not extremely long-term, reaching back only six years, it shows a trend for declines in shrimping activity in some communities, stability in others and growth in a few. This would be expected due to various events: growth of tourist based economies along the southeast coast that are competing with more traditional coastal economies, increasing gentrification in communities, again related to growth and higher in-migration, competition with domestic shrimp in the markets from foreign-sourced shrimp, a weak national (U.S.) economy, etc.

Overall, approximately 60 South Atlantic shrimping communities were identified from the landings data supplied. It is not reasonable to describe in detail each of the 60 communities, so one brief description of an indicator community will be given instead after an overview of the state population and fishery demographics.

<u>North Carolina</u>
According to the NOAA Fisheries (2002) the State of North Carolina has landed close to 140 and 160 million pounds of seafood in 2001 and 2002 respectively. Two ports, Wanchese-Stumpy Point and Beaufort-Morehead City, both rank within the top 50 ports in the United States in terms of landings and value for those same years. Since 1998, North Carolina has had a high of 535 registered fishing vessels with federal permits, but this number was reduced to 439 in 2001, likely due to changes in state fisheries regulations (Table 5.2.1-31). Most vessels with federal permits had either king or Spanish mackerel with snapper grouper class 1 permits being the next most common.

Table 5.2.1-31. Number of federal permits by type for North Carolina. (Source: NOAA Fisheries 2002).

Type of permit	1998	1999	2000	2001
Total permitted vessels	535	513	477	439
Commercial king mackerel	428	362	356	336
Commercial Spanish mackerel	376	256	211	216
Commercial spiny lobster	21	23	17	13
Charter/headboat for coastal pelagics	155	148	141	129
Charter/headboat for snapper grouper	89	94	98	95
Snapper grouper class 1	153	191	155	164
Snapper grouper class 2	28	33	27	26
Swordfish	1	19	17	20
Shark	1	39	24	43
Rock shrimp	0	0	35	37

There were over 9,500 state licenses sold with capability of sale and over 5,500 reported sales in 2002 (Table 5.2.1-33). Although the overall number of license sold has been increasing since 1994, the number of licenses reporting sales has been decreasing. The majority of license sales are for commercial fishing vessels with over 9,400 permits or 46.9% in 2002 (Table 5.2.1-31). Standard commercial fishing license is the next most frequent with 32.9% and shellfish licenses third at 11.4%. There were 832 dealer license sold for the year 2002 in North Carolina.

Table 5.2.1-32. Number of licenses sold by the North Carolina Division of Marine Fisheries each license year, the number of licenses with selling privileges that potentially can report catch on trip tickets by license year and the number of licenses actually used to report catches. Individuals may hold more than one license with selling privileges. (Source: NCDMF 2002).

License year	Number of licenses sold*	Number of licenses reporting sales	Number of licenses sold, but did not report sales
1994	6,781	Not available	Not available
1994/1995	7,535	6,710	825
1995/1996	7,898	7,285	613
1996/1997	8,173	6,700	1,473
1997/1998	8,595	7,000	1,595
1998/1999	8,426*	6,515	1,911
1999/2000+	9,711	6,015	3,696
2000/2001*	9,677	6,057	3,620
2001/2002*	9,712	5,509	4,203

*Licenses from 1994 to June 1999 are Endorsement to Sell licenses. Licenses from 1999 to the present include number of SCFL, RSCFL, Shellfish, Menhaden License for Non-Residents without SCFL, Recreational Fishing Tournament License to Sell Fish and Land or Sell licenses. License year is July to June. Source: 1994-1997/98 license year sales were derived from historical reports. 1998/99-2001/2002 from FIN license sales reports.
*1998/99 was a transition year and not all dBase licenses were migrated to FIN. The numbers provided were from FIN.

*1999/00 to 2001/02 include licenses sold that were subsequently surrendered without a refund.
+1999/2000 license counts were stated as much higher in other documents. This was due to the grace period when switching from ETS to SCFL. The number above is correct.

Table 5.2.1-33. Number of state permits by type for North Carolina. (Source: NCDMF 2002).

Type	Permits	Percent
Commercial fishing vessel registration	9469	46.9
Dealer license	832	4.1
Flounder license	133	0.7
Land or sell license	59	0.3
Non-resident menhaden license	10	0.0
Ocean fishing pier license	25	0.1
Spotter plane license	11	0.1
Retired standard commercial fishing license	676	3.3
Standard commercial fishing license	6632	32.9
Shellfish license	2302	11.4
Recreational fishing tournament to sell license	31	0.2
Total	20180	100.0

The communities of Carteret County, North Carolina that exhibit high shrimp landings are Atlantic, Beaufort, Cedar Island, Davis, Harkers Island, Morehead City, Newport, Sea Level, Smyrna and Stacy. These communities are located along the banks of Core Sound and the area of North Carolina referred to as Down East. More remote and less developed than many other North Carolina coastal communities, the traditions of fishing both for profit and subsistence remain important in day to day life. These communities may rely less on shrimping as the only source of fishing income and participants in the shrimp fishery also participate in other fisheries throughout the year. Other fisheries are blue crab, spot, mullet, bluefish and scallops. Duck hunting is also still conducted as a subsistence activity.

In Onslow County there are two communities that show high amounts of shrimp landings. These communities are Sneads Ferry and Swansboro. The county itself is partly dominated by the large U.S. Marine base, Camp Lejeune, which occupies a fifth of the county's land area. The coastal areas are being slowly more developed for tourism.

Dare County is often thought of as the Outer Banks of North Carolina, but located next to Manteo, North Carolina is Wanchese, one of the fishing communities with the largest amount of seafood landings in the nation. Stumpy Point is sometimes lumped together with Wanchese, although it is a much smaller village characterized by small-scale fishing operations. If one drives North Carolina Route 264, one enters Hyde County and comes to Englehard, which depends economically almost equally on agricultural operations and fishing. While Census data do not count Englehard separately, there is a large Hispanic population in Englehard, tied closely to agricultural work. The women are often found working alongside the African American women at the shrimp tables at the dealers' docks. Swans Quarter is located next to Swans Quarter National Wildlife Refuge and is a ferry crossing point to Ocracoke Island and Cedar Point.

Other shrimping communities in North Carolina are, in Pamlico County: Bayboro, Belhaven, Hobucken, Lowland, Vandemere and Oriental. In Brunswick County: Carolina Beach, Hampstead, Shallotte, Supply, Varnamtown and Wilmington. Brunswick County is becoming rapidly developed with golf courses, retirement villages and private residential homes. As this development continues, one can reasonably expect that dependence on commercial fishing and shrimping to decline, or be marginalized to fewer areas.

Inland Shrimping/Fishing Community: Oriental, North Carolina, Pamlico County
While the village's internet websites bills the place as the "Sailing Capital of North Carolina" and claims that there are over 2,700 boats in the town, Oriental is still very much a fishing dependent community. Located in Pamlico County and on the Neuse River, Oriental was founded in the 1870s and was originally called Smith's Creek. The town changed its name to Oriental, a name promoted by the then-postmaster's wife, Rebecca Midyette. Oriental became incorporated in 1899.

From its inception, Oriental has been heavily dependent on fishing and farming. However, in the early years of the 20th century, logging grew in importance in the areas around Oriental and the village became a hub for transporting lumber by train and ship. The last lumber mill closed in the late 1950s, just as the town was being discovered by sailboat owners. Since then, commercial fishing has remained important, and the town has also attracted a following of sailboat aficionados and world-cruisers. According to one local resident, the mix is a happy one.

In general, Oriental's small population is aging, with 36% being over the age of 65 years, and another 35% being between the ages of 45 and 64 years old. However, there is a steady influx of persons from outside the community that come to Oriental to stay. Furthermore, in 2005 construction of a new subdivision will begin that, when finished, will add approximately one thousand homes to the immediate area.

One local estimate is that at least 20% of the town's population of 875 (U.S. Census 2000) is dependent on fishing in one manner or another. While this is not illustrated well by looking at the available federal permits database (Table 5.2.1-34), fishing effort is better defined by examining the state fishing permit table (Table 5.2.1-35) and in the employment table (Table 3.2-23). It is not unreasonable to assume that close to 200 people in Oriental make a living from seafood related employment.

Table 5.2.1-34. Number of federal permits by type for Oriental, North Carolina (Source: NOAA Fisheries 2002).

Type of permit	1998	1999	2000	2001
Total permitted vessels	**5**	**4**	**7**	**7**
Commercial king mackerel	0	0	1	1
Commercial Spanish mackerel	0	0	1	1
Commercial Spiny lobster	0	0	0	0
Charter/headboat for coastal pelagics	1	0	0	0

Charter/headboat for snapper grouper	0	0	0	0
Snapper grouper class 1	0	0	1	1
Snapper grouper class 2	0	0	0	0
Swordfish	0	0	0	0
Shark	0	0	0	0
Rock shrimp	4	4	6	6
Federal dealers	0	0	0	0

Table 5.2.1-35. Number of State Permits by Type for Oriental, North Carolina. (Source: NCDMF 2002).

Type	Permits
Commercial fishing vessel registration	77
Dealer license	13
Flounder license	9
Land or sell license	0
Non-resident menhaden license	0
Ocean fishing pier license	0
Spotter plane license	0
Retired standard commercial fishing license	5
Standard commercial fishing license	62
Shellfish license	3
Recreational fishing tournament to sell license	0
Total	**168**

Table 5.2.1-36. Employment in fishing related industry for Oriental, North Carolina. (Zip code Business Patterns, U.S. Census Bureau 1998).

Category	NAIC code	Number employed
Total other employment		
Fishing	114100	4
Seafood canning	311711	0
Seafood processing	311712	4
Boat building	336612	0
Fish and seafoods	422460	72
Fish and seafood markets	445220	0
Marinas	713930	28
Total fishing employment		**108**

The annual round of fishing, at least at one of the larger fish houses, is to shrimp during the summer months, then in the winter shift to floundering. In the spring fishermen will go scalloping. This fish house owns a fleet of over six boats and is planning to increase that number to nine or ten shortly.

The fish house will usually unload about 20 boats on a regular basis during the summer shrimping season. Being on the Pamlico Sound, the boats in Oriental work both in the Sound and in the offshore, ocean waters. As noted previously, such inland, sound communities employ more small boats than other areas that work the offshore waters more.

Recreational Fishing in Oriental
While there are a few small charter fishing guide businesses in Oriental, there are no larger charter fishing boats based there. The closest charter boat operations are run out of Morehead City, approximately 20 miles away.

The same holds true for bait and tackle/sporting goods stores in the village. All businesses of this type are located out of the town, either in other surrounding small communities or in Morehead City or Beaufort.

There are at least four boat repair/service and sales businesses in town, most with an eye to serving the larger transient sailboat population in Oriental.

Tournaments
There is one known fishing tournament in Oriental and that is the Oriental Rotary Club All Release Tarpon Tournament, held around the end of July each year. It is limited to 75 boats, and prizes total around $20,000. Other water-oriented events consist mainly of sailing regattas.

Community Demographics, Oriental, North Carolina
In order to put Oriental in a larger geographic and socioeconomic context, certain census data from both the town and the county (Pamlico) have been reproduced in Table 3.2-24.

One should note that Oriental has an aging population and one that is older than the county as a whole. The entire town's permanent population is only 875 persons and only 10-12% of them are under the age of 18, while 35% of the population is 65 years old or older.

Ethnically, Oriental is fairly homogenous, with 90% of the population being white, 7.3% African American, which are figures quite different from the larger county (73% and almost 25%, respectively. There are few Hispanics or other ethnicities in the village.

Only 11% of all housing units are given to vacation rentals, which is less than Pamlico County.

Table 5.2.1-37. Oriental and Pamlico County, North Carolina. Source: Census 2000 summary file 1 (SF 1) 100-Percent Data (Hhttp://www.census.gov).

	ORIENTAL **Number**	ORIENTAL **Percent**	PAMLICO COUNTY **Number**	PAMLICO COUNTY **Percent**
TOTAL POPULATION	875	100.0	12,934	100.0
SEX AND AGE				
Male	419	47.9	6,513	50.4
Female	456	52.1	6,421	49.6
Median age (years)	57.2	(X)	42.9	(X)

	ORIENTAL Number	ORIENTAL Percent	PAMLICO COUNTY Number	PAMLICO COUNTY Percent
18 years and over	781	89.3	10,208	78.9
Male	374	42.7	5,098	39.4
Female	407	46.5	5,110	39.5
21 years and over	767	87.7	9,860	76.2
62 years and over	366	41.8	2,908	22.5
65 years and over	313	35.8	2,429	18.8
RACE				
One race	866	99.0	12,838	99.3
White	794	90.7	9,464	73.2
Black or African American	64	7.3	3,178	24.6
American Indian and Alaska Native	1	0.1	68	0.5
Asian	3	0.3	49	0.4
Asian Indian	3	0.3	15	0.1
Hispanic or Latino (of any race)	12	1.4	171	1.3
HOUSEHOLDS BY TYPE				
Total households	440	100.0	5,178	100.0
Households with individuals under 18 years	57	13.0	1,565	30.2
Households with individuals 65 years and over	222	50.5	1,744	33.7
Average household size	1.98	(X)	2.38	(X)
Average family size	2.38	(X)	2.81	(X)
HOUSING OCCUPANCY				
Total housing units	576	100.0	6,781	100.0
Occupied housing units	440	76.4	5,178	76.4
Vacant housing units	136	23.6	1,603	23.6
For seasonal, recreational, or occasional use	68	11.8	903	13.3
HOUSING TENURE				
Owner-occupied housing units	353	80.2	4,256	82.2
Renter-occupied housing units	87	19.8	922	17.8
EDUCATION, POPULATION OVER 25 YEARS	752	100.0	9,332	100.0
Less than HS Diploma	82	7	2,312	24.7
High school graduate (incl. equivalency)	158	21	2,921	31.3
Some college, no degree	195	26	2,113	22.6
Two or Four Year Degree	218	29	1,500	16
Graduate Degree	99	13.1	486	5.0
MEDIAN HOUSEHOLD INCOME	44,196	X	34,084	X
PERCENT OF FAMILIES BELOW POVERTY LINE		6.2		11.8
FAMILIES W/FEMALE HOUSEHOLDER, NO HUSBAND PRESENT, IN POVERTY		10.5		36.8

South Carolina

South Carolina, while losing many of its traditional fishing communities to coastal development in areas like Hilton Head and Murrells Inlet, still have a shrimping industry, even if it is not as robust as in years past. As of 2002, there were still 584 trawler licenses registered in the state (SCDNR, Personal communication, 2002). As can be seen in Table 3.2-25 there has been a slight decline since 1998 through 2001 in the number of federally permitted vessels in South Carolina.

Starting from the northern part of the state and moving south, the communities most engaged in shrimping are North Myrtle Beach (which can not be considered a fishing community, but is rather an artifact of where a dealer(s) is located), Georgetown, McClellanville, Mount Pleasant (Shem Creek), Charleston, Wadamalaw Island, Edisto Beach, Green Pond (again believed to reflect dealer location and not a fishing community per se), Ridgeland, Port Royal, Frogmore and Saint Helena Island.

Table 5.2.1-38. Number of federal permits by type for South Carolina (Source: NOAA Fisheries 2002).

Type of permit	1998	1999	2000	2001
Total permitted vessels	127	132	121	113
Commercial king mackerel	60	68	64	65
Commercial Spanish mackerel	47	36	15	19
Commercial spiny lobster	4	3	4	2
Charter/headboat for coastal pelagics	36	36	33	37
Charter/headboat for snapper grouper	41	41	36	44
Snapper grouper class 1	66	89	72	86
Snapper grouper class 2	11	14	8	9
Swordfish	0	3	3	2
Shark	0	21	15	19
Rock shrimp	12	12	12	14

The distribution of trawler permits by homeport is shown in Table 5.2.1-39.

Table 5.2.1-39. Number of South Carolina trawler permits by homeport State (SCDNR 2002).

Homeport state	Number of permits
AL	1
FL	11
GA	63
NC	119
NY	1
PA	1
SC	388
TOTAL	**584**

Georgia

Georgia's coastline is winding and oftentimes still remote and quite rural. Most of the coastal development has come in the form of more upscale tourism and resort creation than the attractions geared to the middle-class that are more evident in Florida and South Carolina. One of the biggest threats to these small fishing communities comes from rising land values that increase property taxes for smaller wholesale seafood operations, eventually making it financially impossible to continue conducting business in coastal areas. For example, in the town of Brunswick, shrimp boats used to tie up regularly at the state-owned docks. This has recently changed, as this area will be developed as a yacht marina and accompanying condominiums.

However, the most recent data available on number and types of permits does not reflect what has been observed during fieldwork, and it could be that the data do not show a long enough time line to pick up changes in the state's fisheries. There are, as of 2002, 947 vessels with commercial fishing registrations and of those, 601 that have registered shrimping gear (Table 5.2.1-40).

Table 5.2.1-40. Number of state permits by type for Georgia (Source: GADNR 2002).

Type	Number
Commercial fishing vessel registration	947
Vessels with shrimp gear	482
Full-time commercial fishermen	612
Part-time commercial fishermen	147

The distribution of permits by homeport state is shown in Table 5.2.1-41.

Table 5.2.1-41. Number of state shrimp net permits by homeport state (Source: GADNR 2002).

Alaska	1
Alabama	5
Florida	46
Georgia	385
North Carolina	74
South Carolina	73
Virginia	5
Unknown	1
Total	**601**

The number of federal permits in Georgia is shown in Table 5.2.1-42.

Table 5.2.1-42. Number of federal permits by type for Georgia (Source: NOAA Fisheries 2002).

Type of permit	1998	1999	2000	2001
Total permitted vessels	50	53	57	53
Commercial king mackerel	15	17	19	16
Commercial Spanish mackerel	11	10	11	8
Commercial spiny lobster	5	4	5	5
Charter/headboat for coastal pelagics	7	6	6	5
Charter/headboat for snapper grouper	6	5	5	4
Snapper grouper class 1	14	18	14	14
Snapper grouper class 2	1	6	2	2
Swordfish	0	0	0	0
Shark	0	5	5	4
Rock shrimp	22	25	28	29

The communities, towns and cities with the highest amounts of shrimp landings are: Brunswick, Crescent, Darien, Meridian, Richmond Hill, Savannah, St. Marys, St. Simons Island, Townsend, Tybee Island and Valona.

Florida

Florida's coast and the communities of the littoral have changed drastically since the time when shrimp trawls were first employed off the waters of Fernandina Beach. The population has grown ten to twenty percent in most coastal communities in just the last decade or so. Whereas the other states in the South Atlantic region are just at the beginning of their coastal development booms, the east coast of Florida has very nearly been fully developed.

While shrimp landings appear to still be high in Fernandina Beach, it has been recently reported (Tampa Tribune, 4/04/04) that the waterfront area where shrimp boats and fish houses were located has been declared "blighted", which will open up the area for redevelopment such as condominiums, tourist-oriented businesses, etc. One city planner is quoted that keeping shrimp boats there will be desirable, but most likely such boats will have to fit into the redevelopment plan.

The Mayport/Jacksonville area cannot be considered a fishing community, although the "neighborhood" seaport of Mayport (considered a part of Jacksonville) might be considered a fishing community.

Further south on the coast lies St. Augustine, which in the 1970s and 1980s was a large center for shrimp boats. Most boats now are in one marina, surrounded by sailboats and sportfishing vessels.

Cape Canaveral, in Brevard County, retains an industrial fishing zone atmosphere, and does not act as a residential fishing community per se, as there are just boats, docks, fish houses and a couple of processors located at the port. The fishermen, crew and workers live elsewhere.

Table 5.2.1-43. Number of federal permits by type for Florida east coast (Source: NOAA Fisheries 2002).

Type of permit	1998	1999	2000	2001
Total permitted vessels	3384	1949	2432	2311
Commercial king mackerel	1359	1216	1559	1519
Commercial Spanish mackerel	1540	1228	1479	1377
Commercial spiny lobster	574	457	532	498
Charter/headboat for coastal pelagics	790	275	397	417
Charter/headboat for snapper grouper	401	182	241	257
Snapper grouper class 1	83	564	676	641
Snapper grouper class 2	48	239	269	258
Swordfish	460	58	79	75
Shark	1039	212	251	242
Rock shrimp	167	149	176	167

The decline in numbers of commercial fishermen in Florida overall is well illustrated in both Tables 5.2.1-43, 5.2.1-44 (includes Atlantic and Gulf coast Florida data).

Table 5.2.1-44. Summary of Florida state commercial saltwater licenses data. Source: Commercial Saltwater Licenses data, FWC Division of Marine Fisheries. 2000-2001, 2001-2002, & 2002-2003 from Oracle tables.*

License year	Number of fishermen	Number of fishermen w/Restricted Species Endorsements (RS)	Number of Saltwater Products Licenses (SPL)	No. of SPLs with RS Endorsements
1985-1986	17,739	0	18,239	0
1986-1987	19,007	0	19,510	0
1987-1988	22,901	1	24,435	1
1988-1989	23,107	1,913	24,851	2,242
1989-1990	23,876	5,074	26,148	6,214
1990-1991	19,250	6,191	21,412	7,672
1991-1992	17,974	6,618	20,180	8,219
1992-1993	17,194	6,482	19,385	8,188
1993-1994	18,147	6,698	20,544	8,579
1994-1995	17,354	7,532	19,754	9,497
1995-1996	16,178	8,045	18,374	9,919
1996-1997	15,521	8,114	17,710	9,973
1997-1998	14,884	7,981	17,094	9,909
1998-1999	13,996	7,605	16,173	9,528
1999-2000	13,126	7,183	15,425	9,207
2000-2001	12,495	7,693	14,947	9,923
2001-2002	11,468	7,682	13,834	9,928
2002-2003	11,073	7,662	13,496	9,985

As can be seen in Table 5.2.1-44, there has been an overall decrease in the number of commercial fishermen in Florida (east and west coasts) by approximately 38% since 1985. There has been a decrease of approximately 50% in the number of Saltwater Products Licenses from a high of over 26,000 in 1989-1990. Overall, commercial fishing in Florida is on the decline now, and that would also include shrimping.

5.2.1.4 Bycatch

Description of bycatch in the penaeid shrimp fishery prior to the use of BRDs

The discarded bycatch of fish and invertebrates in the penaeid shrimp trawl fishery is highly variable according to season and area. The following information reflects bycatch levels and composition in the penaeid shrimp fishery prior to the requirement for use of bycatch reduction devices (BRDs). It has been documented that federally approved BRDs reduce overall finfish bycatch by approximately 30% in the South Atlantic. These devices also reduce the numbers of weakfish and Spanish mackerel in the catch by 40%.

Results of initial studies to document bycatch in the penaeid shrimp fishery were described in Amendment 2 to the South Atlantic Shrimp Fishery Management Plan (SAFMC 1996b). Previous determinations of the ratio of finfish (lb) to shrimp (lb heads on) in North Carolina indicated that the daytime ratios were consistently higher than the nighttime ratios due to larger shrimp catches rather than lower finfish catches.

The first integrated bycatch program was part of the congressionally mandated Bycatch Research Program from February 1992 through December 1996. This program was carried out to characterize the entire southeast shrimp fishery prosecuted in both the Gulf and South Atlantic region. To ensure the integrity and validity of the results, the following research protocols were followed:

1. A voluntary observer program using trained observers was undertaken. The program included vessel insurance and compensation for cooperating vessels.
2. Using a stratified sampling approach indexed to shrimping effort, NOAA Fisheries and other cooperating institutions deployed observers throughout the fleet to document bycatch during normal fishing operations using standard data collection methods.
3. All data were entered into a common database managed by NOAA Fisheries' Southeast Fisheries Science Center's Galveston Laboratory.
4. Characterization data were analyzed, and these data and analyses were made available to other program researchers and fishery managers.

For characterization sampling, the entire catch of each trawl was sampled, and all species quantified. For BRD evaluations, a select group of finfishes and other species were quantified, with the remainder of the catch grouped into general categories. Therefore, both bycatch characterization sampling and BRD evaluation data were use to determine general categories of bycatch. Sampling was stratified based on shrimp effort, and given that the South Atlantic shrimp fishery accounts for approximately 10-15 % of the total U.S. shrimp production, the sampling effort was limited for some temporal and spatial strata. Nevertheless, the sampling that occurred provided a sufficient basis for NOAA Fisheries to characterize the fishery in the South Atlantic region. During that program, observers logged a total of 920 sea days documenting bycatch in the South Atlantic shrimp fishery. The majority of the effort was expended during 1992 through 1994.

In response to this federally mandated research program, NOAA Fisheries began cooperative work with the shrimp industry through the Gulf and South Atlantic Fisheries Foundation. The cooperative bycatch research program studied bycatch and gear options in shrimp trawl fisheries throughout the southeast region. The study estimated the catch rate for shrimp and bycatch in the South Atlantic penaeid shrimp fishery.

The South Atlantic observer program included 920 sea days of sampling effort from February 1992 through December 1996. These sea days were accomplished during 604 trips, varying in length from 1 to 54 days (Nance 1998). The results of the program are detailed in Nance (1998) and Nance et al. (1997), and presented in Tables 3.1-4 and 3.1-5. In summary, the study indicated that about 27 kg (59.5 lb) of organisms per hour are taken during trawling operations, and that the finfish to shrimp ratio for the South Atlantic shrimp fishery was 2.83 to 1 by weight and 2.35 to 1 by number. Finfish comprised the majority (51%) of the catch by weight, followed by non-commercial invertebrates (31%), and commercial shrimp species (18%), including brown shrimp, white shrimp, pink shrimp, seabobs, sugar/blood shrimp and rock shrimp. Finfish represented about 54% of the 1,450 organisms taken per hour during normal trawling operations. Non-commercial invertebrates and commercial shrimp species each comprised about 23% of the catch by number (Nance et al. 1997).

Shrimp trawl catch per hour changed seasonally, being lowest during the first trimester of the year (ca. 12 kg/hr [26.5 lb/hr]), while the summer and post-summer seasons had very similar catch rates at around 28-30 kg per hour (Table 5.2.1-45). Finfish catch rates always comprised more than 44% of the catch, while shrimp catch rates were approximately 15% to 18% in the summer and post-summer periods, respectively, but 37% in the pre-summer season. Finfish catch by weight for the entire shrimp fishery was highest between May and August. The highest catch rate of finfish by number occurred in September through December, with nearly 1,800 individual finfish caught per hour. Shrimp catches were higher then too, resulting in a finfish to shrimp ratio of only 2.59 individual finfish to 1 shrimp.

Similarly, shrimp trawl catch per hour differed by latitude as well. By weight, the northern area (>34 N) had the highest overall catch rates (37 kg/hr [81.6 lb/hr]), while areas to the south of 34 N had catch rates at around 25 kg/hr (55.1 lb/hr) (Nance et al. 1997).

Table 5.2.1-45. Average percent composition of shrimp trawl catch by season in the South Atlantic (NOAA Fisheries 1998).

Catch	**Weight**	**Weight**	**Weight**	**Number**	**Number**	**Number**
Time period	Jan-April	May-Aug	Sept-Dec	Jan-April	May-Aug	Sept-Dec
Finfish	44%	58%	44%	65%	58%	44%
Shrimp	37%	15%	18%	11%	26%	17%
Crustaceans	9%	14%	14%	21%	14%	9%
Invertebrates	9%	13%	25%	3%	3%	30%
Total catch (per hr)	12 kg 26.5 lb	30 kg 66.1 lb	28 kg 61.7 lb	850	1350	1800
Finfish:Shrimp ratio	1.19 to 1	3.87 to 1	2.44 to 1	5.91 to 1	2.23 to 1	2.59 to 1

Additional information collected during the Bycatch Program was presented in Amendment 2 to the Shrimp FMP. When looking at catch according to depth of the fishing effort across all shrimp fisheries, the highest bycatch of finfish came from vessels fishing in 60 ft (18.3 m) or greater depths, with 56% of the catch being finfish and 18% shrimp or a ratio of 3.1 finfish caught for each shrimp caught (Table 5.2.1-46).

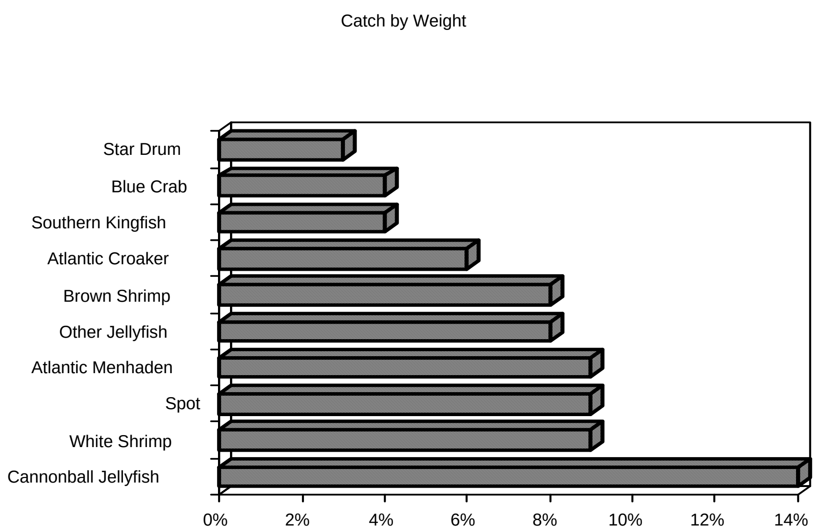
Table 5.2.1-46. Percent average hourly shrimp trawl catch by area and depth (Data Source: NOAA Fisheries 1995).

Area	**Finfish**	**Shrimp**	**Crustaceans**	**Invertebrates**	**Total Catch (number)**	**Finfish to Shrimp**

South Atlantic < 18.3 m (60 ft) > 18.3 m (60 ft)	46% 56%	29% 18%	11% 21%	14% 5%	1229 726	1.6 to 1 3.1 to 1
Florida < 18.3 m (60 ft) > 18.3 m (60 ft)	37% 43%	30% 29%	27% 23%	6% 4%	1207 802	1.2 to 1 1.5 to 1

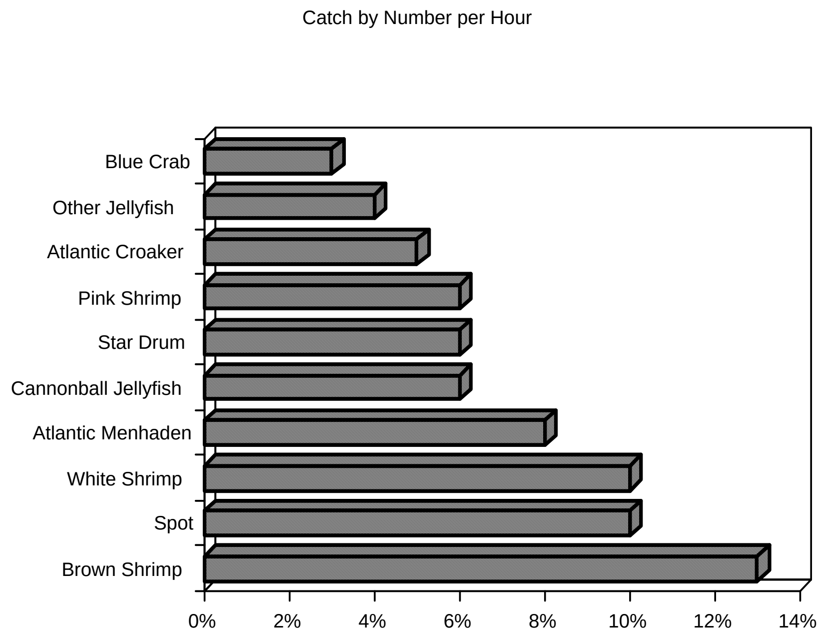
* 393 sea days, 63 trips and 679 tows

When summarizing catch of the South Atlantic shrimp fleet by species, cannonball jellyfish constituted 14% of the catch by weight and brown shrimp made up 8% of the catch by weight and 13% of the catch by number (Figure 5.2.1-1, Figure 5.2.1-2). White shrimp constituted 9% of the catch by weight and 10% of the catch by number. The highest catch of an individual finfish species was spot, which accounted for 9% of the catch by weight and 10% by number (Figure 5.2.1-1, Figure 5.2.1-2).



* 393 sea days, 63 trips and 679 tows

Figure 5.2.1-1. Top ten species caught in South Atlantic shrimp trawls by weight (Data Source: SAFMC 1996a).



* 393 sea days, 63 trips and 679 tows

Figure 5.2.1-2. Top ten species caught in South Atlantic shrimp trawls by number (Data Source: SAFMC 1996a).

BRD research program

The second part of the congressionally mandated Bycatch Research Program, from 1992 through 1996, involved the development and review of bycatch reduction devices (BRDs). These trawl gear modifications were identified as the most cost-effective and least disruptive way to minimize finfish bycatch in the shrimp fishery. A four-phase development program was successfully used under this program structure to develop several BRD designs that are used in the fishery. Within this framework, the research and development of candidate devices was carried out independently by NOAA Fisheries, Sea Grant, state agencies, universities and industry, drawing on a variety of funding sources, primarily the Saltonstall-Kennedy (S-K) and MARFIN (Marine Fisheries Initiative) grants programs.

From 1992 to 1996, fishery researchers and commercial fishers developed and tested a total of 145 bycatch reduction device (BRD) designs throughout the southeast region. Research conducted by the Gulf and South Atlantic Fisheries Foundation, Inc. (Foundation), indicated that reductions in general catch and bycatch were 22% or less (Table 3.1-6). Spanish mackerel catch rate was reduced by 0%-83% and weakfish catch rate was reduced by 6%-58% (Tables 3.1-7a, b and c). The State of North Carolina also conducted testing on BRDs and Table 3.1-7b presents a summary of the observed reduction rates for BRDs that were proposed for use in federal waters when Shrimp Amendment 2 was developed (SAFMC 1996b).

Table 5.2.1-47. Summary of reductions (kg/hr) attributed to BRD designs tested in the South Atlantic during 1993 and 1994 (Sources: Watson, NOAA Fisheries, pers. comm. 1995 and Branstetter, GSAFDF pers. comm. 1996).

	Fish-eye 4"Hx7"W 30 meshes from front	Fish-eye 5"Hx 12"W 30 meshes from front	Fish-eye 5"Hx 12"W 45 meshes from front	Large mesh extended funnel
Total biomass (kg/hr)	-4(27)	-9*(66)	-9(117)	-12(156)
Crustaceans (kg/hr)	+6(27)	-13*(66)	-14*(80)	-13*(156)
Other invertebrates (kg/hr)	-2(27)	-7(66)	-4(111)	-9*(156)
Total finfish (kg/hr)	-16(27)	-16*(66)	-12*(117)	-22*(156)
Comm. shrimp (kg/hr)	-3(27)	-1(66)	-1(116)	+2(156)
Misc. fish spp. (kg/hr)	-15(26)	-6(66)	-14(122)	-22*(156)

* statistical difference from zero where Ho = CPUE of control net - CPUE of the BRD net = 0. Numbers in ( ) represent sample size.

Table 5.2.1-48. Reduction rates (kg/hr) for weakfish, shrimp and Spanish mackerel for the large mesh extended funnel BRD tested primarily off Georgia and South Carolina (1995 GSAFDF data); (Data Source: Watson, NOAA Fisheries, pers. comm. 1995).

Large mesh extended funnel	Reduction rate (kg/hr)	Number	95% Conf.
Weakfish	-37%	63	35%-39%
Spanish mackerel	-44%	26	39%-48%
Shrimp	+2%	63	

Table 5.2.1-49. Reduction rates (kg/hr) for weakfish and Spanish mackerel for Florida fisheye and large mesh extended funnel BRDs tested primarily off North Carolina (NCDMF 1992-1994 data) (Data Source: Watson, NOAA Fisheries, pers. comm. 1995).

Florida fisheye	Reduction rate (kg/hr)	Number = 213
Weakfish	-58%	
Spanish mackerel	-34%	
Shrimp	-8%	

Large mesh extended funnel	Reduction rate (kg/hr)	Number = 36
Weakfish	-56%	
Spanish mackerel	-83%	
Shrimp	-2%	

The fisheye tested by NCDMF off North Carolina reduced weakfish bycatch by 58% with high reductions for other species including spot and Atlantic croaker, which were reduced by more than 50%. The NCDMF tests showed that the fisheye reduced total finfish bycatch by 48% and total biomass by 28% (SAFMC 1996b).

A comparison of reduction rates attributable to various fisheye configurations tested aboard commercial trawlers in North Carolina between 1992 and 1994 indicated that the 9" by 9" fisheye reduced total biomass by over 60% and the 5.5" by 6.5" fisheye showed the greatest finfish reduction of about 60%. The 9" by 9" fisheye reduced Spanish mackerel approximately 50% and the 5.5" by 6.5" fisheye reduced weakfish by over 70%. Tests of large mesh extended funnel BRDs were conducted by NCDMF and showed reduction rates of 55% in finfish numbers and 56% in the number of weakfish (SAFMC 1996b).

These evaluations resulted in the approval of 3 BRD designs for use by the South Atlantic penaeid shrimp fishery. Regulations implementing the actions described in Amendment 2 to the FMP were promulgated effective April 21, 1997. The final rule established a requirement, with limited exceptions, for the use of certified BRDs in penaeid (brown, pink and white) shrimp trawls towed in the South Atlantic exclusive economic zone (EEZ).

Table 5.2.1-50. Reduction rates (kg/hr) for weakfish, trout and Spanish mackerel for large mesh extended funnel and midsize fisheyes tested primarily off South Carolina and Georgia (1993-1994 NOAA Fisheries and GSAFDF data) (Data Source: Watson, NOAA Fisheries, pers. comm. 1995).

Large mesh extended funnel	Reduction rate (kg/hr)	Number	95% Conf.
Weakfish	-6%	39	
Spanish mackerel	-38%	67	16%-59%
Trout	-27%	148	15%-39%
Shrimp	+3%	186	

Midsize fisheye w/hard TEDs 30-mesh position	Reduction rate (kg/hr)	Number	95% Conf.
Weakfish	-40%	58	29%-52%
Spanish mackerel	-34%	47	24%-44%
Trout	-29%	174	21%-37%
Shrimp	+3%	268	3%-10%

Midsize fisheye, w/soft TEDs 30-mesh position	Reduction rate (kg/hr)	Number	95% Conf.
Weakfish	-7%	26	-
Spanish mackerel	-0%	20	-

Trout	-20%	32	-
Shrimp	-2%	112	-

Midsize fisheye, 45-mesh position	Reduction rate (kg/hr)	Number	95% Conf.
Weakfish	-16%	95	
Spanish mackerel	-0%	30	
Trout	-81%	4	
Shrimp	+3%	160	

Recent re-evaluations of all Gulf of Mexico and South Atlantic datasets generated by NOAA Fisheries and the Foundation were utilized in determining the effectiveness of BRDs for use in the eastern Gulf of Mexico (Amendment 10 to the Gulf of Mexico Shrimp Fishery Management Plan; Table 3.1-8). The BRDs currently certified in the South Atlantic (the fisheye and the expanded mesh) achieve a 30% reduction in overall finfish bycatch (Table 5.2.1-51).

Table 5.2.1-51. Reduction rate estimates of various BRDs and one TED for the Gulf of Mexico and South Atlantic
(taken from GMFMC Shrimp FMP Amendment 10).

Species	n	Reduction Rate (%)	P - Value	95% C.I. (%)
12x5 Fisheye BRD				
Shrimp (wt)	157	4	0.16	--
Total Fish (wt)	141	35	0	30 to 39
12x5 Fisheye BRD in the 2.6 Meter Position				
Shrimp (wt)	105	4	0.17	--
Total Fish (wt)	98	44	0	38 to 49
12x5 Fisheye BRD in the 3.8 Meter Position				
Shrimp (wt)	35	-1*	0.78	--
Total Fish (wt)	35	31	0	24 to 37
Extended Funnel Device				
Shrimp (wt)	299	0	0.74	--
Total Fish (wt)	280	38	0	32 to 44
Jones/Davis BRD				
Shrimp (wt)	33	4	0.07	0 to 9
Total Fish (wt)	31	58	0	53 to 63
Parker TED				
Shrimp (wt)	68	7	0.00	4 to 10
Total Fish (wt)	67	32	0.00	28 to 36

*Negative values represent a nominal increase. Source: NOAA Fisheries (unpublished data).

It has been demonstrated that the use of a turtle excluder device (TED) also reduces finfish bycatch in penaeid shrimp trawls. A number of experimental trials were conducted in Cape Canaveral, Florida, during 1986 to test the bycatch reduction capability of various TED designs and configurations. Based on the results of these trials, the Atlantic States Marine Fisheries Commission Weakfish Management Board granted a 23.9% TED credit for weakfish reduction (GSAFF 1999). However, many of those TEDs were soft (net webbing) TEDs that were never certified for use by NOAA Fisheries. Soft TEDs have much greater bycatch exclusion capability than hard (metal grid) TEDs.

The Foundation tested several hard TEDs during the late 1990s for their bycatch exclusion capabilities. A common TED, the Super Shooter, had 0% reduction in finfish bycatch compared to the catch of a “naked” (no TED) net (GSAFF 1997). NOAA Fisheries has similar data on the results of a variety of hard TEDs and none have demonstrated more than a minimal reduction in finfish catch.

Currently, only one soft TED is certified. Recent changes to the TED regulations (68 FR 8456, February 21, 2003) have greatly modified the shape, size and configuration of hard TEDs. No information is available on the bycatch exclusion capability of these TEDs. However, their configurations would suggest that little bycatch reduction would be expected, except for the mechanical exclusion of large fishes such as sharks and rays.

The bycatch reduction device testing protocol

Amendment 2 to the Shrimp FMP established a Bycatch Reduction Device Testing Protocol (Protocol) for examining the bycatch reduction performance of additional BRD designs. BRDs tested under such a Protocol and determined to reduce bycatch mortality of juvenile Spanish mackerel and weakfish by a minimum of 50%, or demonstrate a 40% reduction in numbers of Spanish mackerel and weakfish, would be certified for use in the South Atlantic EEZ shrimp fishery. Juvenile Spanish mackerel and weakfish were bycatch species in South Atlantic shrimp trawl fisheries, while also being targets of directed commercial and recreational fisheries as adults. Thus, these species were targeted species for bycatch reduction. Both of these species were overfished and undergoing overfishing and fisheries managers were trying to recover these stocks to a “healthy” status. Spanish mackerel is managed by the SAFMC (ASMFC also manages Spanish mackerel) and weakfish is managed by the ASMFC.

Under the current Protocol, state fishery management agencies, universities and other institutions can work with fishermen to develop and evaluate BRDs for certification. If an experimental BRD demonstrates the capability to meet the certification criteria, the information is submitted to NOAA Fisheries’ Southeast Regional Administrator (RA) for consideration of certification. If approved by the RA, NOAA Fisheries will announce in the Federal Register the certification of the BRD for use in all South Atlantic EEZ waters.

Currently, Spanish mackerel has recovered from a previous overfished status and is not overfished and is not experiencing overfishing. The 2003 Report of the Mackerel Stock Assessment Panel (MSAP 2003) indicated that F/FMSY (current fishing mortality over a fishing mortality that would achieve MSY) was 0.58, and there was only a 3% chance that overfishing occurred on the Atlantic Spanish mackerel stock in the 2002/2003 fishing year. The median estimate of B2000/BMSY was 1.78; in other words the stock is 1.78 times the size of the stock necessary to produce MSY. There is less than a 1% chance that the stock is overfished.

The 2002 NOAA Fisheries Report to Congress classified weakfish as not overfished and not approaching an overfished condition (NOAA Fisheries 2003a). However, in this report overfishing was undefined. From the perspective of the ASMFC, the most recent assessment for weakfish indicates that total mortality has increased in recent years, probably due to natural factors and not fishing (including bycatch) mortality (ASMFC 2007 Addendum II to Amendment 4 to the Interstate Fishery Management Plan for Weakfish). Amendment 4 to the ASMFC Weakfish Plan still contains the 40% reduction criterion for weakfish (See Appendix F in SAFMC Shrimp Amendment 6). The following is taken directly from Amendment 4 to the Weakfish Plan:

One or more BRDs shall be required in all food shrimp (penaeid) trawl nets with a heardope length exceeding 16 feet and having mesh less than 2.5 in stretched inside measurement (middle to middle knot measurement). All BRDs must be certified, properly installed and demonstrate a 40% reduction by number or 50% reduction of bycatch mortality of weakfish when compared to catch rates in a naked net. States are encouraged to continue research on gear technology and methods that will result in further bycatch reductions.

An addendum to the weakfish plan would be necessary to remove or change this requirement.

Minimizing bycatch in the shrimp fishery to the extent practicable
The Magnuson-Stevens Act requires the Council to establish a standardized bycatch reporting methodology for federal fisheries and to identify and implement conservation and management measures that, to the extent practicable and in the following order: (A) minimize bycatch and (B) minimize the mortality of bycatch that cannot be avoided (16 U.S.C. 1853(a)(11)). The Act defines bycatch as fish that are harvested in a fishery, but that are not sold or kept for personal use. This definition includes economic discards and regulatory discards and excludes fish released alive under a recreational catch-and-release fishery management program (16 U.S.C. 1802(2)). Economic discards are fish that are discarded because they are undesirable to the harvester. This category of discards generally includes certain species, sizes and/or sexes with low or no market value. Regulatory discards are fish that are required by regulation to be discarded such as fish below a minimum size limit, but also include fish that may be retained but not sold.

NOAA Fisheries outlines at 50 CFR 600.350(d)(3)(i) ten factors that should be considered in determining whether a management measure minimizes bycatch or bycatch mortality to the extent practicable. These are:

1. Population effects for the bycatch species;

2. Ecological effects due to changes in the bycatch of that species (effects on other species in the ecosystem);
3. Changes in the bycatch of other species of fish and the resulting population and ecosystem effects;
4. Effects on marine mammals and birds;
5. Changes in fishing, processing, disposal and marketing costs;
6. Changes in fishing practices and behavior of fishermen;
7. Changes in research, administration and enforcement costs and management effectiveness;
8. Changes in the economic, social or cultural value of fishing activities and non-consumptive uses of fishery resources;
9. Changes in the distribution of benefits and costs; and
10. Social effects.

Agency guidance provided at 50 CFR 600.350(d)(3)(ii) suggests the Councils adhere to the precautionary approach outlined in the Food and Agriculture Organization of the United Nations Code of Conduct for Responsible Fisheries (Article 6.5) when faced with uncertainty concerning these ten practicability factors. According to Article 6.5 of the Code, using the absence of adequate scientific information as a reason for postponing or failing to take measures to conserve target species, associated or dependent species, and non-target species and their environment, would not be consistent with a precautionary approach.

The South Atlantic penaeid shrimp fishery occurs in an area extending from Fort Pierce, Florida to Pamlico Sound and Ocracoke Inlet, North Carolina. The federal fishery is primarily prosecuted with otter trawl gear (SAFMC 1993). Other gear (e.g., cast nets, haul seines, wing nets, etc.) also is used, but accounts for a minor portion of the annual commercial landings. Trawl gear is predominantly used in federal waters. Management actions implemented by the Council to minimize bycatch in the penaeid shrimp fishery and the effects of those actions on finfish and invertebrates and on sea turtles are described below. Section 3.1.12.1.3 contains an evaluation of the effects of management measures on bycatch and bycatch mortality of finfish using the ten practicability factors provided at 50 CFR 600.350(d)(3)(i).

In summary, technological devices mandated for use in the South Atlantic penaeid shrimp trawl fishery are estimated to reduce finfish bycatch by at least 30% and to reduce sea turtle bycatch by as much as 97%. More data are needed to improve the reliability of information on the current level of finfish bycatch, which generally continues to exceed the catch of shrimp. However, based on a review of the status of the five species of greatest concern in the South Atlantic (weakfish, king mackerel, Spanish mackerel, Atlantic croaker and spot), there is no evidence to indicate that the mortality of finfish caused by the shrimp trawl fleet (with TEDs implemented) is having a significant adverse affect on finfish stocks. This practicability analysis concluded that current management measures minimize bycatch and bycatch mortality to the extent practicable in the penaeid shrimp fishery.

Bycatch in the shrimp trawl fishery could have adverse socioeconomic effects on finfish fisheries that target the same species that are taken as bycatch in the shrimp fishery. But any adverse effects associated with reducing the number of fish available to the directed commercial and recreational finfish fisheries are likely outweighed by the socioeconomic benefits of the high value shrimp fishery in which some level of bycatch is unavoidable. The revenue generated by the South Atlantic commercial shrimp fishery is the highest in the region relative to other commercial harvesting sectors.

The technology certified by the Council for use in the penaeid shrimp fishery attempts to balance the above described biological, ecological, social and economic tradeoffs by reducing finfish bycatch while minimizing shrimp loss. As a result, current management measures are believed to have minimized finfish bycatch and finfish bycatch mortality to the extent practicable. Researchers continue working to improve the performance and efficiency of bycatch reduction devices.

<u>Managing finfish and invertebrate bycatch in the penaeid shrimp fishery</u>
The key focus of the Shrimp FMP when it was implemented in 1993 was to provide for concurrent closures of state and federal waters following severe winter weather to eliminate fishing mortality on overwintering white shrimp when necessary to ensure the sustainability of the stock (SAFMC 1993). The Council recognized at the time that mortality in the shrimp trawl fishery had an adverse impact on a number of finfish stocks that are important to commercial and/or recreational fisheries in the South Atlantic, including the weakfish, king mackerel, Spanish mackerel, Atlantic croaker and spot (Nance 1998). But an amendment to the Magnuson-Stevens Act in 1990 specifically prohibited the Council from implementing bycatch reduction measures until January 1, 1994. This prohibition was later extended for three months.

The intent of the 1990 Magnuson-Stevens Act incidental harvest provision was to ensure that bycatch reduction requirements were based on reliable information on the magnitude and composition of bycatch, and that such requirements minimized adverse effects on shrimp fishery participants to the extent practicable. The 1990 Magnuson-Stevens Act amendment authorized a 3-year study of bycatch in the Gulf of Mexico and South Atlantic shrimp trawl fishery to characterize bycatch and to develop gear options that could reduce bycatch with minimum loss of shrimp production. Results of these studies are summarized in sections above.

Upon completion of this study, the Council developed Amendment 2 to the Shrimp FMP (SAFMC 1996b). Effective April 1997, Amendment 2 required that shrimp trawl gear operating in federal waters of the South Atlantic use one of three BRDs certified by the Council based on their ability to reduce finfish bycatch while minimizing shrimp loss. These federally approved BRDs include the 12x5 fisheye, the extended funnel BRD and the expanded mesh BRD, which are estimated to achieve a 30% reduction in overall finfish bycatch.

<u>Managing sea turtle bycatch in the penaeid shrimp fishery</u>

The South Atlantic penaeid shrimp trawl fishery also is regulated to minimize interactions with sea turtles, all species of which are listed as either threatened or endangered under the 1973 ESA. The incidental take and mortality of sea turtles as a result of trawling activities has been documented along the Atlantic Ocean seaboard. Federal regulations under the ESA require most shrimp trawlers operating in the South Atlantic to have a NOAA Fisheries approved turtle excluder device (TED) installed in each net that is rigged for fishing to provide for the escape of sea turtles. To be approved by NOAA Fisheries, a TED design must be shown to be at least 97% effective in excluding sea turtles during experimental TED testing (68 FR 8456; February 21, 2003).

The use of TEDs is believed to have had a significant beneficial impact on the survival and recovery of at least some sea turtle species (68 FR 8456; February 21, 2003). However, information from Epperly and Teas (2002) demonstrated that these devices, as originally designed, were not adequately protecting all species and size classes of turtles. Leatherback sea turtles were too large to escape through the TED openings. According to a biological opinion completed in December 2002, as many as 2.5% of the loggerhead turtles in the Atlantic also were too large to exit through the TEDs (68 FR 8456; February 21, 2003). Consequently, NOAA Fisheries amended regulations in February 2003 to 1) modify the dimensions of approved TEDs so that they are effective at excluding leatherbacks and large sexually mature loggerhead and green turtles, and 2) modify trynet and bait shrimp exemptions to the TED requirements to decrease lethal take of sea turtles.

In the 2002 Biological Opinion, NOAA Fisheries determined that “shrimp trawling in the southeastern United States under the proposed revisions to the sea turtle conservation regulations and as managed by the fishery management plans for shrimp in the South Atlantic and Gulf of Mexico is not likely to jeopardize the continued existence of endangered green, leatherback, hawksbill and Kemp’s ridley sea turtles and threatened loggerhead sea turtles” (NOAA Fisheries 2002). The new rule is expected to decrease shrimp trawl related mortality by 94% for loggerheads and by 96% for leatherbacks (68 FR 8456; February 21, 2003).

Bycatch practicability analysis

<u>Population effects for the bycatch species</u>

The population effects of bycatch mortality are the same as fishing mortality from directed fishing efforts. If not properly managed and accounted for, either form of mortality could potentially reduce stock biomass to an unsustainable level. One important difference in the effects of the penaeid shrimp trawl fishery and directed fisheries on finfish is that fishes taken in shrimp trawls are generally small and young. Juveniles are more expendable in one respect because they occur in high numbers, and relatively few actually survive to adulthood. But the reproductive potential of a stock can be compromised if fish are not provided sufficient opportunities to reproduce before they are exposed to fishing or bycatch mortality. The risk of stock collapse increases markedly if the fish are subject to fishing or bycatch mortality before they mature (Myers and Mertz 1998).

Early weakfish management plans indicated that bycatch of juvenile weakfish in the shrimp trawl fishery reduced yield per recruit and spawning stock biomass per recruit of the weakfish stock. The amount of weakfish discarded in the shrimp trawl fishery often approached or exceeded directed landings in South Atlantic states (Nance 1998). BRDs have reduced discards of weakfish and other finfish species by at least 30% since that time. Although some soft TEDs were also documented to reduce finfish bycatch, most of the current hard TED configurations suggest that they will have little impact on bycatch reduction, except for the mechanical exclusion of large fishes such as sharks and rays.

The current level of bycatch in the penaeid shrimp trawl fishery continues to be substantial despite these advancements in bycatch reduction. However, bycatch mortality is incorporated in assessments of finfish stocks where bycatch estimates are available (e.g., weakfish and sharks) (Nance 1998). Additionally, the sustainability of finfish species taken as bycatch in shrimp trawls does not appear to be threatened by this source of mortality.

The following summarizes available information on the status of the five species of greatest concern in the South Atlantic: weakfish, king mackerel, Spanish mackerel, Atlantic croaker and spot. Two of these five species, Atlantic croaker and spot, represent major components of the total shrimp trawl finfish bycatch. The remaining species are represented in the catch in lesser numbers. All were selected for review by Nance (1998) because of their commercial and recreational importance, and because bycatch mortality has the potential to significantly impact their abundance.

The weakfish stock been declining since the late 1990s (ASMFC 2004a). King mackerel and Spanish mackerel are neither overfished nor experiencing overfishing (NOAA Fisheries 2003a). Spanish mackerel stock biomass has more than doubled since the mid-1990s (ASFMC 2004b). The first coast-wide assessment of the Atlantic croaker stock has not yet been completed (ASMFC 2004c). However, the 2001 review of the Atlantic croaker FMP based on a more limited assessment indicates that the population is increasing in size and expanding in age/size structure (Desfosse et al. 2001). Data are inadequate to conduct a formal, coast-wide assessment of spot. But the current BRD and minimum size limit requirements are believed to have reduced mortality sufficiently to protect this stock until an assessment can be completed (ASMFC 2004d).

Observed increases in nesting levels of the Kemp's ridley sea turtles exemplify the significant beneficial impact of TEDs on the survival and recovery of several sea turtle populations. The total annual mortality of Kemp's ridley turtles has been reduced by 44%-50% since 1990, when TEDs became more widely used in U.S. waters. Once the most critically endangered sea turtle, Kemp's ridley nesting levels have increased from 700-800 nests per year in the mid-1980s to over 6,000 nests in 2000. Recent modifications to the TED rule designed to better protect larger species of sea turtles are expected to decrease shrimp trawl related mortality by 94%-96% for loggerheads and leatherbacks, respectively (68 FR 8456; February 21, 2003).

Ecological effects due to changes in the bycatch of shrimp (effects on other species in the ecosystem)

There is limited bycatch of shrimp in the shrimp trawl fishery because nearly all shrimp harvested is marketed. Interaction with BRDs and trawl gear could result in some mortality on those shrimp that subsequently escape the devices. However, the BRDs certified by the Council minimize shrimp loss to the extent possible and have not adversely affected the status of shrimp stocks. According to NOAA Fisheries' most recent report to Congress, none of the South Atlantic penaeid shrimp stocks is overfished or experiencing overfishing (NOAA Fisheries 2003a). Consequently, the ecosystem effects of such losses are expected to be minimal.

Changes in the bycatch of other species of fish and invertebrates and the resulting population and ecosystem effects

Reductions in finfish bycatch attributed to the mandated use of BRDs may result in increased predation on shrimp if affected finfish are shrimp predators. Only 14 of 161 fish species examined during NOAA Fisheries' offshore bycatch characterization surveys on commercial vessels from 1992-1996 were identified as predators on penaeid shrimp. These are the Atlantic croaker, sand seatrout, spotted seatrout, silver seatrout, ocellated flounder, inshore lizardfish, bighead searobin, smooth puffer, red snapper, lane snapper, Spanish mackerel, rock sea bass, dwarf sand perch and Atlantic sharpnose shark (Nance 1998).

Predator-prey relationships are largely dependent on the size structure of predator and prey populations. Juvenile fish that could not prey on large shrimp because of their small size may be able to do so if their exclusion from trawl gear allows them to grow larger. However, it is also possible that some fish will reduce their preference for shrimp as they grow larger and their dietary habits change (Nance 1998).

Simulations using an ecosystem-based model of the interactions among shrimp and finfish stocks in the Gulf of Mexico indicate that shrimp stock biomass could increase by 4.7% or decrease by 17% depending on bycatch exclusion rates and assumptions relative to predator selection of shrimp prey (Nance 1998). Predation is the primary cause of the simulated decrease in shrimp stock biomass. A reduction in the amount of nitrogen recycled from discards is a contributing factor. However, nitrogen returned to the ecosystem through discards is minimal in comparison to the large nitrogen input from rivers (Nance 1998).

The possible outcomes simulated by the model are uncertain, as multiple factors that are not well understood will influence the actual response of the ecosystem to changes in shrimp trawl bycatch. Generally, scientific data are inadequate to reliably predict ecosystem effects, particularly with respect to stock size, and interactions between predators and prey, and species, such as bottomfish, sharks, birds and dolphins, which compete with each other for food and other resources (Nance 1998; Cook 2003). Consequently, the ecosystem model is based on a number of assumptions about which scientists are uncertain, including a discard mortality rate of 100%. The limitations of the model are discussed more fully in Nance (1998).

Changes in the bycatch of non-shrimp invertebrates (e.g., crustacea and molluscs) also could have ecosystem effects. These species have ecological functions in addition to serving as prey for other invertebrates and fishes. For example, some species, like barnacles and hydrozoans, condition habitat for other organisms by providing a growing surface or by contributing to the bioturbation of bottom sediments.

Effects on marine mammals and birds

Under Section 118 of the Marine Mammal Protection Act (MMPA), NOAA Fisheries must publish, at least annually, a List of Fisheries (LOF) that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. The 2003 List of Fisheries classifies the Southeastern U.S. Atlantic Shrimp Trawl fishery as a Category III fishery, meaning that the annual mortality and serious injury of a stock resulting from the fishery is less than or equal to 1% of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (68 FR 135; July 15, 2003). No changes in this fishery's classification were proposed in the 2004 proposed LOF (69 FR 71; April 13, 2004).

Species of large whales protected by the ESA can be found in or near the area in which the South Atlantic shrimp trawl fishery occurs. The slow speed (1 to 2 knots) at which shrimp trawlers operate while trawling is sufficient to allow both whales and fishing vessels time to avoid a collision. There have been no reported interactions between large whales and shrimp vessels in the South Atlantic. A biological opinion conducted by NOAA Fisheries in December 2002 identified the chances of the South Atlantic shrimp trawl fishery affecting these species as "discountable" and determined they were not likely to be adversely affected (NOAA Fisheries 2002). Discountable effects are defined as effects that are extremely unlikely to occur.

There have been no documented seabird-gear interactions in the South Atlantic penaeid shrimp fishery. This finding is based on more than 117,000 hours of observer coverage while trawling on 1,310 trips completed from February 1992 through December 2003 during 12,749 sea days in the U.S. Gulf of Mexico and southeastern Atlantic. A total of 668 trips (1,475 sea days) occurred off the east coast, and 5 trips (127 sea days) targeted waters off both the east coast and in the Gulf of Mexico (E. Scott-Denton, NOAA Fisheries, personal communication). Seabirds that feed on discards would be expected to be affected by any increases or decreases in the amount of discards produced by the shrimp trawl fishery (Nance 1998; Cook 2003). Discards and offal produced by fishing vessels makes food more easily available to seabirds, and have been linked to population increases in a number of species (Cook 2003).

Changes in fishing, processing, disposal and marketing costs

Penaeid shrimp fishermen have experienced direct costs as a result of the BRD and TED requirements. The cost of a BRD ranges from about $20 for a fisheye design to less than $100 for the large mesh extended funnel (SAFMC 1996b). The cost of outfitting small fishing vessels with BRDs is estimated at $200 (four BRDs at a cost of $50 per BRD). These vessels trawl with two nets. Larger shrimp vessels typically use four nets, and keep a spare set onboard. As a result, these vessels are required to purchase approximately eight BRDs, with a resulting cost of $400. The purchase of these gear modifications is a recurring expense. Currently, the cost of a TED typically used for an offshore, larger vessel runs approximately $320 to $350. For shrimpers whose TED frames were large enough to be compliant with the new rule and only needed to have the opening modified – the cost ran approximately $50. In general, shrimpers will have their TEDs re-worked every year, which if it does not require replacing the TED, will run approximately $100/TED.

The use of BRDs could result in some shrimp loss. But studies suggest that the use of BRDs or similar techniques to reduce finfish capture would not negatively affect shrimp production in the long-term if finfish exhibit even moderate selectivity against shrimp as prey (Nance 1998). The amount of shrimp loss associated with the three BRDs certified for use in the South Atlantic region is expected to be minimal.

The bycatch reduction achieved by BRDs could benefit shrimp fishermen by reducing the time required to cull unwanted species. Reducing culling time could improve the quality of the shrimp processed by decreasing the amount of time it takes to get shrimp into cold storage. The net economic effect of BRDs has not been quantified. But anecdotal information indicates that some fishermen favor using these devices because they increase net revenue per trawling operation (SAFMC 1996b).

<u>Changes in fishing practices and behavior of fishermen</u>

Some fishermen could perceive BRD and TED requirements as unnecessarily restrictive. However, there are few data available to adequately define how the requirements are perceived, and how these perceptions have changed fishing practices and behavior. A survey conducted by Kitner in 1987 to collect information on shrimp fishermen's response to TEDs found that reactions were more favorable among those who had experience with the devices. The fishermen's response to the BRD requirement in Shrimp Amendment 2 was similar. Those fishermen most familiar with BRDs appeared to be most accepting of the regulations. However, the Council received relatively few comments in opposition to the regulation overall. This could indicate that the industry was resigned to having to use the new technology. Also, it could indicate that shrimp fishermen understand the value of BRDs.

Bycatch mortality can reduce the availability of finfish to directed fisheries. Finfish taken in shrimp trawls are generally juveniles, and most of these fish would likely be subject to natural mortality before they become available to directed fisheries. However, bycatch mortality can adversely affect the status of stocks taken in directed fisheries by reducing the opportunity for bycatch species to mature and reproduce before they are subject to mortality. Because declining landings have precipitated the imposition of state and federal catch restrictions in some directed fisheries, participants in those fisheries likely perceive the BRD requirement as a regulation that promotes equity in the fisheries (Nance 1998).

Changes in research, administration and enforcement costs and management effectiveness

Research needed to understand the effectiveness of BRDs and TEDs is costly, as are administrative and enforcement efforts needed to implement and enforce these regulations. However, the implementation of these gear modification requirements has improved management effectiveness by decreasing turtle and finfish bycatch in the fishery.

Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources

The combined landings from U.S. shrimp fisheries in 2002 ranked highest in value of all domestic fisheries that year (NOAA Fisheries 2003b). The South Atlantic shrimp fishery generates the most revenue for the commercial harvesting sector in this region. During the last two years for which data are available (2001 and 2002), commercial shrimp landings in the South Atlantic generated an average of $63.56 million annually (Section 5.4.1.1 above).

The U.S. Congress recognized the need to balance the costs of bycatch reduction with the social and economic benefits provided by the shrimp fishery when it mandated the study of shrimp trawl bycatch (and potential gear modifications) through the 1990 reauthorization of the Magnuson-Stevens Act. The resulting cooperative bycatch research program was effective in identifying gear options that could reduce shrimp trawl bycatch with minimum loss of shrimp production.

While BRD and TED requirements certainly present direct costs to participants in the shrimp fishery, they could reduce overall costs by making operations more efficient. Additionally, studies of BRDs suggest that the use of these devices or similar techniques to reduce finfish capture would not negatively affect shrimp production in the long-term if finfish exhibit even moderate selectivity against shrimp as prey (Nance 1998).

Decreases in bycatch mortality attributed to these technologies are believed to have contributed to the survival and recovery of at least some sea turtle populations and finfish stocks. The societal benefits associated with recovering these species are not easily quantified, but are believed to outweigh any short-term costs to penaeid shrimp fishermen related to the required use of bycatch reduction technology.

Changes in the distribution of benefits and costs

Prior to the mandated use of bycatch reduction technology in the penaeid shrimp fishery, there was a general perception that benefits and costs were not equitably distributed between the shrimp trawl fisheries and directed finfish fisheries and between the shrimp trawl fisheries and the broader public. Commercial and recreational fishermen who target finfish taken incidental to the trawl fishery believe that shrimp fishermen should share the burden of regulations needed to sustain declining fish stocks (Nance 1998). And at least some members of the public view bycatch as unnecessary waste. Discarded finfish provide an ecological service in that they are consumed by other marine species.

However, the ecological role of discarded finfish would have been different had they been allowed to mature. The mandated use of BRDs and TEDs was intended to address these perceived inequities while maintaining a productive, high value shrimp fishery.

Social effects

There are few data available to adequately define the social effects of BRD and TED requirements. Penaeid shrimp fishermen could be experiencing negative effects related to the costs of installing and using the devices and to feeling overregulated. They also could be experiencing positive effects related to improved efficiency. The concerned public is likely experiencing social benefits related to knowing that the organisms they value for aesthetic and existence reasons are better protected. However, some members of the public could be of the opinion that the reductions in bycatch achieved through BRD and TED requirements are insufficient.

Conclusion

This section evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality in the South Atlantic penaeid shrimp fisheries based on the findings in above and using the ten factors provided at 50 CFR 600.350(d)(3)(i). In summary, technological devices mandated for use in the South Atlantic penaeid shrimp trawl fishery are estimated to reduce finfish bycatch by at least 30% and to reduce sea turtle bycatch by as much as 97%. More data are needed to improve the reliability of information on the current level of finfish bycatch, which generally continues to exceed the catch of shrimp. However, based on a review of the status of the five species of greatest concern in the South Atlantic (weakfish, king mackerel, Spanish mackerel, Atlantic croaker and spot), there is no evidence to indicate that the mortality of finfish caused by the shrimp trawl fleet (with TEDs implemented) is having a significant adverse affect on finfish stocks. Therefore, the Council concluded that current management measures minimize bycatch and bycatch mortality to the extent practicable in the penaeid shrimp fishery.

5.2.2 Deepwater Shrimp

5.2.2.1 Description of fishing practices, vessels and gear

Given the distance from shore, depth of water, and gear necessary to harvest rock shrimp, there is no recreational fishery. The rock shrimp commercial fishery has existed off the east coast of Florida for approximately thirty years once extending from Jacksonville to Cape Canaveral. The relatively recent beginning for this shrimp fishery, compared to other southeast shrimp fisheries can be attributed to the lack of a viable market for the crustacean once considered “trash.” Rock shrimp found a niche in the local fresh market and restaurant trade during the early 1970s, and became a regional delicacy. The increase in participants and market opportunities for smaller rock shrimp brought about a subsequent change in harvesting patterns as the fishing grounds extended south as far as St. Lucie County (SAFMC 1996a). Limited sporadic harvest has also occurred off Georgia, North Carolina and South Carolina. A limited access program was established in 2003 for vessels harvesting, in possession of and landing rock shrimp in Georgia and Florida. Expanding markets created growth within the industry that in turn has changed the composition of the rock shrimp fishery including the harvesting and the intermediate sectors (SAFMC 1996a).

In the south Atlantic region commercial trawlers is essentially the only user group exploiting the rock shrimp resource, commercial trawlers. Rock shrimp (*Sicyonia brevirostris*) harvested by commercial vessels is the only one of six species of *Sicyonia* reported for the south Atlantic coast that attains a commercial size (Keiser 1976). When the rock shrimp industry began, few vessels participated on a full-time basis with some vessels making a few trips a year when the white and brown shrimping ended, or as a bycatch of the penaeid shrimp fishery (Dennis 1992). During the period 1986 to 1994 there was an increase in effort in terms of the number of vessels participating (SAFMC 1996a).

Rock shrimp have been harvested along Florida's east coast from Cape Canaveral to as far north as Jacksonville. At one time, this fishery extended into south Georgia (statements at Public hearings for Shrimp Amendment 5). The increase in participants and market opportunities for smaller rock shrimp brought about a subsequent change in harvesting patterns as vessels began fishing as far south as St. Lucie County. This shift in effort to the south reflected new participation in the fishery as the majority of those harvesting these new areas were from the Gulf region. A control date for this fishery of April 4, 1994 was set to put the industry on notice that the Council could at some future date develop a limited access program for this fishery (SAFMC 1996a).

Amendment 1 to the Shrimp Plan established a requirement for vessel permits and dealer permits, and prohibited trawling for rock shrimp in an area off of Florida. These measures were published in the Federal Register on September 9, 1996.

<u>Season</u>
The peak rock shrimping season generally occurs from July through October (SAFMC 2002). Historically, the fishery did not begin until August or September (SAFMC 1996a). To a degree, the amount and timing of effort in the rock shrimp fishery are dependent on the success of the white and brown shrimp fisheries.

The following tables were developed to analyze the impacts from a seasonal closure in the rock shrimp fishery. Seasonal groupings are based on the classification used for the rock shrimp observer coverage data presented in Section 5.2.1. Data on rock shrimp harvest, ex-vessel value and number of trips are presented by season because monthly summaries could reveal confidential data (Tables 5.2.2-1, 5.2.2-2, 5.2.2-3). It appears that the highest level of landings have consistently been taken in the summer and fall seasons (Table 5.2.2-1).

Table 5.2.2-1. Harvest of rock shrimp from the South Atlantic by season (pounds).

Season	1997	1998	1999	2000	2001	2002
Winter	538,033	648,231	744,427	398,138	215,870	213,639
Spring	190,616	67,460	147,043	231,200	83,389	38,092
Summer	1,567,890	714,117	1,517,117	4,690,493	2,471,910	315,488

Fall	1,233,766	2,530,752	1,856,609	2,860,293	3,324,485	267,743
Total	3,530,305	3,960,560	4,265,196	8,180,124	6,095,654	834,962

Table 5.2.2-2. Ex-vessel value of rock shrimp harvested from the South Atlantic by season.

Season	1997	1998	1999	2000	2001	2002
Winter	$536,562	$951,900	$1,211,563	$724,751	$327,079	$346,617
Spring	$187,484	$126,016	$248,992	$453,813	$152,723	$58,908
Summer	$1,481,597	$859,996	$2,695,208	$7,432,017	$3,470,167	$535,792
Fall	$1,411,563	$3,398,933	$3,563,560	$3,535,647	$3,908,484	$551,370
Total	$3,617,206	$5,336,844	$7,719,324	$12,146,227	$7,858,454	$1,492,686

Table 5.2.2-3. Number of trips on which rock shrimp were caught by season.

Season	1997	1998	1999	2000	2001	2002
Winter	156	193	266	158	89	123
Spring	137	93	192	140	66	64
Summer	159	132	166	324	164	112
Fall	123	223	254	160	205	99
Total	575	641	878	782	524	398

Harvest Area Information

During development of Shrimp Amendment 1, the Rock Shrimp Producers Association submitted information to the Council indicating that the harvest area extended between just north of New Smyrna Beach to Stuart between 36.6 m (120 ft) and 47.5 m (156 feet) and between 61 m (200 ft) and 73 m (240 feet) (SAFMC, 1996a). The fishable grounds are hard sand to shell hash bottoms, which run north and south with a width as narrow as one mile. There was an effort shift to the south of Cape Canaveral which exposed the known concentrations of *Oculina* coral and the *Oculina* Bank HAPC to bottom trawls. Trawling was prohibited in the HAPC (a 4 x 23 nm strip bounded by latitude 27°30' N. and 27°53' N. and longitude 79°56' W. and 80°00' W.) in 1982 as one of the measures under the Coral Fishery Management Plan (GMFMC and SAFMC 1982). In addition, Amendment 1 to the Snapper Grouper Fishery Management Plan prohibited the retention of snapper grouper species caught by roller rig trawls and their use on live/hard bottom habitat north of 28° 35' N. latitude (SAFMC 1988). Furthermore Amendment 1 to the Shrimp Plan (SAFMC, 1996a) prohibited trawling in the area east of 80° 00' W. longitude between 27° 30' N. latitude and 28° 30' N. latitude shoreward of the 183 m (600 ft) contour.

In recent years, fishing activity has been concentrated off the Atlantic coast of Florida and particularly near Cape Canaveral (Sea Grant Louisiana 2006; SAFMC 1999). Some sources describe the coast between Jacksonville and St. Lucie Inlet as being of particular importance (Hill 2005b in Oceana, 2007)

Trawl Vessels

There are two types of vessels in the rock shrimp fishery: ice or fresh boats and freezer boats. Most new rock shrimp trawlers are 75-80 feet in length and are rigged to tow two to four nets simultaneously. The double-rigged shrimp trawler has two outrigger booms from whose ends the cable from the winch drum is run through a block to the two nets (Figure 5.2.2-1). Testimony at Amendment 1 hearings indicated that a standard freezer trawler was around 73 feet and would pull four forty-foot nets.

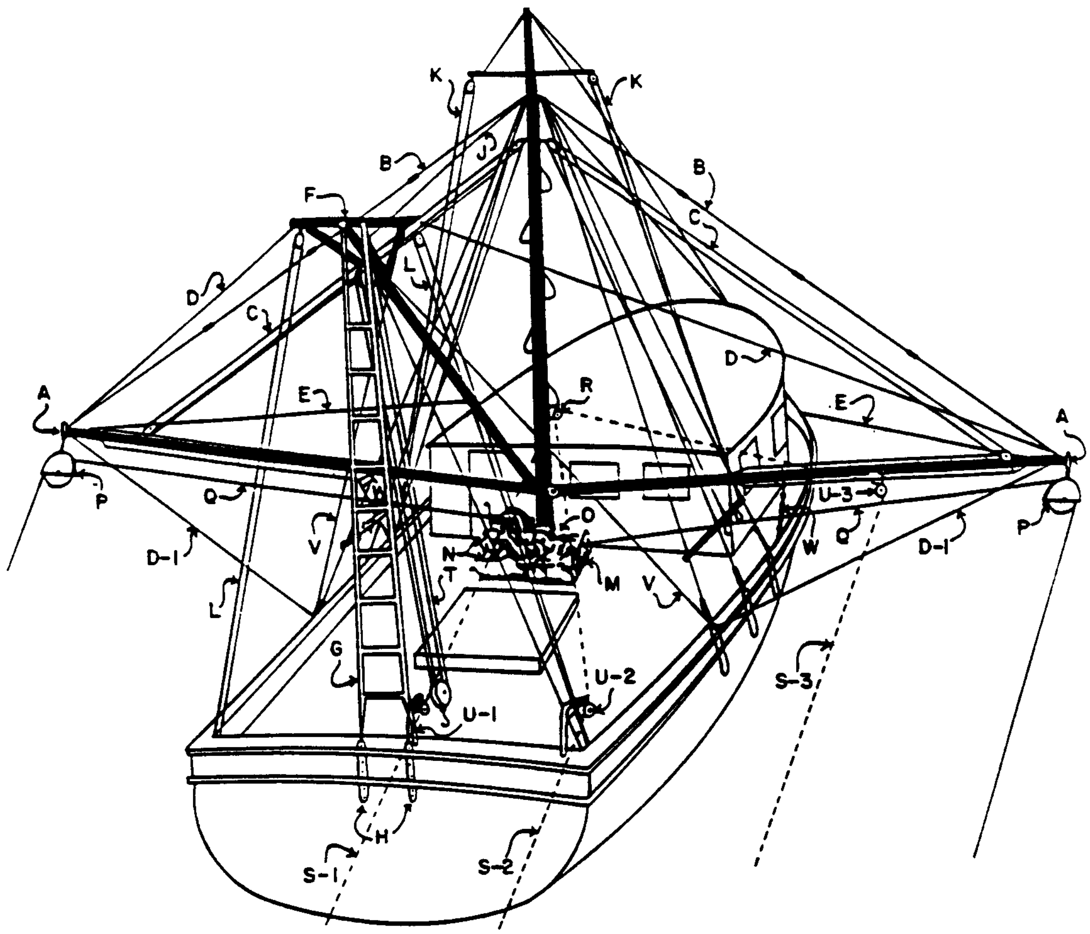


Figure 5.2.2-1. Rigged shrimp vessel similar to ones used in the rock shrimp fishery (SAFMC 1993). A- Towing boom or outrigger; B- towing boom topping stay; C- topping lift tackles; D- or D-1-towing boom outrigger back stay; E- towing boom outrigger bow stay; F- modified boom; G- boom back stays- ratline structure; H- boom back stay plate on transom; J- boom topping lift stay; K- single block tackle; L- single block tackle; M- trawl winch; N- heads, two on trawl winch; O- center drum for trynet warp; R- leading block for try net; S-1, S-2, S-3- trynet lead block; T- main fish tackle tail block; U-1, U-2, U-3- trynet lead block; any one may be used to accord with selection of S-1, S-2, or S-3; V- boom shrouds; W- chain stoppers for outriggers.

Essentially the only gear used in the rock shrimp fishery is the trawl which consists of: (1) a cone-shaped bag in which the shrimp are gathered into the tail or cod end; (2) wings on each side of the net for herding shrimp into the bag; (3) trawl doors at the extreme end of each wing for holding the wings apart and holding the mouth of the net open; and (4) two lines attached to the trawl doors and fastened to the vessel. A ground line extends from door to door on the bottom of the wings and mouth of the net while a float line is similarly extended at the top of the wings and mouth of the net. A flat net is more often used when fishing for rock shrimp since they burrow into the bottom to escape the trawl. This net has a wider horizontal spread than other designs and is believed more effective (SAFMC 1996a).

Some vessels use twin trawls, which are essentially two trawls on a single set of doors, joined together at the head and foot ropes to a neutral door connected to a third bridle leg. Thus, instead of towing two seventy-foot nets the vessel tows four forty-foot nets. This rig has some advantages in ease of handling and increased efficiency. At the time Amendment 1 was developed industry advisors indicated that the cod end mesh size commonly used in the industry was between 1 7/8 and 2 inches stretched mesh measured on the diagonal (SAFMC 1996a).

The tow length varies depending on many factors including the concentration of shrimp. Large boats fishing offshore waters make much longer drags lasting several hours. Testimony at public hearings for Shrimp Amendment 1 indicated that vessels may drag up to 30 to 35 miles over a number of tows in one night fishing for rock shrimp (SAFMC 1996a).

Fleet Characteristics
From the 1994 poll conducted during development of Shrimp Amendment 1, the majority of vessels were from south Atlantic states primarily Florida Table 5.2.2-4. However, 40% of the vessels included in this profile reported they were from Gulf States. There was no information provided by vessels from North Carolina in this 1994 report.

Information for the rock shrimp industry indicated that in the past the majority of boats in the rock shrimp fishery were wooden ice boats. Almost half of the harvesters providing information for the 1994 report had steel hulled vessels and 84% were freezer boats. There were only seven ice boats (Table 5.2.2-4). Of the vessels included in the 1994 report, over 75% were at least ten years old; over half were 15 years or older (Table 5.2.2-4)

Table 5.2.2-4. Fleet Characteristics for a Comparative Subsample of the 1994 Rock Shrimp Fishery (SAFMC, 1996a).

Variable	Frequency	Percent	N
State which vessel was registered			n=43
Florida	19	44%	
Alabama	14	33%	
South Carolina	3	7%	
Georgia	4	9%	
Texas	3	7%	
Vessel construction type			n=43
Steel	21	49%	

Wood	13	30%	
Fiberglass	9	21%	
Type of vessel			n=43
Freezer	36	84%	
Ice	7	16%	
Year vessel built			n=43
1975 & before	8	19%	
1976 - 1980	22	51%	
1981- 1985	7	16%	
1986 - 1990	1	2%	
1991 -1994	5	12%	

During 1994, harvesters from the south Atlantic on average were older and had been rock shrimping much longer than harvesters from the Gulf States (Table 5.2.2-5). Harvesters from both regions had long tenures as fishermen with each average close to the overall mean of twenty-five years. Gulf vessels tended to be longer, had more crew, and pulled larger nets on average. Moreover, these vessels made fewer and longer trips than those from the south Atlantic. Average catch was higher for Gulf vessels, as was the dollar amount needed to break even per/day while fishing (Table 5.2.2-5; SAFMC 1996a).

Table 5.2.2-5. A Comparative Subsample of Rock Shrimp Harvester Characteristics by Region (Ice Boats and Freezer Boats Combined) (SAFMC, 1996a).

Variable	Average for Gulf Region	n	Average for South Atlantic Region	n	Average Combined Gulf/SA*	n
Age	43	14	47	26	46	40
Years as a fisherman	24	14	26	26	25	40
Years as a rock shrimper	5	14	15	26	11	40
Boat Length (ft)	81	17	75	26	78	43
Number of crew (ft)	5	17	3	26	4	43
Size nets (ft)	55	17	45	26	50	43
Net mesh size (in)	1 7/8	17	1 7/8	26	1 7/8	43
Bag mesh size (in)(mode)	1 3/4	17	1 3/4	24	1 3/4	41
Trip length (days)	21	16	14	22	17	38
Number of trips	5	16	9	21	7	37
Amount to break even/day	$1050/day	7	$922/day	13	$967/day	20
Average catch (lb)	46,633	14	20,892	20	31,491	34
Exvessel Price	$1.20	14	$1.22	17	$1.21	31

* Combined Gulf/SA is the total for both regions divided by the number for both regions.

Data on fleet characteristics were summarized from the NMFS Southeast permits database (Table 5.2.2-6). These data represent information on all vessels with rock shrimp permits, which can amount to over 400 in any complete year (Table 5.2.2-7). These trends may not be representative of active vessels in this fishery since, at most, 153 vessels harvested rock shrimp annually from 1996 through 2000 (Table 5.2.2-6). South Atlantic rock shrimp permits were purchased by vessels from a wide geographic range spanning Massachusetts to Texas; however, most permitted vessels are located in Florida and Alabama. The number of permits issued to vessels in Louisiana appears to be on a declining trend (Table 5.2.2-6).

Table 5.2.2-6. Rock Shrimp Permitted Vessels by Home Port State. Source: NMFS Permits Office.

Year	AL	FL	GA	LA	MA	MS	NC	NH	NJ	NY	RI	SC	TX	VA	Total
1996	37	101	11	16		4	15		3	1		12	4	16	220
1997	85	180	15	28	2	5	26	1	7	3	1	15	18	22	408
1998	85	201	14	24	3	3	38		7	3	1	11	17	24	431
1999	87	199	17	13	5	2	33		8	2		11	16	22	415
2000	95	187	18	10	2	2	31		7	1	2	13	14	19	401

Since 1996 the length composition of the permitted rock shrimp fleet appears to be fairly stable with about 70% of all vessels in the 60 to 79 foot range (Table 5.2.2-7, Table 5.2.2-8). As stated previously these data may not reflect the actual size distribution of the active fleet.

Table 5.2.2-7. Number of Rock Shrimp Permitted Vessels in each Length Category. Source: NMFS Permits Office.

Category	1996	1997	1998	1999	2000
Less than 30 ft	2	5	9	18	13
30-39 ft	1	12	23	24	20
40-49 ft	6	9	15	16	16
50-59 ft	9	17	17	15	15
60-69 ft	87	150	144	132	129
70-79 ft	93	170	178	163	155
80-89 ft	19	40	40	42	45
90 – 137 ft	3	5	5	5	8
Grand Total	220	408	431	415	401

*The data on overall length was provided to the Permits Office from information contained in the Coast Guard's Certificate of Documentation (Pers. Comm. Janet Miller, NMFS Permits Office). The Coast Guard requires information on overall vessel length not keel length and vessels owners have to provide either a builders certificate or a manufacturer's letter with this information.

Table 5.2.2-8. Proportion of Rock Shrimp Permitted Vessels in each Length Category.

Category	1996	1997	1998	1999	2000
Less than 30 ft	0.9%	1.2%	2.1%	4.3%	3.2%
30-39 ft	0.5%	2.9%	5.3%	5.8%	5.0%

40-49 ft	2.7%	2.2%	3.5%	3.9%	4.0%
50-59 ft	4.1%	4.2%	3.9%	3.6%	3.7%
60-69 ft	39.5%	36.8%	33.4%	31.8%	32.2%
70-79 ft	42.3%	41.7%	41.3%	39.3%	38.7%
80-89 ft	8.6%	9.8%	9.3%	10.1%	11.2%
90 - 137 ft	1.4%	1.2%	1.2%	1.2%	2.0%

Table 5.2.2-9. Rock Shrimp Permitted Vessels in each Horsepower Category.

Horse Power Category	1996	1997	1998	1999	2000
100-399	4%	7%	7%	8%	6%
400-499	44%	42%	40%	40%	38%
500-599	22%	21%	21%	21%	22%
600-699	15%	17%	17%	16%	16%
700-799	7%	8%	8%	9%	8%
Greater than 800	8%	8%	7%	8%	9%

Engine horsepower of the majority of permitted vessels ranges anywhere from 400 to 700 (Table 5.2.2-9). Also, the proportion of permitted vessels in each horsepower category did not change substantially during the period 1996 to the end of 2000 (Table 5.2.2-9).

Table 5.2.2-10. Proportion of Active Rock Shrimp Vessels in each Length Category.

Category	1996	1997	1998	1999	2000
Less than 60 ft	4.4%	3.2%	4.1%	3.1%	2.7%
60-69 ft	38.1%	41.5%	42.5%	34.4%	31.5%
70-79 ft	47.8%	42.6%	41.1%	43.0%	43.2%
More than 80 ft	9.7%	12.7%	10.9%	19.5%	22.5%
Vessels not in permits file*	19	14	3	7	9

*These vessels reported landings on the states' trip tickets, however, the Vessel ID numbers were not in the rock shrimp permits database. A total of 47 vessels could not be located in the rock shrimp permits database. Length data for most of these vessels was obtained from the Coast Guard vessel documentation database.

Table 5.2.2-11. Proportion of Active Rock Shrimp Vessels in each Horsepower Category.

Category	1996	1997	1998	1999	2000
0-400 HP	50.8%	54.0%	55.7%	40.5%	38.3%
401-500 HP	21.1%	22.5%	17.1%	22.3%	18.7%
501-600 HP	15.6%	9.0%	14.3%	17.4%	18.7%
601-700 HP	7.0%	9.0%	8.6%	11.6%	14.0%
More than 700 HP	5.6%	5.5%	4.2%	8.2%	10.2%

Most of the active vessels are above 60 feet in length and during the period 1996 to 2000 there was an increase in the size composition of active vessels in the fleet (Table 5.2.2-7). In 1996 around 10% of vessels in the fishery were larger than 80 ft, and by 2000 this proportion increased to 22.5% (Table 5.2.2-8). This trend was also reflected in engine horse power (Table 5.2.2-11). From 1996 through to the end of 2000 there was a decline in the proportion of vessels with engine horse power less than 500, and a concurrent increase in the proportion of vessels in horse power categories greater than 500 (Table 5.2.2-11).

Allowable gear

The minimum mesh size for the cod end of a rock shrimp trawl net in the South Atlantic EEZ off Georgia and Florida is 1-7/8 inches (4.8 cm), stretched mesh. This minimum mesh size is required in at least the last 40 meshes forward of the cod end drawstring (tie off strings), and smaller mesh bag liners are not allowed. A vessel that has a trawl net on board that does not meet these requirements may not possess a rock shrimp in or from the South Atlantic EEZ off Georgia and Florida.

As of January 12, 2007, on a vessel that fishes for or possesses rock shrimp in the South Atlantic EEZ, each trawl net or try net that is rigged for fishing must have a certified BRD installed.

TEDs are required in the rock shrimp fishery.

5.2.2.2 Economic description of the fishery

Vessels harvesting rock shrimp in the South Atlantic Council's area of jurisdiction land most of the product in the states of Florida, Alabama and Georgia. Small quantities are landed in South Carolina and North Carolina. The majority of the landings come from the east coast of Florida. In the subsequent tables rock shrimp landings data are aggregated for all states so as not to reveal confidential information.

During the period 1984 to 1996 landings of rock shrimp increased substantially (SAFMC 1996a). The ex-vessel value of rock shrimp peaked in 1996 at $15.37 million coinciding with the highest level of recorded landings for this fishery (SAFMC 2002). Much of this increase was attributed to increased effort within the fishery. However, there does seem to be a cyclical pattern to the abundance of rock shrimp that is driven primarily by environmental factors.

Rock shrimp landings dropped from the record high level in 1996 of 21.3 million pounds to 3.53 million pounds in 1997. Since 1997 landings and ex-vessel revenue were on an increasing trend peaking at 8.18 million pounds and $12.15 million in 2000 (Table 5.2.2-12).

Table 5.2.2-12. Rock shrimp harvested in the South Atlantic: annual landings, ex-vessel revenue and effort.

Item	1997	1998	1999	2000	2001	2002
Landings (lb.)	3,530,305	3,960,560	4,265,196	8,180,124	6,095,654	834,962

Ex-vessel value	$3,617,206	$5,336,844	$7,719,324	$12,146,227	$7,858,454	$1,492,686
Real ex-vessel revenue in $2002*	$4,055,164	$5,890,556	$8,336,203	$12,691,982	$7,986,234	$1,492,686
Price/lb.	$1.02	$1.35	$1.81	$1.48	$1.29	$1.79
Real price/lb. in $2002*	$1.14	$1.49	$1.95	$1.55	$1.31	$1.79
Trips**	575	641	878	782	524	395
Number of vessels	180	195	261	182	159	148
Total fishing income for these vessels***				$43,876,424	$38,137,950	$28,490,368
Real fishing income for these vessels in $2002*				$45,847,882	$38,758,081	$28,490,368
Rock shrimp trips where penaeid shrimp comprised less than 1% of the catch	44	103	62	128	98	14
Number of dealers****	41	27	29	29	32	30
Landings not associated with a vessel	157,673	47,912	125,256	243,065	53,956	15,411

Landings information from the Gulf of Mexico and other (unknown) states are included in this table.
* The CPI was used to adjust these values for inflation.
**Rock shrimp may not be the primary target on all of these trips. Typically shrimpers target penaeid shrimp and rock shrimp on the same trip.
***Includes vessel income from rock shrimp harvest and harvest of other species in the South Atlantic and Gulf of Mexico. Typically vessels in the South Atlantic rock shrimp fishery operate in the penaeid shrimp fishery in the South Atlantic and Gulf of Mexico.
****Data on dealers only compiled for the Gulf of Mexico for 2000, 2001 and 2002.

The proportion of rock shrimp landings to total shrimp landings for the east coast of Florida was greater than 40% during 2000 and 2001. The actual percentage cannot be reported as it would then be possible to calculate the level of rock shrimp landings in the other states. These are confidential data because there were less than 3 dealers or vessels reporting rock shrimp landings in these states.

There was a substantial decrease in rock shrimp landings and corresponding ex-vessel value in 2002. Landings declined from 6.1 million pounds in 2001 to 0.83 million pounds in 2002 (Table 5.2.2-12). Rock shrimp fishermen reported that 2002 was an unusually poor year for rock shrimp catches on the Atlantic coast of Florida and even though harvest levels increased in 2003 catches were still below "normal" levels. Preliminary data for 2003 from the ACCSP web site revealed that 1.59 million pounds of rock shrimp were harvested from the east coast of Florida in 2003 (note that information for 2003 is not complete and this figure does not represent total landings for the entire year). There were no explanations for the atypical catches in 2002. These markedly low catch levels could be linked to unusual environmental conditions.

During 1997 to 2002, participation in the rock shrimp fishery increased until 1999. During that year 261 vessels participated in this fishery. Thereafter, there was a decline in number of vessels landing rock shrimp to a low of 148 in 2002. A limited access program was approved for this fishery in July 2002. Analyses included in Amendment 5 indicated that approximately 168 vessels would qualify for the South Atlantic Limited Access Rock Shrimp Permit. After implementation and appeals, limited access rock shrimp endorsements were issued to 155 vessels. Additional endorsements will be issued to other qualifying fishermen once they provide documentation of vessel ownership.

Vessels in the rock shrimp fishery also participate in the penaeid shrimp fishery and other fisheries in the South Atlantic and Gulf of Mexico. In fact, on many trips where rock shrimp are caught it is typical for penaeid shrimp species to be targeted. The total number of trips in which rock shrimp were caught has decreased since 1999 (Table 5.2.2-12). Additional information would be required to determine the primary target of these trips and to correctly interpret observed trends in effort.

Legally, rock shrimp caught in the South Atlantic can only be sold to permitted rock shrimp dealers. The number of dealers issued permits annually varied between 65 and 83 during 1997 to 2000 (SAFMC 2002). However, since 1997 no more than 32 dealers were active in this fishery each year. These rock shrimp dealers also hold permits in other fisheries such as snapper/grouper (SAFMC 2002).

The statistics on this fishery presented in Table 5.2.2-12 are different from similar data on the rock shrimp industry reported in Amendment 5 to the South Atlantic Shrimp Fishery Management Plan (SAFMC 2002). In 2002, the Florida trip ticket database was updated with information from rock shrimp fishermen who submitted a number of apparently unreported trip tickets or trip ticket data not in Florida's database. This exercise corrected Florida's rock shrimp catch and effort data for several years and explains the higher rock shrimp landings and ex-vessel value in Table 5.2.2-12 compared to similar data in Table 9 of Amendment 5 (SAFMC 2002).

5.2.2.3 Social and cultural environment

In 1994, as shown in Table 5.2.2-13, of those harvesters indicating marital status all but three were married and all but three had children. Well over half were high school graduates, and 19% had continued their education beyond high school. Of those harvesters included in this report, thirty (73%) were captain owners, ten were captains, and one was a crew member.

As the public hearing document produced no useable data, the socio-demographic data from 1994 is the most recent and representative information available (Table 5.2.2-13). In hopes of supplementing that information, a number of informal telephone conversations were carried out with those that currently hold south Atlantic rock shrimp permits. There were 333 vessel permits, but most likely quite a few less actual boat owners, as there were as many as 23 boats in one instance counted registered to one company.

Table 5.2.2-13. Demographic Characteristics of a Comparative Subsample of Rock Shrimp Harvesters for 1994. Source: Data Provided at Public Hearings for Shrimp Amendment 1 (SAFMC, 1996a).

Variable	Frequency	Percent	N
Marital Status			n=40
Married	37	93%	
Not married	3	7%	
Dependents			n=40
Has children	37	93%	
Does not have children	3	7%	
Education			n=40
Grade School	2	5%	
Some high school	9	23%	
High school graduate	21	53%	
Vocational/tech school graduate	1	2%	
Some college	6	15%	
College graduate and more	1	2%	
Status			n=41
Captain/owner	30	73%	
Captain	10	24%	
Crew	1	2%	

The conversations with approximately 25 rock shrimp permit holders pointed to four distinct types within the larger group (see Permit Holders – Typology below). First, there were those permit-holders (Type 1) that held a permit because they believed that it might be of some future use to them or their children. Their boats were not outfitted for shrimping/trawling, and they lived and ported their vessel great distances from the rock shrimp grounds. They expressed little expectation of ever using the permit. They knew only a minimal amount about the proposed management plan, and were not surprised to learn that they would most likely lose their eligibility to hold the permit in the future. For example, one permit holder explained he had sold the boat already once, but in the course of payment the new owner was incarcerated and so the boat was returned to him. He had refit it and was now selling it to another fisherman. The permit holder did not express any feelings about losing the permit, as he did not intend to use it.

The second “natural history” category (a “natural history” category being formed from the deductive method as opposed to inductive methods) of permit holders (Type 2) were those that were current participants in the penaeid shrimp fishery and had shrimped for rock shrimp in the past twenty or so years, but either had not landed a sufficient amount of rock shrimp or did not have landings in the qualifying years to be eligible for a limited entry permit. This group contains some of the historical participants (that is, those that have begun fishing for rock shrimp in the years previous to the qualifying years) in the rock shrimp fishery. For example, one woman explained that her husband has been shrimping for 30 years and has rock shrimped off and on when “he has had to.” She explained that he preferred not to rock shrimp because it required going farther offshore, required extra crew, and one had to catch more rock shrimp than other types to make any profit. This year her husband has gone to the Gulf of Mexico because the catches are so far depressed in the Atlantic in 2001. She claimed that they could document landings before the qualifying years as she had saved receipts from earlier sales. She cleans houses for extra income for the household.

The third group (Type 3), roughly identified would be eligible for a limited entry permit, but based on recent entry into the fishery (during the period 1996-2000), and having sufficient landings. In some cases, these might be participants that are fairly young (20 years of age approximately) and who are interested in carrying on a family tradition of shrimping. Some in this group are older but are just recently able to afford to own a boat on their own.

The fourth and final group (Type 4) in this typology is composed of both older and younger fishermen and women. The have historical participation in the fishery, they have fished in the fishery in recent years, they have sufficient landings and they will be eligible for a permit. They expressed concern for those that will be excluded from the fishery, but also claim that they are pleased that the fishery will be managed, in their perception, more efficiently and fairly.

No dealers or processors of rock shrimp were interviewed, although a dealer/processor survey should be incorporated into future fishery management plans.

Table 5.2.2-14. PERMIT HOLDERS – TYPOLOGY

	Ever Rock Shrimped?	Historical Participation?	Landings >15K	Eligible for Limited Entry?
TYPE 1	No	No	No	No
TYPE 2	Yes	Yes	No	No
TYPE 3	Yes	No	Yes	Yes
TYPE 4	Yes	Yes	Yes	Yes

Conversations also revealed a number of perceived negative social impacts should the limited entry program be implemented. The impact most often discussed was what might be referred to as a loss of opportunity to balance their fishing business. While permit holders may not have been active in harvesting rock shrimp since 1996, they held the permit as “insurance.” Some fishermen saw rock shrimp as part of an “annual round” of fishing, where they usually fish for white shrimp in the spring, "brownies" in the summer, and rock shrimp and pink shrimp in the fall. It was explained that the inactive permit-holders most often participated in other shrimp fisheries, but when "times got really bad" they felt that they could fall back on rock shrimp fishing. This type of fall-back would allow them to meet minimal fishing and household necessities, such as making a boat or house banknote payment.

The 1999 SAFMC SAFE Report for the Shrimp Fishery of the South Atlantic (SAFMC 1999) notes that fisherman migration is an additional adaptation to the seasonal nature of the shrimp fishery. Rather than switch over to other fisheries available to them locally, some shrimpers choose to temporarily migrate to other states or regions with greater abundance of shrimp. At times, especially for larger vessels, these migrations last for extended periods of time and take them far up the Atlantic coast or far south to the Gulf of Mexico (Johnson and Orbach, 1990). Smaller vessels migrate as well, though their search for shrimp frequently takes them only to states adjacent to their home states. This migration of boats needs to be accounted for because the rock shrimp fishery draws boats from the Gulf when fishing is good in the Atlantic and from the Atlantic to the Gulf when catches are better there.

The practice of keeping one's opportunities open is a common business strategy, and not only in fisheries. It is not "speculation" per say, as speculation is most often defined in a somewhat negative manner, as assuming a risk in hopes of a gain, or buying something in the hopes of selling it at a high profit. While some of this behavior is present among some permit-holders, it is not widespread. There would need to be a large and sustained disaster in many other fisheries for rock shrimp to attract all permit holders to fish for rock shrimp; conversely, there would need to be a large and a sustained success in the rock shrimp industry (high prices, high catches) for the same event to occur.

Community Profiles

Because of the lack of in-depth social or ethnographic data for this fishery, various problems arise when trying to determine impacts from the proposed actions in this amendment. Chief among these problems is the difficulty in determining the geographic area or community where the impacts may be felt. One approach would be to analyze which vessels would be eligible for continuing participation in the limited entry rock shrimp fishery, and then determine where –in which ports - the majority of their landings have occurred. Where those landings occur – the communities – could then be analyzed for potential social impacts. The number and location of landings for vessels that were active but will not qualify for the limited entry program could then be compared to vessels that will qualify and have landings in the same area. If those communities or geographic regions are the same, the gains in landings for some vessels might cancel the losses for others. However, this type of analysis leaves out consideration of impacts that might occur in the vessel owner's community of residence, such as a loss of income to the vessel generating a need for other household members to seek employment in order to meet household needs that were previously met by rock shrimp catches, however sporadic those catches may have been.

There are problems with the data for conducting this type of analysis: there are missing vessel identification numbers and mismatches in the datasets that cannot be resolved. Of the vessels that will qualify (N=168), 42, or 25% could not be found in the landings dataset that covered the years 1998 – 2000. This is most likely due to the fact that the missing vessels had qualifying landings in the years previous to 1998.

There are problems of classification also, as with the problem of determining what the term "homeport" or hailing port means. Does this location portray where the vessel actually spends most of it's time when not fishing (in between regular trips), or spends time when not fishing during the season, or at some other time? A listed homeport may not be where the vessel is usually kept, or where the vessel usually unloads its catch. Because of the difficulty in assessing the meaning of "homeport," in spite of the fact that with better data it could be an important variable in the determination of impacts, it will not be used as a variable in the following analysis.

Trying to determine impacts on the community listed for the vessel's owner does not alleviate the problem either; the vessel owner may not live in a fishing community per say; in the south Atlantic traditional fishing community social organization and settlement patterns have been drastically changed since the 1960s when tremendous population shifts to the coasts have occurred (Florida's coastal population alone nearly doubled from 1960 to 1980; US Census Bureau, 1995). Residential patterns for commercial fishermen tend less to cluster together in the present than they may have in the past. Nor are residential patterns for the vessel's crew known. It is not now possible to measure the effects the management measures will have on the crew (and their families, etc.) of the vessel when there is essentially no specific data on crew socio-demographics. Again, this is problematic when one cannot tell if the crew lives on the vessel, in the immediate vicinity of the vessel, or if they live elsewhere.

It is nearly impossible due to data limitations to determine with certainty what the level of impacts on these geographically dispersed cities and communities might be. People in communities ranging from Virginia to Texas and Washington state held rock shrimp permits. However, the majority of these permits were latent – they had never been used and thus one could predict that the loss of that permit will not generate a significant impact to that entity.

The size of the communities is also problematic for the analysis. In a city the size of Miami, the loss of one permit to one vessel would generate a miniscule community impact. However, in the smaller communities that still depend a great deal on fishing for both economic and cultural welfare, the impact from one or two vessels keeping or losing permits/income could indeed be greater. Even within large cities that little resemble what might be called traditional fishing communities, there are sub-communities of fishermen, rather like neighborhoods, that may feel the impacts of regulatory measures even though the larger city structure may obscure or even cushion the importance of those impacts.

It is not possible to carry out complete community profiles of all the potentially impacted communities in the south Atlantic. There is no data to accomplish this task at this time;

however, future research is planned so that such analyses will be possible. The following description addresses only the three regions of Florida predicted to experience the most impacts – positive and negative – from the proposed measures in this amendment.

The descriptions of the following geographic regions, counties, or communities are partial, reflecting the current lack of community data in the south Atlantic.

Duval County: Jacksonville, Jacksonville Beach, Atlantic Beach, and Mayport
Duval County itself continues to grow at a relatively fast rate. Its 1990 population was 672,971, but increased to 778,879 in 2000, an increase of 15.7%. The ethnic composition of this northeastern Florida coastal county is mostly white, with almost 66% of Duval county self-identifying as white, 28.5% as African American, and four % as Hispanic/Latino in the 2000 Census. The county's per capita median income in 1990 was $28,513. The owner-occupied housing rate was 63% and 37% for rentals.

Atlantic Beach, one of the residential communities in Duval County, and blended into Jacksonville, had a 2000 total population of 13,368. The median age of the city's residents is 39.3 years. Eighty-two percent of the population is self-identifies as white, 12.7% as African American and 4.2% as Hispanic/Latino. The median age of the population is 39.3 years. Housing is divided between 61.1% owner-occupied units, and 33.9% rental units. The city was incorporated in 1925.

The community of Jacksonville Beach is located close to Atlantic Beach, and has a 2000 population of 20.990. The population self-identifies as 90.9% white, 4.8% African American, and 3.0% Hispanic/Latino. The median age of the population is 38.4 years. Owner-occupied housing units make up 59.7% of the units, and the remaining 40.3% are rentals.

Mayport Village is not considered an official city in Census Bureau records, as it was incorporated into the Jacksonville/Duval county government in 1967. However it is a well-known port, and traces its European beginnings to 1564 and the settlement by the French Huguenots. Later the Spanish exerted their influence, and then in the mid-1800s the Village attracted Southern European and Minorcan immigrants because of its reputation as a fishing village. Mayport Village houses both NOAA field offices and the Mayport Naval Station. There is a dock there that serves the car ferry that crosses the Saint John's River. It is also home to various commercial (Table 5.2.2-15) and recreational fishing interests. According to the Waterfronts Florida Community Website (www.dca.state.fl.us/ffcm/FCMP/waterfronts/community/mayport.htm), the village is on the verge of revitalization.

Table 5.2.2-15. Commercial Landings from Mayport, Florida. Source: NMFS.

Year	Millions of Pounds	Millions of Dollars
2000	4.5	9.9
1999	3.9	7.7
1998	3.5	7.3

1997	3.9	6.1
1995	4.3	8.0
1994	6.4	13.5
1993	4.8	6.2

Brevard County: Port Canaveral/Cape Canaveral, and Cocoa/Cocoa Beach

The community of Port Canaveral and Cape Canaveral, including Cocoa Beach and the city of Cocoa, exhibit a great volume of landings of rock shrimp in the south Atlantic. Historically, the coastal communities of central Florida developed in the late 1800s along with Henry Flagler's railway line. They were small rural entities whose economies revolved around the growing, packing and shipping of pineapples (and later citrus), cattle ranching and commercial fishing. Major pulses of growth came with both World Wars, and then later with the coming of NASA activities, which spurred development in the late 1950s and early 1960s. Commercial fishing remained an important component of these communities' livelihoods, and only in the past 20-30 years has it diminished significantly. However, in its place has come a great increase the number of private recreational fishermen and women, and also a growth in the number of for-hire vessels.

Brevard County itself continues to grow at a relatively fast rate. Its 1990 population was 398,978, but increased to 476,230 in 2000, an increase of 19.4%. The ethnic composition of these central Florida coastal communities is primarily white, with almost 90% of Brevard county self-identifying as white in the 2000 Census. The county has an estimated 1997 (latest available data) poverty rate for people of all ages of 11.3 percent and this is relatively low for the state of Florida. The county's personal median income is $36,353 for the same year.

Cocoa Beach, one of the residential communities for Port Canaveral, had a 2000 total population of 12,482, with 96.6 percent of persons self-identifying as white. The median age for this community is 56.6 years. Owner-occupied units make up 72.7 percent of the housing, while renter-occupied units comprise 27.3 percent of the pool.

The community of Cape Canaveral is the closest residential community to the commercial shipping, fishing and recreational boating port of Port Canaveral. According to the 2000 Census, the city had a total population of 8,829, with the median age being 46.2. The largest ethnic category for Cape Canaveral is white, comprising 94.7 percent. Perhaps reflective of the industries that dominate the area, housing tenure is almost equally divided between renter-occupied units and owner-occupied units (49.9 versus 50.1 percent, respectively).

The commercial fishing interests in the area are overshadowed by large corporate conglomerations such as Disney Cruise Lines (Port Canaveral recently passed Miami as the number one cruise passenger port in the world), the NASA Space Program, and the numerous charter and private recreational fishing interests that dock or launch their boats from the Port. While the commercial fishing component is therefore a smaller entity in the Port, it none-the-less has its own section of the harbor which is prominently identified on the new signage at the entrance of the port.

A brief descriptive history of the port from the Canaveral Port Authority is quoted below (http://www.portcanaveral.org, August, 2001):

Port Canaveral has developed from a small oil and shrimp port into the busiest cruise port in the Western Hemisphere. It also has developed into an international hub for cargo from humble beginnings when a cargo vessel loaded with newsprint and a petroleum tanker made the first calls on Port Canaveral in 1955. Three years later, Tropicana tanker vessels began transporting refrigerated single-strength orange juice to New York out of Port Canaveral.

Bulk cement was first shipped through the port in the mid-1960s. Petroleum, which continues to be one of Port Canaveral's major imports, accounted for 93 percent of the Port's cargo by 1966, while cement imports represented six percent. The remaining one percent of cargo included newsprint, military and miscellaneous cargo. During 1966, Port Canaveral's cargo tonnage reached the one-millionth mark for the first time.

As cargo tonnage continued to increase, so did the varieties of cargo shipped through Port Canaveral. In the 1970s, scrap steel processed locally for export was added to the port's list of cargo, as well as fresh citrus cargo exports to Northern Europe and Japan. During the 1980s, citrus concentrate became a key import in addition to deciduous concentrates from Argentina and Chile.

Solar salt (evaporated sea water) used for premium water conditioning and in agricultural markets, also became a new commodity at Port Canaveral in 1982. Morton Salt Company opened a solar salt processing plant at Port Canaveral in 1990, and today more than a quarter of a million tons of salt is shipped through the Port annually.

In the early 1990s, single strength orange juice came back after a 30-year hiatus. Other primary cargoes at Port Canaveral, such as lumber, cement and newsprint also have increased steadily since the 1980s. The seafood industry also continues to thrive at Port Canaveral.

This port has historically (since 1996) the highest level of landings of rock shrimp in the south Atlantic. There are currently 3 seafood processor/dealers located in the port; individual landings are not known for these businesses but total landings are shown in Table 5.2.2-16. There were approximately 7 such seafood wholesale businesses in 1993, but that number declined to five in 1998. These figures indicate that change in the industry is occurring but without further research it is not possible to understand the causes or incidence of change.

Table 5.2.2-16. Commercial Landings from Cape Canaveral, Florida. Source: NMFS.

Year	Millions of Pounds	Millions of Dollars
2000	10.9	15.3

1999	8.9	11.9
1998	8.9	10.6
1997	10.3	15.6
1996	21.2	17.7
1995	10.1	16.9
1994	19.5	30.6
1993	13.4	17.2
1992	10.8	10.4
1991	7.8	9.9
1990	8.8	13.2

Monroe County: Key West and Marathon

Monroe County, unlike Brevard and Duval counties, has grown much slower in the past decade, with the population growing from 78,024 in 1990 to 79,589 in 2000, an increase of only two percent. The ethnic composition of this south Florida coastal county is mostly white, with 90.7% of the county's residents self-identifying as white in the 2000 Census. Hispanic/Latinos make up 15.8% and African Americans 4.8%. The county's median age is 42.6 years. The county has an estimated 1997 (latest available data) poverty rate for people of all ages of 11.3 percent and this is relatively low for the state of Florida. The county's personal median income is $36,353 for the same year.

Key West has a 2000 population of 25,478; the median age for this community is 39.3 years. According to the official Key West website (http://www.keywestcity.com/), the city's primary economic activity is tourism, and 1.3 million visitors were received in 1996. Commercial landings are shown in Table 5.2.2-17. A description of the city is offered at the city's website:

Key West lies near the end of the chain of islands known as the Florida Keys, and is the southern-most city in the continental United States. The island-community is located about 90 miles north of Cuba and 150 miles southwest of Miami at a latitude of 24 degrees, 33 minutes, 5 seconds North and at a longitude of 81 degrees, 48 minutes, 14 seconds West. The island has an area of 4.2 square miles, while the City-incorporating the northern part of neighboring Stock Island-has an area of 5.79 square miles. The City initially developed because of its proximity to the Florida Straits, the abutting Florida Reef, strong offshore ocean currents (the Gulf Stream), and the area's unpredictable winds, combined with a large natural deep-water harbor and deep channels into the harbor. The Florida Straits are the northern-most sea passage from the Gulf of Mexico to the Atlantic Ocean. For three centuries this passage formed part of the great nautical trade route that carried ships from Caribbean and South American ports to their European homelands. The location of Key West serves as a gateway both to the Caribbean and between the Atlantic Ocean and the Gulf of Mexico was recognized by the military at an early date. Another important regional factor in the development of the City has been its proximity to Cuba, 90 miles to the south.

The cost of living is high in Key West, which could be why so few vessels or owners report Key West as their residence or homeport. In 1996 the American Association of Realtors ranked Key West as the fourth most expensive real estate market in the United States. The community of Marathon has a 2000 population of 10,255. The median age for in Marathon is 43.8 years.

Table 5.2.2-17. Commercial Landings from Key West, Florida. Source:NMFS.

Year	Millions of Pounds	Millions of Dollars
2000	16.9	50.6
1999	19.8	51.9
1998	18.9	44.8
1997	18.8	54.9
1996	23.7	62.8
1995	23.4	66.7
1994	21.5	53.0
1993	20.3	35.2
1992	9.4	17.4
1991	14.1	35.1
1990	11.4	21.7

Participation in Other Fisheries

Participants in the commercial rock shrimp fishery are involved in other fisheries. Larger vessels often participate in other trawl fisheries mainly for white, brown, and pink shrimp. Many of the larger shrimp vessels in the region are mobile and can participate in the offshore shrimp fisheries throughout the south Atlantic states and the Gulf of Mexico. However, they are restricted from the inshore/bay shrimp fisheries. Other information on harvest areas during the Shrimp Amendment 1 public hearing process indicated that many rock shrimp vessels do fish other regions throughout the year. Many vessels fish during the open Gulf shrimp season in the summer months just prior to the rock shrimp season. Also the peak in the pink shrimp fishing on Florida’s west coast occurs just after the rock shrimp season.

More recent information on participation in other fisheries from three sources is presented below. The rock shrimp permits database contains information on other federal permits that were issued to rock shrimp vessels. It appears that the majority of these vessels only hold rock shrimp permits (Table 5.2.2-18). This does not imply that they are dependent on one fishery. Most rock shrimp vessels participate in the penaeid shrimp fisheries in the Gulf and south Atlantic, which do not require federal permits. Some of the fisheries that multiple permit holders can participate in include: snapper/grouper, king mackerel, Spanish mackerel, shark, Gulf reef fish, and swordfish.

Table 5.2.2-18. Number of Federal Permits Owned by Rock Shrimp Permit Holders. Source: NMFS Permits Office.

Number of	1996	1997	1998	1999	2000

Permits					
1(Rock Shrimp)	167	293	292	286	275
2	35	51	54	55	60
3	3	17	20	20	26
4	8	18	20	12	10
5	5	10	9	16	11
6	1	5	14	10	9
7		9	10	7	2
8		3	4	3	1
9			4	1	1
10	1	2	2	5	4
11			1		1
12			1		1
Grand Total	220	408	431	415	401

When completing permit application forms applicants are requested to include information on the most important fisheries in which the vessel participates. However, the shrimp fishery is not classified into penaeid shrimp or rock shrimp. From the permits data file rock shrimp permitted vessels do participate in other fisheries. The most common is the shrimp fishery:

Permitted vessels that do not participate in the shrimp fishery –10%
Permitted vessels that only participate in the shrimp fishery-59%
Permitted vessels that participate in the shrimp fishery and other fisheries-31%

Permitted vessels that participate in other fisheries apart from the shrimp fishery declared that they are involved in the spiny lobster, reef fish, king mackerel, and shark fisheries most often.

Vessels in the rock shrimp fishery participate in other fisheries in the Gulf of Mexico and the south Atlantic region. In order to obtain complete information on a vessel's revenue profile and economic dependence on rock shrimp, there would have to be a systematic search of all databases in the Gulf and south Atlantic to obtain information on the respective vessel's landings and ex-vessel revenue in all fisheries. This would only be possible if all states had a trip ticket system or other reporting mechanism in place that captured this information.

Data from the Florida trip ticket program provides some information on the dependence of these vessels on rock shrimp, however this is only reflective of the landings in the State of Florida. For most of these vessels additional revenue comes from other shrimp as opposed to other fisheries apart from shrimp. At most rock shrimp vessels obtain 20% of their Florida revenue from other species apart from shrimp. At least 25% of vessels landing in Florida obtain anywhere from 80-100% of their Florida fishing revenue from rock shrimp, and 62% of all vessels landing rock shrimp in Florida obtain at least 40% of fishing income from rock shrimp (Table 5.2.2-19).

Table 5.2.2-19. The Proportion of Vessels landing rock shrimp in Florida in each Revenue Category (% of Vessel Revenue from Rock Shrimp Landings in Florida) during 2000. Source: Florida Fish and Wildlife Research Institute (FWRI).

Rock Shrimp Revenue Category	% of Vessels in each rock shrimp revenue category
0-19%	18.5%
20%-39%	19.3%
40%-59%	16.5%
60%-79%	20.2%
80%-100%	25.5%

5.2.2.4 Bycatch

The discarded bycatch of fish and crustaceans in the rock shrimp trawl fishery is highly variable by season and area. Comments received from industry representatives at scoping meetings and public hearings for Amendment 1 to the Shrimp Plan indicated that the catches have very little bycatch north of Cape Canaveral and in deeper water. As vessels began fishing earlier in the year, in June and July versus August or September, discards of unmarketable juvenile rock shrimp increased dramatically. Industry representatives also indicated that beyond 36 meters (120 ft) 90% of the catch is rock shrimp; therefore, it can be assumed that the remaining is bycatch (SAFMC, 1996a). The data on bycatch from trips that target rock shrimp are still limited, however. There was an early attempt to characterize the catch composition of rock shrimp trips in the South Atlantic. However, only one rock shrimp bycatch characterization observer trip was completed between January 26 and February 4, 1995 (SAFMC 1996a).

In order to document species associated with rock shrimp benthic habitats, NMFS SEFSC Pascagoula Laboratory compiled lists of species associated with rock shrimp catches in research trawling efforts for finfish and shrimp conducted between 1956 and 1991 (See Appendix A in Shrimp Amendment 5). At a minimum, these lists will provide potential bycatch associated with rock shrimp trawling. In order to identify possible key species caught in association with harvestable levels of rock shrimp, only trawl records when rock shrimp catches met or exceeded 40 pounds per hour per 40 foot of head rope were used based on input from public hearings and discussions with people in the industry.

From industry accounts, as the rock shrimp fishery developed and vessels began fishing earlier in the year, in June and July versus August or September, discards of unmarketable juvenile rock shrimp increased. Members of the South Atlantic Rock Shrimp Advisory Panel recommended gear modifications that were implemented in Amendment 5 to the South Atlantic Shrimp Plan to address this problem (SAFMC 2002).

The most recent information on bycatch in this fishery comes from a preliminary report of a NOAA Fisheries observer study conducted during the period September 2001 through December 2002 (See Appendix C in Shrimp Amendment 6). Nine rock shrimp trips were observed from September 2001 through December 2002. Six trips occurred off the east coast of Florida, two trips operated in the Gulf of Mexico and off the east coast of Florida and one trip targeted Gulf of Mexico waters exclusively.

A total of 177 tows was sampled from eight trips off the east coast of Florida. A total of 233 unique species was collected. There were 37 species of crustacea, 166 fish species, 29 other invertebrate species and 1 category of miscellaneous debris. All of these vessels were using BRDs voluntarily. Therefore, the results of the sampling reflect the catch that was not excluded by BRDs.

The following summarizes the main findings in this report:

1. Rock shrimp comprised 10% of the catch by weight and 13% by number.
2. Extrapolated catch per unit effort (CPUE) for rock shrimp was 3.6 kilograms per hour (approximately 7.9 pounds per hour).
3. Penaeid shrimp comprised 6% of the catch by weight and 4% by number.
4. Finfish comprised 54% of the catch by weight and 32% of the catch by number.
    - i. During the summer 2002 (June, July and August) 53% of the catch (by weight) was finfish (65 tows observed).
    - ii. During the fall 2002 (September, October and November) 54% of the catch (by weight) was finfish (41 tows observed).
    - iii. During the winter 2002 (December, January and February) 64% of the catch (by weight) was finfish (8 tows observed).
    - iv. CPUE of finfish was highest in winter 2002 (27.1 kg./hr) followed by fall 2002 (19.8 kgs/hr) and summer 2002 (19.0 kgs/hr).

Weight extrapolations from the species composition samples for both years, all areas, seasons and depths indicate that:

1. Dusky flounder (*Syacium papillosum*) comprised 13% of the total catch.
2. Iridescent swimming crab (*Portunus gibbesii*) comprised 10% of the total catch.
3. Rock shrimp comprised 10% of the total catch.
4. Inshore lizardfish (*Synodus foetens*) comprised 9% of the total catch.
5. Longspine swimming crab (*Portunus spinicarpus*) at 8%.
6. Spot (*Leiostomus xanthurus*) at 6%.
7. Blotched swimming crab (*Portunus spinimanus*) at 5%.
8. Brown shrimp (*Farfantepenaeus aztecus*) at 4%.
9. Red goatfish (*Mullus auratus*) at 2%.
10. All other species combined comprised 33% of the total weight.

Data from one additional trip in 2002 were not included in these results because the data were not computerized at the time the report was prepared. These observed trips were sampled during an atypical rock shrimp season where harvest was especially low compared to previous years. Thus, these findings should be considered preliminary and a more realistic evaluation of this fishery is expected from analyses of results at the completion of this observer program.

A different catch composition could be observed during a year when rock shrimp harvest is at a "normal" level. From preliminary data on rock shrimp landings and industry reports it appears that rock shrimp harvests rebounded during 2003. Observer coverage in the rock shrimp fishery extended through 2003. Information from these trips will be analyzed and presented to the Council for future evaluation of the rock shrimp fishery. From preliminary data for the 2003 portion of the observer coverage program, it appears that rock shrimp catch rates were higher and they comprised a larger proportion of the catch compared to the 2002 observer data. For all 125 tows in the 2001/2002 observer program, rock shrimp made up 9.6% of the overall catch. A preliminary examination of the data from the 95 tows observed in 2003 indicated that 21.3% of the total catch was comprised of rock shrimp (Scott-Denton, NOAA Fisheries, Southeast Fisheries Science Center, pers. comm. 2003).

See Section 5.4.1.4 for more detailed information on bycatch in the South Atlantic shrimp fisheries.

5.2.3 Snapper Grouper

5.2.3.1 Description of fishing practices, vessels and gear

Commercial fishery

Commercial fishermen utilize vertical lines, longlines, black sea bass pots/traps, spears, and powerheads to harvest snapper grouper species. An economic survey of commercial snapper grouper vessels along the South Atlantic coast done in the mid-1990s found that the average length of a boat was 32.7 feet, with nearly all sampled boats being less than 50 feet in length (Waters et al. 1997). Boats with bottom longlines tended to be the longest, had the most powerful engines, the greatest fuel capacities, and the largest holding boxes for fish and ice. On the other hand, boats with vertical lines, especially in the southern area, tended to be the shortest, had the least powerful engines, the smallest fuel capacities, and the smallest holding boxes for fish and ice (ibid).

Vertical Lines

The vertical line sector of the commercial snapper grouper fishery operates throughout the Council's area of jurisdiction from the North Carolina/Virginia border to the Atlantic side of Key West, Florida. According to NMFS Logbook data, there were 15,302 trips reported in 2001 in which vertical line (hook and line) gear was identified as the main gear for that trip. Fishermen use this gear in about 13 to 110 fathoms (78 to 660 feet) of water, both day and night.

The majority of hook and line fishermen use either electric or hydraulic reels known as "bandit" gear due to its resemblance to slot machines ("one-armed bandits") that are used in casinos. Boats generally have 2 to 4 bandit reels attached. A typical bandit reel is attached to the gunwale of the boat and consists of a fiberglass reel that holds about 1,000 feet of cable; an L-bar or spreader, which keeps the leader from tangling with the main line; a pulley to feed the cable from the reel through the L-bar; a fiberglass arm; and an electronic or hydraulic reel motor.

Captains of boats with bandit gear maneuver the boat back and forth across an area of high relief that runs northeast and southwest looking for fish using a color machine and relying on fishing spots that have been previously marked on their plotter. The captain uses the color machine to differentiate bottom type and fish presence, and can tell what kind of fish may be in the area based on where they appear in the water column, the size of the air bladder that shows up on screen, and how the fish are congregated.

Fishing begins with a baited line that is thrown out over the gunwale of the boat as the fisherman releases the drag on the spool of the bandit reel and sends the line down in search of the bottom or desired depth. If dropping on a spot for the first time, the fisherman may have to adjust the depth at which s/he fishes, first finding the bottom and then reeling up the line enough to be fishing above the bottom.

Fishermen tend to either "sit and soak" or "get up and down" when using bandit gear in the mid-shelf fishery (mostly targeting vermilion snapper and some groupers). When they sit and soak, they are fishing live or dead baits with circle or "jap" hooks and letting their rigs (generally a 20- to 40-foot leader with 2 hooks) soak near the bottom for anywhere from 15 minutes to an hour. Fishermen will use the sit-and-soak method to catch grouper and some snapper, such as red snapper in about 13 to 50 fathoms (78 to 300 feet) of water. When fishermen get up and down, they are actively fishing 2 to 3 straight hooks per reel with cut bait. When fishing this way, the line is tended constantly and brought up to the surface as soon as a bite is felt. Fishermen using the get-up-and-down method catch most of the vermilion snapper, triggerfish, and porgies. Fishermen also fish for grouper using this method, but with larger hooks.

When fishing for deepwater snapper grouper species (primarily snowy grouper but also large red porgy, blueline tilefish, Warsaw grouper, and speckled hind) in 50 to 100 fathoms (300 to 600 feet) of water, fishermen bait multi-hook rigs with anywhere from 2 to 10 circle hooks with squid, Boston mackerel, or other cut bait.

In South Florida, fishermen use handlines to harvest yellowtail snapper, which is mostly a day boat fishery. Fishermen chum for yellowtail by grinding or cutting up bait fish and distributing the chum on top of the water with the intention of drawing the yellowtail snapper closer to the surface in a school to make them easier to catch. The fish are caught on handlines with "j" hooks and then chill-killed for high quality. Sometimes these fishermen use a splatter or spider pole to catch the fish when chumming, which is a 10- to 12-foot bamboo pole with a single line and a barb-less hook attached.

There is no consistent day/night pattern of fishing within the vertical line sector of the South Atlantic snapper grouper fishery. The time of day and/or night varies from captain to captain as a matter of personal preference. The majority of the bandit fleet fishes year round for snapper grouper. The only seasonal differences in catch are associated with the spawning season closures in March and April for gag grouper. Most fluctuations in fishing effort in the vertical line fishery are a result of the weather, such as hurricanes and tropical and winter storms, which limit effort. When king mackerel are running, some fishermen stop bandit fishing for snapper grouper species to target king mackerel.

Longlines
The Council allows the use of bottom longlines only in waters deeper than 50 fathoms (300 feet) and north of St. Lucie Inlet, Florida. Fishermen with longline gear onboard may only retain deepwater species. Fishermen use this gear to target snowy grouper and golden tilefish, while incidentally catching blackbelly rosefish.

Longline boats are typically bigger, have longer trips, and cost more to operate than bandit boats because they operate farther offshore. From a port such as Charleston, South Carolina, a South Carolina longline boat will travel 90 miles offshore to reach the fishing grounds, stay out for as many as 9 to 10 days, and incur expenses equivalent to $2,500.

The longline is located on a spool about midway back on the stern of the boat, and a spool generally holds about 15 miles of cable. When fishing begins, the cable is paid out through a fair lead on top of the spool and then another at the stern of the boat. A poly-ball and a high flyer are paid out first to mark the longline at one end. At the stern are usually two crewmembers that stand near baskets full of made up rigs (previously baited hooks and leaders). As the line pays out, they snap the leaders onto the mainline as fast as possible, but generally every two feet.

While the line is paying out, the Captain may steer the boat in a zigzag fashion or make exaggerated turns to set the gear in the desired location. Some crews use weights as the Captains make big turns to prevent the mainline from rolling over and drifting on top of itself. When the desired amount of longline is paid out, the crew breaks it loose from the drum and snaps on another poly-ball and high flyer to indicate the end of the longline.

The amount of mainline that is paid out and the length of soak time of the line varies by boat and circumstance. Sometimes boats will set out 5 miles of cable at a time making as many as 4 or more sets a day, while others will set out 15 miles at a time and make only 2 sets a day. Soak time will vary depending upon how well fishing is going; however, the longest amount of time that longline gear is in the water is about 2 hours. The gear is hauled back from a haul back station with a boom that swings over the side of the boat that helps feed the cable through a block and pulley system. As the line is hauled back on board, catch is removed from the leaders, leaders are removed, and the main line is fed back into the level wind and back to the spool.

Longlines are fished only from daylight to dark because sea lice come out at night and eat the flesh of fish that would hook up on the line. Snapper grouper fishermen use longlines all year long with little or no seasonal fluctuation barring a busy hurricane season.

Black Sea Bass Pots
Black sea bass pots are used exclusively to target black sea bass, though bycatch of other snapper grouper species is allowed. The pots have mesh size, material, and construction

restrictions to facilitate bycatch reduction and to prevent ghost fishing if pots are lost. All sea bass pots must have a valid identification tag attached and over 87 percent of tags in April 2003 were for boats with homeports in North Carolina.

Fishing practices within the black sea bass pot fishery vary by buoy practices, setting/pulling strategies, number of pots set, and length of set, with seasonal variations. Many fishermen set individual pots with one buoy line per pot. Others set doubles, which are two pots attached to one buoy line. Individual pots may also be connected to a ground line. This configuration is commonly referred to as a "trawl" and has a buoy line on each end. Indications are that only one person in North Carolina may be fishing with trawls. Both sinking and floating buoy lines are used. Many fishermen off North Carolina use floating lines because they are less likely to get hung up on the bottom, while several South Carolina fishermen reported using sinking lines. In South Carolina, fishermen report using ¼-inch poly line attached to a buoy or high flyer. Buoy lines are typically 200 feet (61 meters) in length. In the South Atlantic EEZ, the use of buoys is not required but, if used, each buoy must display the boat's assigned official number and color code.

Fishermen use different strategies for targeting black sea bass, but the most common technique is "precision setting" in which fishermen target areas located with on-board electronics, set pots on suspected aggregations of fish, and locate, pull, and move pots depending upon how well an area is producing. Pots may be clustered with only a few set in one area and numerous set in a different area depending upon the availability of hard bottom and how successful the catch rate. There may be anywhere from a 3 to 5 mile (4.8 to 8 kilometers) distance between pots or just 10 to 14 feet (3 to 4.5 meters). Another strategy scatters pots over a wide area or in rows, regardless of bottom habitat, and leaves the set of pots with the intention of having the fish come to the pot. This technique targets more migratory individuals and the pots tend to stay in the water for a longer period of time.

How pots are fished varies depending on the fisherman, season, or area. Typically, fewer pots (on average 60 or less) are fished during the winter than during the summer with the majority of fishermen taking their pots in every night. In the summer when more fish are scattered, the fishermen may fish a few hundred pots and leave them out for extended periods of time, pulling them no more than twice a day. During the winter, soak times are shorter with pots being pulled 2 to 3 times a day or more. Pots set as doubles or in trawls usually have longer soak times than those individually set. In general, how long pots are soaked or whether they are removed daily depends upon the number of pots set, gear configuration, season, and the preference of the fisherman. Preferences may also vary by region.

The South Carolina black sea bass pot fishery is mainly a winter fishery. The season begins in November and, depending upon the water temperature (the colder the better for bass trapping), generally goes through April. Pots are fished individually with short soak times (in some cases about an hour), and the number of pots fished range from 6 to 30 depending upon the fisherman. Most fishermen haul their pots from the water when they return home. In the fall, most pots are set in 70 to 90 feet (21.3 to 27.4 meters) of water, and as the season progresses, fishermen tend to move their pots out to about 100 to 200 feet (30.5 to 36.6 meters). Most trips are day trips.

The North Carolina pot fishery is mainly a winter fishery as well; however, some fishermen continue to pot fish through the summer. The number of pots fished typically ranges from 25 to 60, but more pots are fished in the summer. Fishermen usually set their pots in water depths ranging from 30 to 90 feet (9 to 27.4 meters), though in areas further south, pots are generally set at depths ranging from 70 to 100 feet (21.3 to 30.5 meters). The duration of most trips is one day, however, some extend over multiple days. Roughly half of the fishermen in North Carolina pull their pots when heading home, while the other half leaves them and lets them soak for several days.

Overall, it appears that for the South Atlantic black sea bass pot fishery, the number of trips tends to be greater during the winter months than the summer. Data from the Reef Fish Logbook Program show that there were 1,054 trips in 2001 in which sea bass pots were reported as the main gear. Of these trips, 53 percent were conducted from November through March. Logbook data going back to 1998 show a range of 63 to 72 percent of reported trips occur during the November through March time period with the number of trips falling off in March.

Assessing the actual fishing effort at any given time within the black sea bass pot fishery is difficult. Many participants are active in other fisheries, including the recreational charter fishery during the summer months. The effort placed in the black sea bass pot fishery is often dependent on how well the income generated by black sea bass fishing compares to the income generated by the fisherman's other endeavors. Many snapper grouper permit holders maintain pot endorsements, but are not active in the pot fishery.

The number of fishermen permitted to fish with pots is higher than the actual number fishing. In South Carolina, logbook data suggests that as many as 50 to 60 fishermen are permitted to use pots as either their primary or secondary gear, but only a quarter of them are actively involved in pot fishing during the season.

Fishermen are required to purchase a tag for each pot they possess. As of April 23, 2003, the following number of black sea bass pot tags had been ordered for vessels with active snapper grouper permits, listed by homeport states:

- Georgia — 45 tags;
- Florida — 150 (east and west coasts combined);
- North Carolina — 1,979; and
- South Carolina — 93.

Since most fishermen tend to fish only a portion of their pots while keeping the remaining pots available to replace any losses during the season, the number of tags purchased is often not an accurate count of how many pots are actively being fished.

Powerheads and Spears

In federal waters, fishing commercially by diving and killing the fish by spear or powerheads is most commonly practiced off the coast of Florida. The use of powerheads to kill snapper grouper is illegal in the EEZ off the coast of South Carolina (50 CFR 622.31(g)) and in Special Management Zones.
Powerheads, or bangsticks, are underwater firearms that usually use 12-gauge or .357 Magnum rounds. Sharp contact from a thrust against a solid object activates a heavy, spring loaded, stainless steel firing pin, which detonates the round from a short barrel. Much of the damage inflicted on the target comes from the rapidly expanding gases forced into the body by the barrel end pressed at that moment against it.

There are 3 common methods to kill fish. First, in clear water, some fishermen shoot just a spear, because it has the capability of being more accurate at longer distances (40 to 50 feet) than a powerhead. Second, there is a traditional powerhead (also known as a bangstick), which is a powerhead attached to a metal shaft or wooden pole. The initial injury to the fish comes from a spear tip and then the powerhead is used to kill the fish. The third way is when a powerhead is on the shaft of the spear and once the trigger is pulled, the powerhead hits the fish and the round is detonated in the fish.

Bottom time is a function of depth. It is also important to separate total dive time from spearing/working time on the dive. The following two estimates of spearing/working times on the bottom are based on input from divers:

Estimate 1: about ¾ of bottom time is spearing/working time. At 100 to 120 feet a diver has about 15 minutes of spearing/working time on the bottom, and an 80 cubic foot tank lasts about 20 minutes at 100 feet. A diver can use 4 tanks per day so total spearing/working time ranges between 1 to 1.5 hours per diver per day.
Estimate 2: the maximum allowable bottom time is about 16 minutes per tank in the summer and 12 minutes in the summer. At 4 tanks per diver per day, the maximum bottom time would be 64 minutes in the summer and 48 minutes in the winter.

Private recreational fishery

According to MRFSS estimates (2005 SAFE Report), an average of 4.5 million recreational anglers participated in saltwater fishing in the Southeastern United States in recent years. It is not possible to determine the number of those that target snapper grouper species but testimony at public hearings, Council meetings and overall public interest indicates that the recreational snapper grouper fishery is growing in popularity. Recreational fishermen for the large part use hook and line gear although in some areas spearfishing for reef fish can be popular.

Methods to that recreational fishermen use to fish for snapper grouper are very diverse. The distance people can go offshore in search of reef fish depends in part of size of their boat, engine power, comfort level, and fuel prices. Experience levels vary among recreational fishermen and therefore fishing methods and efficacy differ. Bottom fishing for snapper and shallow water grouper can be accessible to many recreational fishermen as they do not have to travel as far offshore and there somewhat less skill involved than deep drop fishing that targets mostly for big grouper. As with the commercial fleet, many recreational anglers rely on technology such as fish finders and color machines to find fish. There is little or no technology gap between the professional (for-hire and commercial) fishermen and those who fish for fun on the weekends.

Recreational anglers will use both electric and manual reels for bottom fishing. Twelve volt Electric reels such (commonly called elec-tra-mates) attach to fishing rods and reels to assist fishermen in reeling in catches from deep water. People who use electric reels tend to be more serious about fishing or who fish deeper water.

Fishermen will choose to use lighter or heavier tackle based on which species they are targeting, the level of skill of the fishermen and a multitude of other factors including limiting gear loss. Generally when fishing for grouper they will use heavier line (80 to 120 pound test) and larger hooks (6/0 and larger) which mostly calls for larger weights. Fishing for snappers, porgies and grunts generally means lighter tackle (1/0 to 4/0 hooks and 20 and 40 pound test).

Like tackle, the use of bait also varies very widely among the region and among fishermen and according to target species. Cut bait, live baits and even artificial plugs are all used to fish for various snapper and grouper species. Popular cut baits include menhaden, herring, bluefish, sardines and cigar minnows.

For-hire recreational fishery

Headboats (also called party boats) are popular in the southeast. These vessels are larger than the commercial hook and line fleet and private and charter boats. Many are longer than 100 feet in length. They provide easy and economical access to successful fishing for the beginning angler and tourist. These boats take as many as 100 people offshore to fish for snapper grouper and a host of other fish.

Fishing trips on headboats can either be an all day or half day. Generally when fishing off the Carolinas on half day trips they are fishing the black fish banks targeting sea bass, porgies, sharks, flounder, and other bottom species. On all day headboat trips, they will fish 40 to 50 miles offshore to target snapper, grouper, large sea bass, and trigger fish. Occasionally larger fish such as king mackerel, cobia, amberjack, and dolphin may be landed. In general, headboats are fishing the same grounds as the commercial fleet and they can often be seen fishing side by side.

Generally, customers are provided with gear and bait. The fishing methods on headboats for snapper grouper species are similar to those of the commercial fishery and the private charter fishery. Customers will be set up with a 4/0 or 6/0 reel rigged with 80 pound test monofilament, a rig with a 16 ounce weights and the same variety of hook sizes as commercial fleet uses. Most reels will be set up with two hook rigs. Cut squid is generally the preferred bait among headboat crews because it is easy to prepare and stays on the hook longer than other baits.

Headboats will make special trips to fish during the night. Generally, headboat trips will either last half a day (4 hours) or an entire day (11 hours).

Allowable gear

Commercial

The following gear represents the only gear allowable for this fishery:

- Vertical hook-and-line including hand-held hook-and-line and bandit gear
- Spearfishing gear without rebreathers
- Powerheads, except where expressly prohibited in Special Management Zones and in the EEZ off South Carolina.
- *Bottom longline, only in depths 50 fathoms or more, and only north of St. Lucie Inlet (27°10' N. lat.), Florida. (Bottom longline can not be used for wreckfish).
- Black sea bass pots except in SMZs and only north of Cape Canaveral, Florida (Vehicle Assembly Building), (28°35.1' N. lat.)
- Sink net fishermen (NC only) can make multi-gear trips and all legal species harvested with black sea bass pots and/or vertical hook and line gear may be retained.

*Vessels with longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden, blueline and sand tilefish.

Black Sea Bass Pot Requirements: A black sea bass pot or trap that is used or possessed in the South Atlantic must meet the following requirements:

- For sides other than the back panel: hexagonal mesh (chicken wire) — at least 1.5 inches between wrapped sides; square mesh — at least 1.5 inches between sides; OR rectangular mesh — at least 1 inch between the longer sides and two inches between the shorter sides.
- For the entire panel, i.e., the side of the pot opposite the side that contains the pot entrance, mesh that is at least 2 inches between sides.
- It must have an escape panel or door with an opening equal to or larger than the interior end of the trap's throat (funnel) placed on at least one side, excluding the top and bottom. Its hinges or fasteners must be made of one of the following degradable materials: ungalvanized or uncoated iron wire no larger than 19 gauge or 0.041 inches diameter OR galvanic, timed release mechanisms with a letter grade no higher than J.
- It must have an unobstructed escape vent opening on at least two opposite vertical sides (excluding top and bottom) meeting the following requirements: The escape vent opening must measure at least 1 1/8 x 5 3/4" for rectangular vents, 1.75 x 1.75" for square vents (inside measure), or 2 diameter for circular vents.
- Sea bass pots must be removed from the water in the South Atlantic EEZ when the quota is reached.

Recreational

- Vertical hook-and-line including hand-held hook-and-line, and bandit gear
- Spearfishing gear without rebreathers
- Powerheads, except where expressly prohibited in Special Management Zones (SMZs). In addition, the use of explosive charges, including powerheads is prohibited in the EEZ off South Carolina.

5.2.3.2 Economic description of the fishery

(from SNG Amendment 13C)
The economic description of the snapper grouper fishery is separated into two main segments: a description of the commercial fishery that focuses mainly on the commercial harvesting sector and a description of the recreational fishery with separate descriptions of the for-hire and private sectors. There is some overlap between the for-hire and the commercial harvesting sectors in the South Atlantic snapper grouper fishery as some vessels participate in both sectors.

A description of the databases used in this section can be found in Appendix E of Snapper Grouper Amendment 13C.

Commercial fishery

The commercial snapper grouper fishery in the South Atlantic is comprised of vessels, which utilize a number of different gear types and target a variety of species. The following sections describe trends for the overall fishery, followed by discussions about the individual species addressed in this document.

Commercial Landings, Ex-vessel Value, Price, and Effort
The snapper grouper complex is important to the commercial harvesting sector in the U.S. Southern Atlantic states (South Atlantic). In 2003, landings of snapper grouper species managed by the South Atlantic Council amounted to 6.44 million lbs with an ex-vessel value of $11.91 million (Table 5.2.3-1). In comparison, landings of the five species in Amendment 13C (SAFMC 2006) (red porgy, vermilion snapper, black sea bass, golden tilefish and snowy grouper) amounted to 2.05 million lbs with an ex-vessel value of $3.99 million in 2003 (Table 5.2.3-2). The value of all snapper grouper landings represented 7% of the value of commercial landings and 21% of the value all finfish landings in South Atlantic states in 2003 (Table 5.2.3-1).

During 1999 to 2003, landings, ex-vessel (dockside) revenue, number of vessels in the fishery, number of permitted vessels, number of trips and days fished have been declining (Table 5.2.3-1, 5.2.3-2). The decline in these parameters appears to be more prominent from 2002 to 2003. Many fishermen reported that unusually cold water temperatures in the summer and fall of 2003 were associated with lower harvests. Inflation adjusted revenue for all snapper species declined by $3.55 million from 1999 to 2003 and the inflation adjusted average price for all species declined by 8% (Table 5.2.3-1). For Snapper Grouper Amendment 13C (SAFMC 2006) species inflation adjusted revenue declined by $2.09 million dollars and the inflation adjusted average price declined by 10% (Table 5.2.3-2).

The number of vessels with reported snapper grouper landings dropped from 1,101 in 1999 to 906 in 2003, with the decline in the number of vessels evident in all harvest categories (Table 5.2.3-1). Prior to 2003, the decline in the active snapper grouper fleet is concentrated in the number of vessels that land less than 10,000 lbs of snapper grouper species annually. Only 20 vessels landed more than 50,000 lbs in 2003 and 172 vessels reported landings that exceeded 10,000 lbs (Table 5.2.3-1). Based on the low level of landings, it would appear that a relatively large number of vessels (734 out of 906) operated on a part-time basis in the snapper grouper fishery during (Table 5.2.3-1).

The number of vessels with any reported landings snapper grouper species included in Amendment 13C (SAFMC 2006) dropped from 520 in 1999 to 396 in 2004 (Table 5.2.3-1). Except for the "greater than 50,000 lb" harvest category, the decline in the number of vessels is evident in all harvest categories. If 2003 and 2004 are discounted, because of the extreme cold water temperatures observed in 2003 and the unusually active hurricane season in 2004, the decline in the active fleet is concentrated in the number of vessels that land less than 10,000 lbs of Amendment 13C (SAFMC 2006) species annually. Only eight vessels landed more than 50,000 lbs in 2004 and 74 vessels reported landings that exceeded 10,000 lbs (Table 5.2.3-2).

Table 5.2.3-1. The snapper grouper fishery in the South Atlantic: annual landings, ex-vessel revenue, and effort. Source: Southeast logbook (SEFSC, Beaufort Lab, NMFS) and Southeast permits database (SERO, NMFS).

Item	1999	2000	2001	2002	2003	2004
Snapper grouper landings	7,704,007	7,679,823	7,562,215	7,324,660	6,442,148	
Ex-vessel revenue from the snapper grouper fishery	$13,996,781	$14,619,050	$13,902,225	$13,521,614	$11,914,249	
Real ex-vessel revenue in $2003*	$15,466,056	$15,618,643	$14,436,371	$13,825,781	$11,914,249	
Ex-vessel revenue from all landings in the South Atlantic **	$202,772,265	$218,251,010	$175,665,169	$168,359,567	$163,863,862	
Ex-vessel revenue from finfish landings in the South Atlantic **	$59,337,165	$69,941,863	$65,211,694	$62,615,403	$56,818,354	
Number of trips	17,200	16,241	16,922	16,820	16,176	
Days fished	29,285	28,913	29,567	29,243	27,227	
Average days per trip	1.70	1.78	1.75	1.74	1.68	
Price/lb	$1.82	$1.90	$1.84	$1.85	$1.85	
Real price/lb $2003*	$2.01	$2.03	$1.91	$1.89	$1.85	
Number of permitted vessels	1,441	1,341	1,264	1,174	1,123	1,066
Number of vessels with unlimited permits	1,085	1,001	959	907	879	841
Number of vessels landing snapper grouper species	1,101	1,045	981	955	906	
Number of vessels with more than 100 lb of landings	972	920	850	813	773	
Number of vessels with more than 1,000 lb of landings	657	606	585	583	542	
Number of vessels with more than 5,000 lb of landings	311	304	288	281	276	
Number of vessels with more than 10,000 lb of landings	199	195	196	200	172	
Number of vessels with more than 50,000 lb of landings	27	26	26	26	20	

Number of dealer permits	239	245	252	246	271	269
Number of processors (snapper grouper species)+	6	11	9	5	10	
Number of processors (snapper grouper and unclassified finfish species)+	15	20	17	20	15	

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Number of trips	17,200	16,241	16,922	16,820	16,176	
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Average days per trip	1.70	1.78	1.75	1.74	1.68	
Price/lb	$1.82	$1.90	$1.84	$1.85	$1.85	
Real price/lb $2003*	$2.01	$2.03	$1.91	$1.89	$1.85	
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Number of vessels with more than 50,000 lb of landings	27	26	26	26	20	
Number of dealer permits	239	245	252	246	271	269
Number of processors (snapper grouper species)+	6	11	9	5	10	
Number of processors (snapper grouper and unclassified finfish species)+	15	20	17	20	15	

Landings information came from the Southeast logbook. Data from the Gulf of Mexico and other (unknown) states are not included in this table. However, Monroe County data is included. Also, wreckfish landings are not included.
* The CPI was used to adjust these values for inflation.
** Data obtained form the NMFS web site.
+Summarized from the NMFS Annual Processor Survey.

Table 5.2.3-2. Species addressed in this amendment1: annual landings, ex-vessel revenue, and effort in the South Atlantic. Source: Southeast logbook (SEFSC, Beaufort Lab, NMFS).

Item	1999	2000	2001	2002	2003	2004
Landings (5 species)	2,796,552	3,144,204	3,149,283	2,627,477	2,047,711	2,323,581
Ex-vessel revenue	$5,504,700	$6,477,358	$6,188,370	$5,204,760	$3,992,534	$4,699,342
Real ex-vessel revenue in $2003*	$6,082,541	$6,920,254	$6,426,137	$5,321,841	$3,992,534	$4,629,894
Number of trips	5,867	5,680	5,837	5,614	4,648	4,326
Days fished (days away)	14,460	14,320	15,450	14,956	12,582	11,548
Average days per trip	2.46	2.52	2.65	2.66	2.71	2.67
Price/lb	$1.97	$2.06	$1.97	$1.98	$1.95	$2.02
Real price/lb $2003*	$2.18	$2.20	$2.04	$2.03	$1.95	$1.99
Number of vessels landing these 5 species	520	474	459	414	396	396
Number of vessels with more than 100 lb of landings	383	370	363	330	307	304
Number of vessels with more than 1,000 lb of landings	240	232	220	211	186	184
Number of vessels with more than 5,000 lb of landings	137	145	140	124	107	111
Number of vessels with more than 10,000 lb of landings	93	93	99	89	64	74
Number of vessels with more than 50,000 lb of landings	7	9	7	7	5	8

[1] This includes red porgy, vermilion snapper, black sea bass, golden tilefish, and snowy grouper.

The limited access program in the South Atlantic snapper grouper fishery was implemented in 1998/1999 and since that time through 2004 there has been a decline of 375 permitted vessels (244 vessels with unlimited permits). Some of the vessels, which exited the snapper grouper fishery were replaced through the two for one permitting program while other vessels were not replaced, and 1,725 different vessels reported landings in this fishery from 1999 to 2003 (Table 5.2.3-3). In comparison, over this period, 970 different vessels recorded harvests of the five species addressed in this amendment (Table 5.2.3-3). There appears to be a core group of vessels that frequently operate in the South Atlantic snapper grouper fishery. For example, 678 (205+473) vessels fished during at least 4 out of the past five years, and 473 vessels fished every year since the limited access program went into effect (Table 5.2.3-3).

In contrast to the trend observed with vessel participation, the number of snapper grouper dealer permits increased during the period 1999 to 2004 (Table 5.2.3-1). One explanation for this trend could be fishermen are acting as their own dealers and selling directly to consumers or other retailers and wholesalers in an attempt to increase profit margins or to adapt to the decline in the number of "fish houses" operating in the South Atlantic. Fish houses provide support to the fishing industry including any or all of the following: dockage, fuel, ice, repair parts, gear and supplies, fish packing and processing, and a place for transactions with permitted snapper grouper dealers. In some cases fish house owners extend credit to vessel owners with negative cash flow problems. About 10 fish houses that provided docking facilities in the South Atlantic closed for business during the past five years. More recently, one of the main fishing docks in the snapper grouper fishery located in Murrells Inlet, South Carolina closed for business. The owner sold this waterfront property to a condominium developer. In general, closure of fish houses and loss of dock space results in relocation costs, increased costs of fishing, and disruption of normal business relationships. A more detailed description of the adaptations in the secondary sector to the closure of several fishing docks can be found in the cumulative impacts section (Section 4.13) of Snapper Grouper Amendment 13C (SAFMC 2006).

Table 5.2.3-3. Distribution of vessels by the number of years they operated in the snapper grouper fishery during 1999-2003. Source: Southeast permits database, Permits Office, SER, NMFS.

Number of years fished	Number of vessels in the snapper grouper fishery	Number of vessels harvesting species in Am. 13C
1	507	434
2	324	162
3	216	104
4	205	82
5	473	188
Total number of vessels operating in the fishery during 1999-2003	**1,725**	**970**

Long-term Trends

The snapper grouper fishery has been heavily regulated since the fishery management plan was implemented in 1983 (Figure 5.2.3-1). Apart from the response to fishery management regulations, fluctuations in landings can be partly attributed to changes in stock abundance and availability, water quality, environmental conditions, market conditions (e.g., price), and fleet dynamics. Ex-vessel prices for the various species in the fishery depend on the quantity of landings, product quality, market conditions such as the availability of imports and the relative prices of substitutes, and consumer income levels.

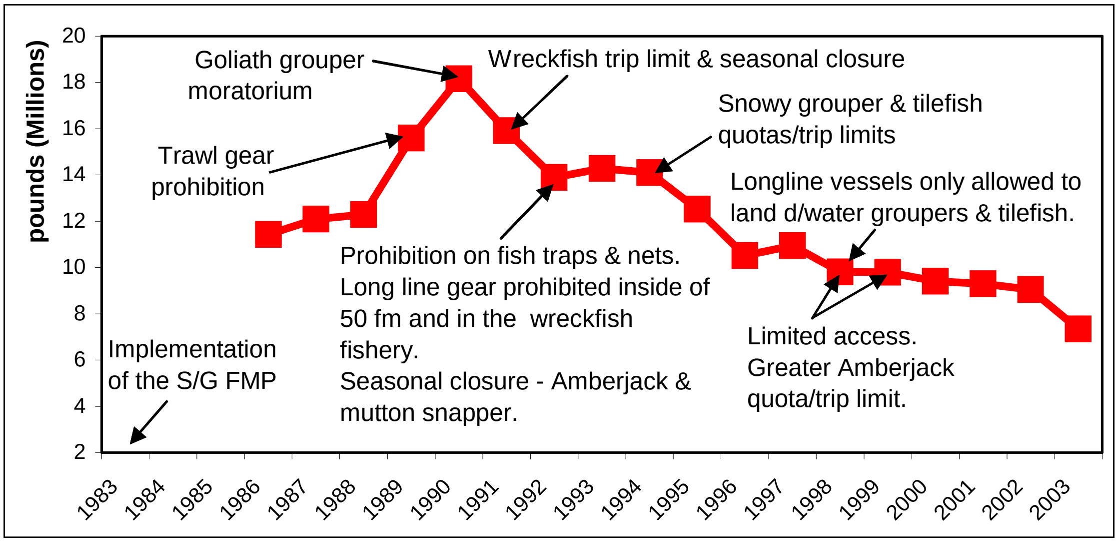

Figure 5.2.3-1. Major events in the regulatory history of the snapper grouper fishery superimposed on total snapper grouper landings during 1983-2003. Source: Accumulated landings system, Southeast Fisheries Science Center, Beaufort Lab.

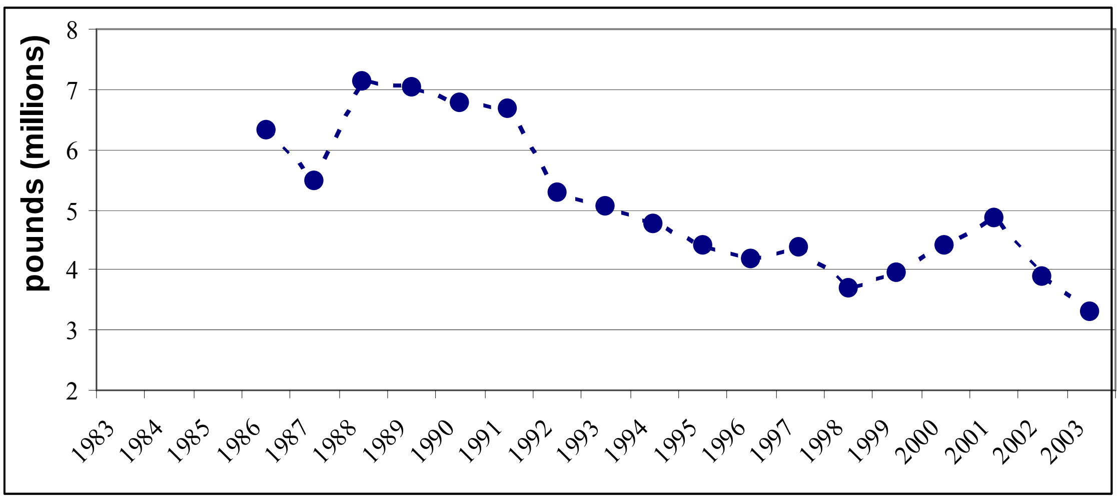

Figure 5.2.3-2. Trends in total harvest of species in Amendment 13C (SAFMC 2006) during 1983-2003. Source: Accumulated landings system, Southeast Fisheries Science Center, Beaufort Lab.

Snapper grouper ex-vessel landings and value increased from 1986 to 1990. During this period, real ex-vessel revenue increased from approximately $26 million to $35 million (Figure 5.2.3-2). Even though the overall average unit price of the fish, adjusted for inflation, was on a decreasing trend during this period (Figure 5.2.3-3), the 59% increase in landings resulted in the growth in overall ex-vessel revenue from 1986 through 1990. Data from the Accumulated Landings System (ALS) were used to examine long-term trends in prices, landings and revenue (see Appendix E in Snapper Grouper Amendment 13C, SAFMC 2006). These data will not correspond exactly to the statistics in Table 5.2.3-1 since this table contains statistics derived from the Southeast logbook database.

Since the peak in snapper grouper landings and revenue in 1990, there has been a steady decline in landings, ex-vessel revenue, and real ex-vessel revenue (Figure 5.2.3-3, Figure 5.2.3-4). The cause of this decline can be partly attributed to restrictive regulations taken to improve/maintain the health of species in the snapper grouper complex and protect essential fish habitat. This fishery was first regulated in 1983 with a number of size limit measures and gear restrictions. In 1992, Amendment 4 prohibited fish traps, entanglements nets, longlines for wreckfish, and the use of longline gear inside of 50 fathoms for snapper grouper species in the South Atlantic EEZ. Also, additional minimum size regulations and bag limits went into effect during 1992 (Figure 5.2.3-1).

The implementation of a limited access program in 1998/1999 partly contributed to the decline in the number of commercial vessels in the snapper grouper fishery (SAFMC 1997). Since 1999, the annual number of permitted vessels has declined by 375; the number of vessels with unlimited permits has declined by 244 (Table 5.2.3-1). Commercial and recreational fishermen in the snapper grouper fishery have faced additional restrictive measures implemented in Amendment 9 (SAFMC 1998c) and Amendment 12 (SAFMC 2000). A detailed account of these regulations is contained in the history of management section of this document. If current permit requirements remain in effect, it is likely fishing effort will continue to decline since each new entrant will have to purchase two existing snapper grouper permits. Also, the number of non-transferable permits will decline over time as their owners retire.

The trend in aggregate harvest of all species in this amendment follows a similar pattern to landings in the snapper grouper fishery (Figure 4.2.3-1). There was a continual decline in harvest from 1991 until 1998. However, unlike the trend in total snapper grouper landings, the total harvest of these five species increased between 1998 and 2001, before declining again during the following three years (Figure 5.2.3-1).

The average unit price for all snapper grouper species was fairly stable from 1986 to 1992 (Figure 5.2.3-4). Under normal conditions one would expect nominal prices to increase over time to account for inflation. However, landings increased during this period, which could partly account for the decreasing trend in inflation-adjusted prices up until 1991. Real prices remained relatively stable between 1992 and 2001 and declined afterwards. Other factors that influence snapper grouper prices include landings and market conditions in the Gulf of Mexico and the quantity of imports. The overall average price for snapper grouper species is calculated from data for a large number of individual species with different price trends. Also, prices for individual species will vary by size and for some species like black sea bass there is a large difference in price per lb among the various size categories.

In 2004, the volume of snappers and groupers imported into the U.S. was 43 million lbs valued at $75.6 million dollars. In comparison, domestic harvest of snappers and groupers landed at ports in the Gulf of Mexico and South Atlantic states amounted to 23.4 million lbs in 2003 (NOAA Fisheries 2004). Imports of snappers and groupers are classified into two product forms: fresh and frozen. Fresh fish comprised over 70% of total snapper grouper imports in 2004 (Table 4.2.3-4), which increased almost threefold from 16 million lbs in 1991 to 44.4 million lbs in 2003. Imports of other product forms cannot be identified by species group.

It is reasonable to expect that imports influence domestic prices. From the point of view of fishermen, imports contribute to depressing dockside prices. However, imports increase the aggregate U.S. supply of snappers and groupers, which leads to lower retail prices for consumers. Thus, consumers in this country benefit from imports, although there are also balance of trade considerations with imports, which affect the buying power of U.S. consumers in the long run. Imports also benefit some wholesalers and retailers in the fishing industry, especially at times when the domestic fishery is unable to supply market needs.

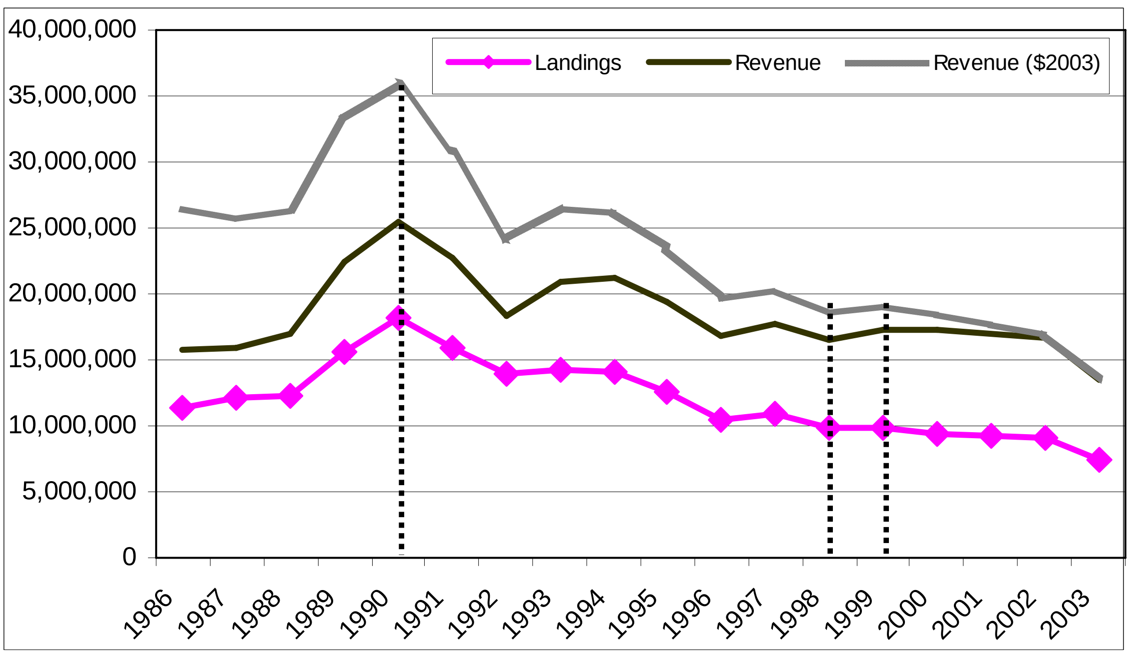

Figure 5.2.3-3. Trends in dockside landings and nominal and real ex-vessel revenue for all snapper grouper species in the South Atlantic region during 1986-2003. Florida landings include all of Monroe County. Source: Accumulated landings system, Southeast Fisheries Science Center, Beaufort Lab

*landings data are presented in whole weight equivalents
**Real value was calculated using the Consumer Price Index (CPI) and represents the purchasing power of earnings of a respective year in 2003 dollars.
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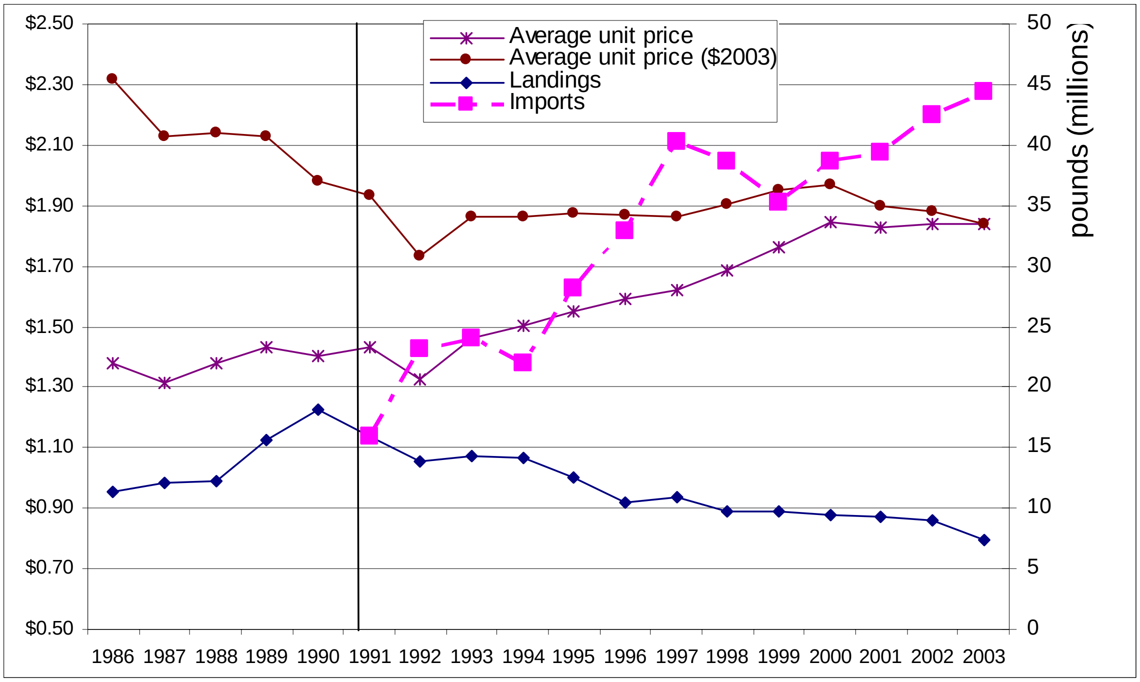


Figure 5.2.3-4. Trends in unit price, imports, and landings of snapper grouper species. Average unit prices are expressed in nominal value and real value (2003 dollars). Source: Accumulated landings system, Southeast Fisheries Science Center, Beaufort Lab.

Table 5.2.3-4. U.S. imports of snappers and groupers from 1991 to 2004. Source: NMFS, Foreign Trade Database.

YEAR	Pounds of imports by product form Millions of pounds**			Value of imports by product form Millions of dollars		
	FRESH	FROZEN	TOTAL	FRESH	FROZEN	TOTAL
1991	12.6	3.4	16.0	$16.3	$4.0	$20.2
1992	19.4	3.9	23.2	$28.0	$4.6	$32.6
1993	20.8	3.2	24.0	$28.9	$3.9	$32.9
1994	20.0	2.0	22.0	$28.4	$2.5	$30.9
1995	26.1	2.1	28.2	$35.9	$2.6	$38.5
1996	30.7	2.2	32.9	$44.8	$2.7	$47.5
1997	36.8	3.5	40.2	$53.8	$4.2	$58.0
1998	35.1	3.6	38.7	$53.3	$5.2	$58.5
1999	32.0	3.3	35.3	$49.4	$4.6	$53.9
2000	32.5	6.1	38.6	$53.5	$9.5	$63.0
2001	31.1	8.4	39.4	$51.7	$10.6	$62.3
2002	33.3	9.2	42.5	$57.1	$12.3	$69.5
2003	34.2	10.2	44.4	$58.9	$14.4	$73.3
2004	33.2	9.8	43.0	$61.7	$13.9	$75.6

<u>Overall Description of the Snapper Grouper Fishery for Individual South Atlantic States</u>

Due to confidentiality considerations, statistics on the economic importance and characteristics of the snapper grouper fishery for individual states in the South Atlantic are presented as averages for 1999 to 2003.

The South Atlantic state with the highest ex-vessel revenue from snapper grouper landings was Florida ($5.8 million) followed by North Carolina ($3.7 million), South Carolina ($3.3 million), and Georgia ($0.8 million) (Table 5.2.3-5). A similar ranking is observed for the number of days fished, number of trips, landings, number of permitted vessels, and number of vessels in the fishery by state (Table 3-8b). Snapper grouper landings appear to be relatively more important to the commercial fishing industry in Florida and South Carolina compared to the other two states. However, another picture emerges when considering the relative contribution of snapper grouper species to the overall ex-vessel value of finfish landings. Approximately 95% of the total revenue from finfish landings in Georgia is comprised of snapper grouper species (Table 5.2.3-5). Thus, while total snapper grouper landings in Georgia may be relatively low compared to other states, the fishery has great significance to the commercial finfish harvesters in the state.

Similar to the pattern observed for the South Atlantic, the dockside value of landings, number of trips and the number of vessels in the snapper grouper fishery declined during the period 1999-2003. However, the relative decrease in South Carolina was not as severe as observed for the other states during this period. For example, the decrease in ex-vessel value was 12% for South Carolina compared to 31% for North Carolina, 32% for Georgia, and 22% for Florida. A possible explanation for this difference is that even though the number of vessels declined in South Carolina the number of days fished increased (in contrast to the other states). Also, the proportional decline in vessels with a high level of landings was lower in South Carolina than observed for the other states. Except for South Carolina the number of home-ported vessels with snapper grouper permits decreased in all states (Table 5.2.3-5).

Another difference to note is snapper grouper trips in Georgia and South Carolina were of greater duration than trips in the other two states. The average trip length for South Carolina and Georgia was 4.64 days and 6.35 days, respectively compared to 1.75 days for North Carolina and 1.4 days for Florida (Table 5.2.3-5). One explanation for this difference is the fleet in Florida and North Carolina is comprised of a larger proportion of smaller vessels (Table 5.2.3-5 and Table 5.2.3-8). In Florida, snapper grouper species are available closer to shore whereas the travel distance to the fishing grounds is greater for vessels fishing in the other states. The shorter average trip length in North Carolina could be due to a fishery comprised of small vessels, which primarily operate in the inshore areas and only venture further out occasionally to catch snapper grouper species.

Average landings per vessel and average landings per trip were much higher for South Carolina and Georgia vessels compared to vessels from the other two states (Table 5.2.3-6). In North Carolina, the average landings per trip was 645 lbs compared to 2,354 lbs for Georgia. The average landings per day was at about the same level for all states except Florida where the average landings per day was about 50% less than the average daily catch in Georgia (Table 5.2.3-6).

Table 5.2.3-5. Economic characteristics of the snapper grouper fishery by state in the South Atlantic from 1999-2003. Source: Database derived from the Southeast logbook provided by the Southeast Fisheries Science Center, NMFS, Beaufort Lab.

	Average per year - 1999-2003				**Change from 1999-2003 (1999 to 2004 for the permit data**)**			
Item	North Carolina	South Carolina	Georgia	Florida	North Carolina	South Carolina	Georgia	Florida
Snapper grouper Landings (lb)	2,016,539	1,637,005	428,472	3,251,899	-24%	-3%	-20%	-17%
Ex-vessel revenue	$3,673,443	$3,273,266	$823,729	$5,806,406	-31%	-12%	-32%	-22%
Ex-vessel revenue from all landings*	$93,529,784	$27,396,198	$17,490,320	$42,408,722	-13%	-9%	-43%	-33%
Ex-vessel revenue from all finfish landings*	$34,308,323	$5,502,254	$862,760	$16,243,040	-6%	5%	-22%	-18%
% of total ex-vessel revenue	4%	12%	5%	14%				
% of total revenue from finfish landings	11%	59%	95%	36%				
Number of trips	3,125	1,016	182	12,346	-20%	-5%	-7%	-2%
Number of days	5,475	4,712	1,150	17,490	-18%	15%	-11%	-8%
Average trip length	1.75	4.64	6.35	1.4	2%	21%	-5%	-6%
Number of permitted vessels**	191	89	15	945	-33%	5%	-20%	-27%
Number of vessels with unlimited permits**	163	80	13	686	-28%	17%	-23%	-25%

* Data downloaded from the NMFS web site.
** Statistics on snapper grouper permits are calculated using data from 1999-2004.

Table 5.2.3-6. Economic characteristics of the snapper grouper fishery by state in the South Atlantic from 1999-2003. Source: Database derived from the Southeast logbook provided by the Southeast Fisheries Science Center, NMFS, Beaufort Lab.

	Average per year -1999-2003				**Change from 1999-2003**			
Item	North Carolina	South Carolina	Georgia	Florida	North Carolina	South Carolina	Georgia	Florida

Number of vessels (any landings)	181	75	14	738	-14%	-27%	-14%	-18%
Average landings per vessel (lb.)	11,153	21,827	29,755	4,406				
Average landings per trip (lb.)	645	1,612	2,354	263				
Average landings per day (lb.)	368	347	372	186				
Number of vessels with more than 100 lb of landings	157	73	13	631	-19%	-29%	0	-20%
Number of vessels with more than 1,000 lb of landings	124	64	12	402	-15%	-24%	-9%	-17%
Number of vessels with more than 10,000 lb of landings	64	39	8	84	-27%	-12%	0	-1%
Number of vessels with more than 50,000 lb of landings	confidential data	10	confidential data	7				
Number of dealer permits	38	22	4	129	93%	-8%		1%

The previous two paragraphs described the entire fishery for snapper grouper species by state. Statistics on only the species in this amendment, summarized by state for the period 1999 to 2003, are contained in Table 5.2.3-7. North Carolina had the highest level of recorded landings (1.07 million lbs), followed by South Carolina (0.80 million lbs), Florida (0.66 million lbs) and Georgia (0.21 million lbs). A similar ranking is observed for the number of days fished and sales revenue (Table 5.2.3-7). The species addressed in this amendment are relatively more important to the snapper grouper fishery in North Carolina, South Carolina, and Georgia, where these five species comprised at least 50% of the revenue from snapper grouper landings, compared to Florida where they comprised 22% of the total snapper grouper revenue. A slightly different picture emerges when considering the importance of these species to all finfish harvested in the respective state. In Georgia, these species comprised at least 53% of the total finfish landings compared to less than 10% for North Carolina and Florida (Table 5.2.3-7).

Commercial fishermen made more trips for the species addressed by this amendment and more vessels were engaged in the harvest of these species in Florida and North Carolina compared to the other two states. However, the average trip length, the harvest per trip, and the annual harvest per vessel is considerably higher for South Carolina and Georgia compared to the other two states (Table 5.2.3-7). These statistics are fairly comparable to the observations made in the earlier discussion on the entire snapper grouper fishery.

As observed for the entire snapper grouper fishery, changes in landings, ex-vessel revenue, the number of trips, and the number of vessels engaged in harvesting these five species were lower in 2003 compared to 1999. A greater proportional decline in ex-vessel revenue and landings was observed for North Carolina and Florida compared to the other two states (Table 5.2.3-7).

Table 5.2.3-7. Economic characteristics of the fishery for species in this amendment by state from 1999-2003. Source: Database derived from the Southeast logbook provided by the Southeast Fisheries Science Center, NMFS, Beaufort Lab.

	Average per year - 1999-2003				**Change from 1999-2003**			
Item	North Carolina	South Carolina	Georgia	Florida	North Carolina	South Carolina	Georgia	Florida
Landings (lb)	1,070,275	802,498	212,522	660,445	-32%	-7%	-2%	-40%
Ex-vessel revenue	$2,119,258	$1,599,875	$453,683	$1,288,570	-36%	-9%	-3%	-34%
% of total snapper grouper revenue	58%	49%	55%	22%				
% of total revenue from finfish landings	6%	29%	53%	8%				
% of total revenue from commercial landings	2%	6%	3%	3%				
Number of trips	2,682	991	175	1,678	-26%	-5%	-13%	-22%
Number of days	4,917	4,624	1,138	3,655	-21%	16%	-12%	-30%
Average trip length	1.84	4.67	6.55	2.17				
Number of vessels	156	74	13	219	-23%	-28%	-15%	-23%
Average landings per vessel (lb.)	6,852	10,874	16,348	3,021				
Average landings per trip (lb.)	399	810	1,214	394				
Average landings per day (lb.)	218	174	187	181				

Table 5.2.3-8. Length distribution of permitted vessels by state in 2004. Source: Southeast permits database, Permits Office, SER, NMFS.

Size Category (feet)	**Florida**	**North Carolina**	**Georgia**	**South Carolina**
Less than 20	6%	2%	0%	1%
20-29	51%	35%	17%	22%

30-39	31%	46%	42%	44%
40-49	10%	16%	42%	30%
50-59	2%	1%	0%	2%
60-69	1%	1%	0%	1%
70-79	<1%	<1%	<1%	<1%
larger than 80 feet	<1%	<1%	<1%	<1%
	100%	100%	100%	100%

Species Composition in the Commercial Fishery

Numerous species make up the Snapper Grouper Fishery Management Unit (FMU). In Amendment 13B to the Snapper Grouper FMP, the Council is considering dividing the FMU into nine separate multi-species sub-units to conserve and manage snapper grouper species that are generally targeted and/or captured together. Much of the remaining social and economic analyses in Section 3.4 describe the economic and social environment in the context of these proposed sub-units. In terms of ex-vessel revenue the most important groups include the shallow water groupers, shallow water snappers, and mid-shelf snappers (Figure 5.2.3-5). Of secondary importance are golden tilefish, deep water groupers, jacks, and sea basses. No one group comprised more than 30% of the snapper grouper complex revenue during the period 1999 to 2003 (Figures 5.2.3-5, 5.2.3-6).

Ex-vessel revenue from the species in this amendment accounts for 41% of the total snapper grouper revenue. Revenue from South Atlantic vermilion snapper harvest comprises 20% of the total snapper grouper revenue (Figure 5.2.3-6). Among other factors the species composition of the snapper grouper catch depends on fishing location, time of year, and distance from shore.

Trends in the harvest of individual species in this amendment are presented in Figure 5.2.3-7. Subsequent to the peak observed in 1988 black sea bass landings declined continuously over the period 1991 to 2002. These statistics contain harvest north of Cape Hatteras, which includes harvest from the black sea bass populations managed by the Mid-Atlantic Fishery Management Council. Vermilion snapper harvests were at their lowest levels during 1992 through 1998. Since 1999, harvest of vermilion snapper increased and peaked in 2001. Harvest in 2003 was at the level observed during 1992 to 1998 (Figure 5.2.3-7). As mentioned previously, harvest of other snapper grouper species were at unusually low levels in 2003 and this was linked to extremely low water temperatures during 2003. Snowy grouper and golden tilefish landings were at their highest levels during the period 1989 to 1993. The observed drop off in 1994 is possibly correlated to the trip limit and quota regulations implemented in 1994 for these two species (Figure 5.2.3-5). Further harvest declines of these species occurred from 1999 through 2003 (Figure 5.2.3-7). Red porgy harvests have been declining throughout this entire period. The drop in red porgy landings during the period 1999 through 2003 resulted from the substantial harvest reduction measures implemented in 1999 (Figure 5.2.3-7). A detailed account of the regulatory history of the snapper grouper fishery is contained in Section 1.3 of this amendment.

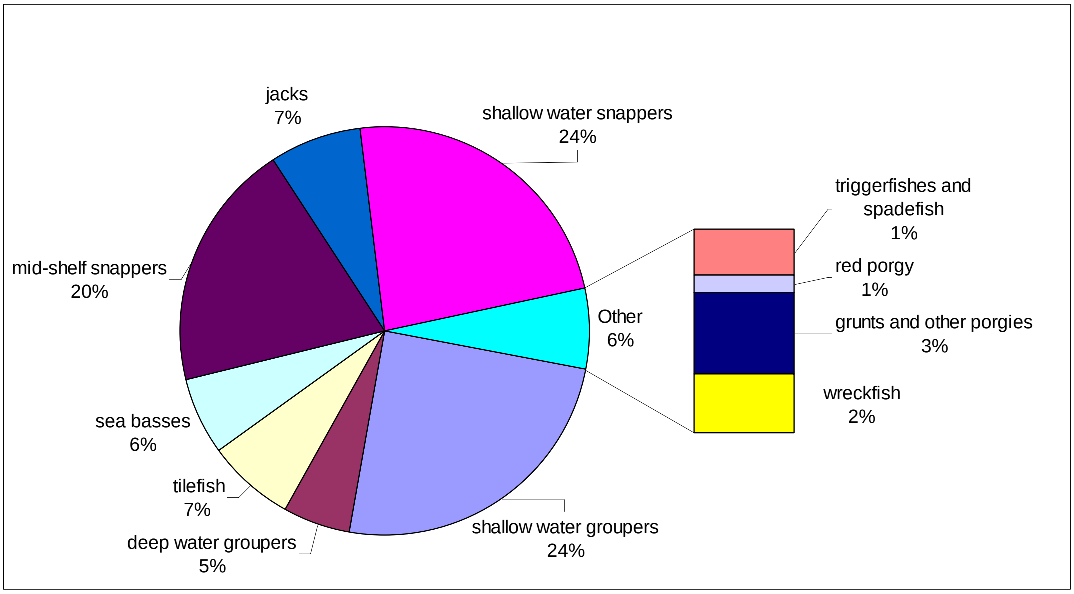


Figure 5.2.3-5. Proportion of ex-vessel revenue derived from the various groups in the snapper grouper complex. Average ex-vessel revenue for 1999-2003 was used to calculate the percent composition. All unclassified groupers were placed in the shallow water grouper unit (1A) and all unclassified snappers were placed in the shallow water snapper category. Source: Accumulated landings system, Southeast Fisheries Science Center, Beaufort Lab.

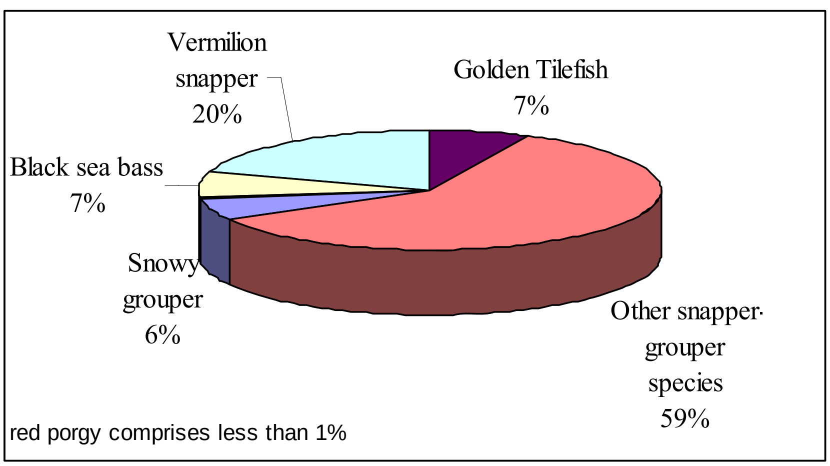


Figure 5.2.3-6. Proportion of ex-vessel revenue derived from the various species addressed in Snapper Grouper Amendment 13C (SAFMC 2006). Average ex-vessel revenue for 1999-2003 was used to calculate the percent composition. Source: Accumulated landings system, Southeast Fisheries Science Center, Beaufort Lab.

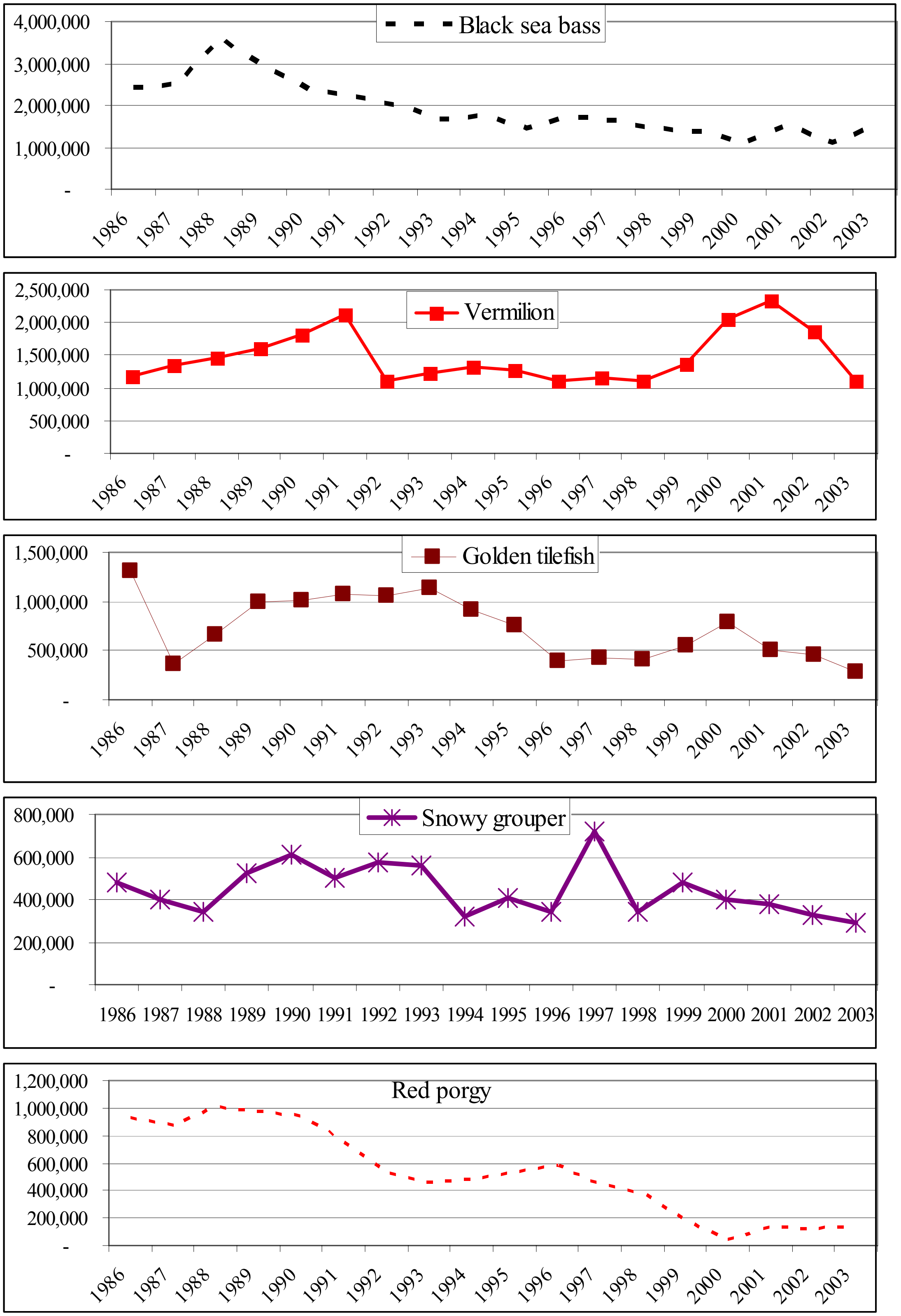


Figure 5.2.3-7. Harvest trends in landings for the five species in Snapper Grouper Amendment 13C (SAFMC 2006) during 1986-2003. Source: Accumulative landings system, Southeast Fisheries Science Center, Beaufort Lab.

A substantial difference in price exists among the various species or species groupings in the snapper grouper complex. In general, the species groupings can be placed into three categories based on the observed average annual price per lb (Figure 5.2.3-8):

- Low price category - nominal price did not exceed $1.00 per lb during the entire time series. Species groups include the jacks, grunts and other porgies, and triggerfishes and spadefish.

- Medium price category – generally prices ranged between $1.00 and $1.50 per lb. Species groups include red porgy, black sea bass, and the tilefishes. The tilefish group can be split into two categories based on average prices where blueline tilefish would fall into the low price category. Average ex-vessel prices for golden tilefish varied between $1.30 and $2.00 per lb.

- High price category - the price per lb is usually close to or exceeds $2.00 per lb. The following groups fall in this category: deep water groupers (including snowy grouper), wreckfish, shallow water groupers, shallow water snappers, and mid-shelf snappers (including vermilion snapper).

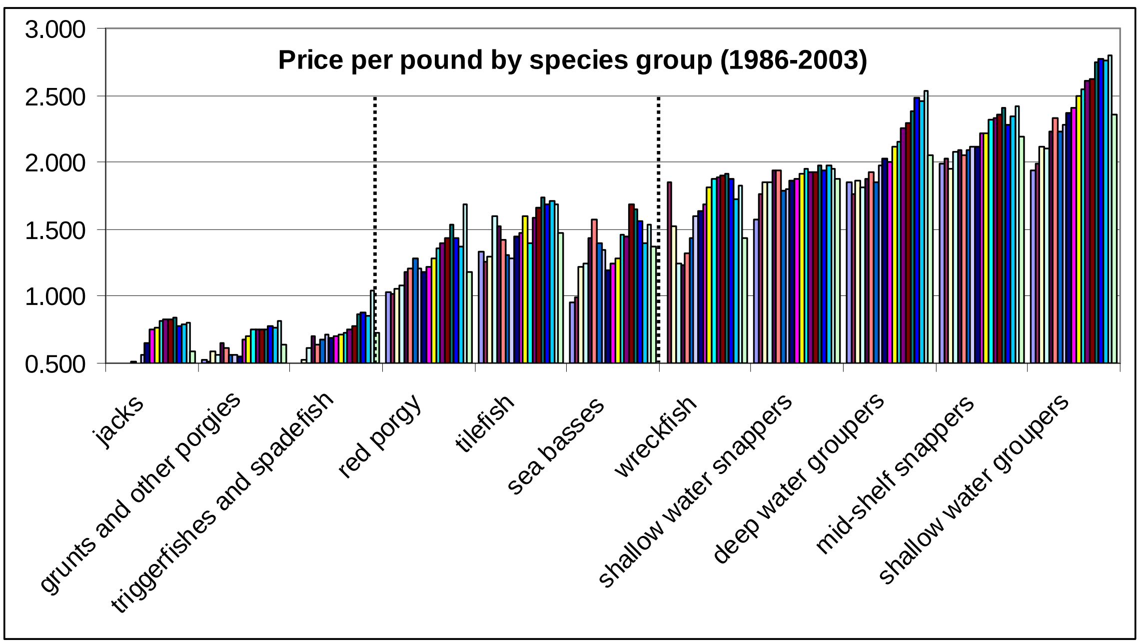


Figure 5.2.3-8. Price per lb by species group during 1986-2003. Source: Accumulative landings system, Southeast Fisheries Science Center, Beaufort Lab.

Trips where shallow water snappers, shallow water groupers, and jacks are caught dominate the snapper grouper fishery (Table 5.2.3-9). Also, a large proportion of the snapper grouper fleet reported landings for species in these groupings (Table 5.2.3-10). As far as trips and vessels where a specific unit was the top revenue earner, shallow water snappers and shallow water groupers emerge as the most important groups in the snapper grouper fishery (Table 5.2.3-9, Table 5.2.3-10). However, there is substantial variability among the groups in terms of the proportion of trips where a unit is the top revenue earner as a percent of total trips when species in that unit were caught. The shallow water snapper group was the top revenue earner on 69% of all trips where species in the unit were caught. For the mid-shelf snappers, tilefishes, sea basses, shallow water groupers, and deep water groupers, this figure is around the 40% level. The other units (jacks, triggerfishes/spadefish, and grunts/porgies) are not usually the top revenue earner on trips where they are caught. These are lower priced species groups and are probably not targeted as regularly as the other units in the snapper grouper complex. Also, these species are probably caught in association with many other species and hence are not a main contributor to overall revenue (Table 5.2.3-9). In terms of primary and secondary sources of revenue most vessels depend on the shallow water groupers, followed by shallow water snappers and mid-shelf snappers (Table 5.2.3-10).

Table 5.2.3-9. Average number of trips during 1999-2003 with landings from each proposed unit in Snapper Grouper Amendment 13B. Source: Data table provided by the Southeast Fisheries Science Center, NMFS, Beaufort Lab.

Unit	Trips with at least 1 pound in unit (Y)	Percent of all trips that landed at least 1 pound of unit	Trips with unit at top source of revenue (X)	Percent of trips with unit at top source of revenue	(X/Y) *
Shallow Water Groupers	6,045	36%	2,745	16%	45%
Deep Water Groupers	1,816	11%	684	4%	38%
Tilefish	1,250	8%	472	3%	38%
Shallow Water Snappers	9,279	56%	6,412	38%	69%
Mid-Shelf Snappers	3,488	21%	1,487	9%	43%
Triggerfishes	2,478	15%	42	0%	2%
Jacks	5,742	34%	1,063	6%	19%
Red Porgy	1,446	9%	16	0%	1%
Grunts and Porgies 7B	4,127	25%	133	1%	3%
Sea Basses	2,673	16%	1,018	6%	38%

16,672 = The average number of trips for the period 1999-2003 where at least 1 lb of snapper grouper species was landed.
*Top revenue trips for each unit as a percent of all trips with at least 1 lb of the unit.

Table 5.2.3-10. Average number of boats during 1999-2003 with landings from each proposed unit in Snapper Grouper Amendment 13B. Source: Data table provided by the Southeast Fisheries Science Center, NMFS, Beaufort Lab.

	Total boats with at least 1 pound of species in group	Percent of all boats that landed at least 1 pound of unit	Boats with Top-revenue trips only (X)	Both top-rev and secondary rev trips (Y)	X+Y
Shallow Water Groupers	677	68%	95	353	448
Deep Water Groupers	269	27%	36	102	139
Tilefish	170	17%	20	56	76
Shallow Water Snappers	708	71%	200	282	482
Mid-Shelf Snappers	388	39%	47	178	225
Triggerfishes	307	31%	6	21	27
Jacks	625	63%	29	158	187
Red Porgy	187	19%	0	7	8
Grunts and Porgies	461	46%	6	45	51
Sea Basses	255	26%	30	73	103

998 = average number of vessels that landed at least 1 lb of snapper grouper species during the period 1999-2003
X = Number of boats that only recorded trips for the unit as top-revenue unit
Y = Number of boats that recorded trips for unit, with some trips as top-revenue and other trips as secondary source of revenue

Golden tilefish dominate most trips on which this species is caught. Since the species was the top revenue earner on 59-75% of all trips where it was caught during the period 1999 to 2004 (Table 5.2.3-11). In comparison, black sea bass was the top revenue earner on 34% to 41% of all trips where black sea bass were harvested during the same period (Table 5.2.3-11).

Data on the composition of the catch were examined for all trips where a particular species was caught (Table 5.2.3-11). This information provides insight into potential target shifts if regulations restrict the harvest of a particular species. Vermilion snapper is a top revenue earner on a large proportion of trips on which this species is caught, and gag, red grouper and scamp also frequently dominate the catch on these trips (Table 5.2.3-9). Vermilion snapper is targeted on a large number of trips on which snowy grouper and red porgy are harvested (Figures 5.2.3-11, 5.2.3-12).

For golden tilefish and black sea bass, the composition of the catch was examined by gear type. In the case of black sea bass, catch on trips employing trap gear is dominated by black sea bass. Black sea bass was the top revenue earner on 99% of all trap trips. However, catches taken by hook and line gear are dominated by vermilion snapper and gag (Figure 3-11d). It is reasonable to surmise black sea bass are not usually the main target on these hook and line trips. Golden tilefish tend to dominate the revenue earned on longline trips (77%). This is evident also on trips where golden tilefish are caught using hook and line gear (Figure 5.2.3-14). For both gear types, snowy grouper dominates the catches on a fairly large proportion of trips (20% in the hook and line fishery and 13% in the long line fishery) (Figure 5.2.3-11, 5.2.3-14).

Table 5.2.3-11. Landings, ex-vessel revenue, number of vessels, and effort associated with harvest of the five species in this amendment during 1999-2004. Source: Southeast logbook, SEFSC, NMFS, Beaufort Lab.

Year	Landings (pounds)	Ex-vessel Revenue	No. vessels[1] (A)	No. vessels top species[2] (B)	All trips[3] (C)	Trips - top species[4] (D)	% top vessels of total (B/A)	% top trips of total (D/C)
				Vermilion snapper				
1999	906,279	$2,111,719	332	181	2,856	1,136	55%	40%
2000	1,381,791	$3,203,512	293	176	2,849	1,487	60%	52%
2001	1,651,209	$3,539,515	294	181	3,029	1,690	62%	56%
2002	1,309,396	$2,912,203	273	166	2,907	1,495	61%	51%
2003	769,895	$1,733,558	248	149	2,173	926	60%	43%
2004	1,065,613	$2,466,331	250	156	2,111	1,034	62%	49%
				Snowy grouper				
1999	463,054	$934,613	247	147	1,767	711	60%	40%
2000	412,784	$862,871	228	140	1,723	693	61%	40%
2001	352,331	$765,232	226	130	1,719	603	58%	35%
2002	310,458	$669,035	205	112	1,550	600	55%	39%
2003	286,936	$638,558	189	109	1,347	541	58%	40%
2004	236,774	$543,741	166	92	1,048	430	55%	41%
				Red porgy				
1999	91,412	$133,889	237	25	1,586	29	11%	2%
2000	15,207	$23,560	144		623		0%	0%
2001	52,412	$76,753	199	8	1,790	11	4%	1%
2002	56,706	$81,327	180	7	1,694	41	4%	2%
2003	44,768	$61,612	175	8	1,541	12	5%	1%
2004	43,327	$54,492	170	7	1,289	8	4%	1%
				Black sea bass				
1999	790,645	$1,365,122	307	140	3,069	1,257	46%	41%
2000	550,757	$931,397	256	112	2,485	956	44%	38%
2001	604,438	$938,950	249	97	2,959	1,186	39%	40%
2002	506,673	$745,418	237	91	2,616	881	38%	34%
2003	597,840	$924,386	225	88	2,241	863	39%	39%
2004	705,889	$1,121,589	240	103	2,342	903	43%	39%
				Golden tilefish				
1999	545,923	$959,897	82	53	545	389	65%	71%
2000	783,774	$1,456,076	94	62	710	532	66%	75%
2001	489,253	$868,160	87	53	471	294	61%	62%
2002	444,285	$796,842	86	55	569	363	64%	64%
2003	348,281	$634,436	64	42	394	233	66%	59%
2004	272,392	$513,294	66	44	335	233	67%	70%

[1] number of vessels with at least one lb of recorded landings of the respective species.
[2] number of vessels on which the species was a top revenue earner for at least one trip during the year.
[3] number of trips with at least one lb of the species.
[4] number of trips on which the species was the top revenue earner.

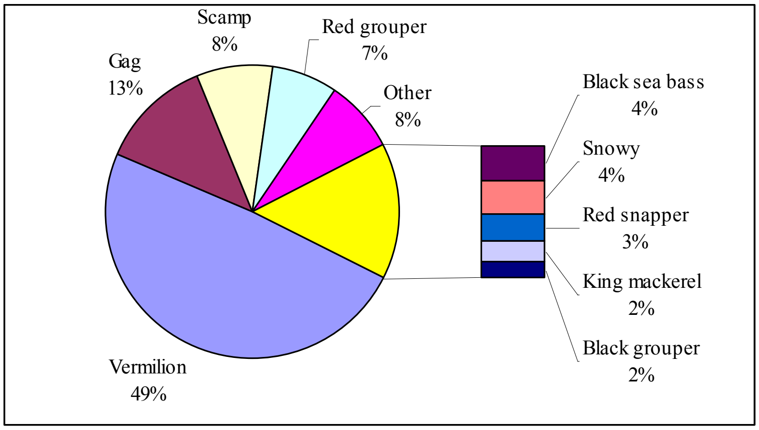


Figure 5.2.3-9. Proportion of trips where the respective species was the top revenue earner on all trips where vermilion snapper were harvested. Source: Southeast logbook database, NMFS, Beaufort Lab.

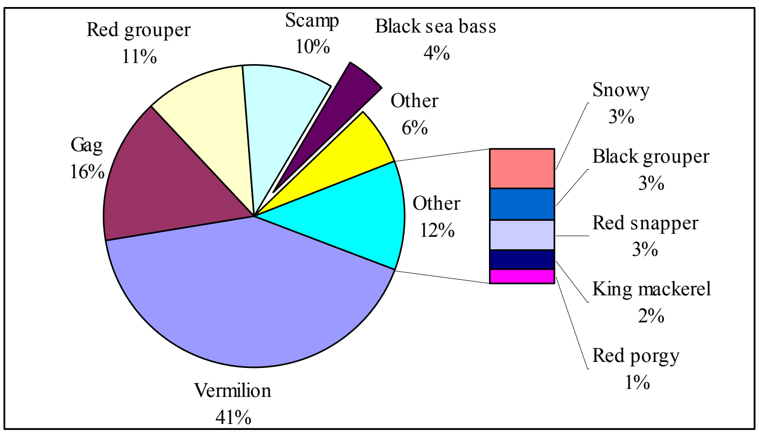


Figure 5.2.3-10. Proportion of trips where the respective species was the top revenue earner on all trips where red porgy were harvested. Source: Southeast logbook database, NMFS, Beaufort Lab.

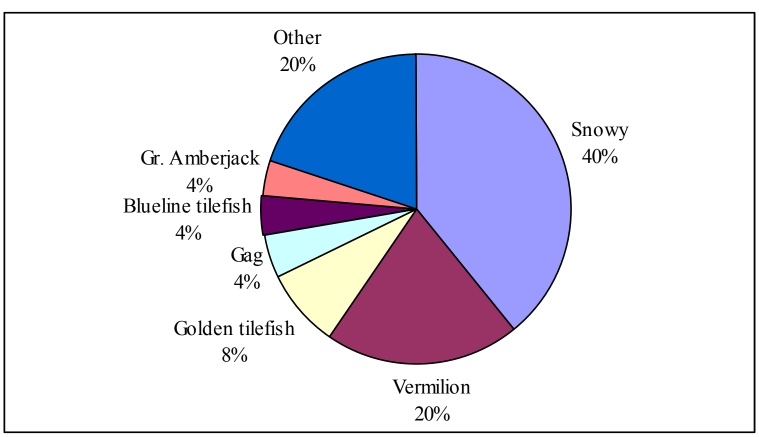


Figure 5.2.3-11. Proportion of trips where the respective species was the top revenue earner on all trips where snowy grouper were harvested. Source: Southeast logbook database, NMFS, Beaufort Lab.

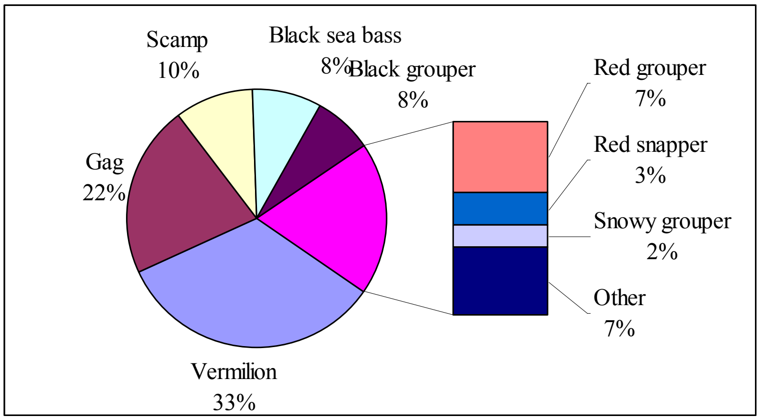


Figure 5.2.3-12. Proportion of trips where the respective species was the top revenue earner on all trips where black sea bass were harvested by hook and line gear. Source: Southeast logbook database, NMFS, Beaufort Lab. Black sea bass was the top revenue earner on 99% of trips on which black sea bass were caught using trap gear.

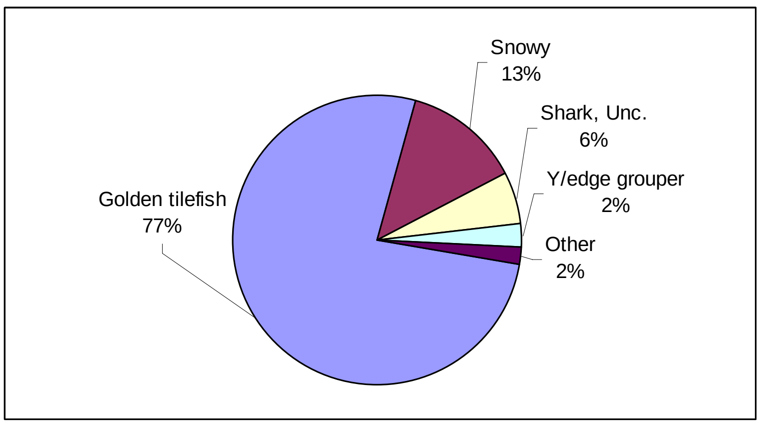


Figure 5.2.3-13. Proportion of trips where the respective species was the top revenue earner on all trips where golden tilefish were harvested by longline gear. Source: Southeast logbook database, NMFS, Beaufort Lab.

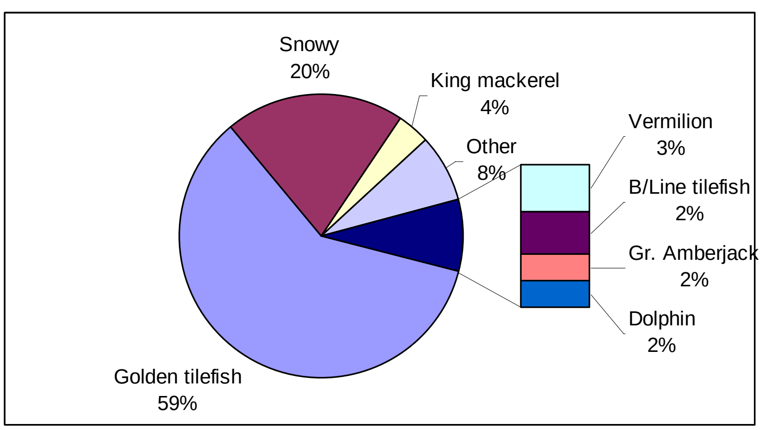


Figure 5.2.3-14. Proportion of trips where the respective species was the top revenue earner on all trips where golden tilefish were harvested by hook and line gear.

Source: Southeast logbook database, NMFS, Beaufort Lab.

There is some variability among the states with respect to the species and/or species groups dominating overall revenue from snapper grouper landings. In terms of ex-vessel revenue the top state for black sea bass is North Carolina. Revenue from golden tilefish landings is concentrated in Florida and to a lesser extent South Carolina (Table 5.2.3-12, 5.2.3-13). Most of the shallow water snappers and jacks are landed in Florida, with minimal landings in other states (Table 5.2.3-12). In terms of overall contribution to the state's revenue from snapper grouper landings, North Carolina snapper grouper harvests are dominated by the mid-shelf snapper, shallow water grouper, and sea bass units. Mid-shelf snappers and shallow water groupers also dominate the snapper grouper fishery in South Carolina (Table 5.2.3-12, 5.2.3-14). In Georgia, the mid-shelf unit comprises 59% of the total revenue in the snapper grouper complex followed by the shallow water grouper unit. Of the five species in this amendment, vermilion snapper dominates the total harvest in Georgia (Table 5.2.3-13). In Florida, the most important group is the shallow water snapper unit, which makes up 43% of the snapper grouper revenue (Table 5.2.3-14).

Table 5.2.3-12. Average ex-vessel value of the snapper grouper units (proposed in Snapper Grouper Amendment 13B) by state during 1999-2003. Source: Southeast logbook database, NMFS, Beaufort Lab.

Group	North Carolina	Georgia	South Carolina	Florida	Other
Shallow water groupers	$1,077,252	$217,731	$1,228,433	$962,362	
Deep water groupers	$275,553	$14,044	$228,680	$367,193	$3,505
Tilefishes	$105,115	$5,476	$266,709	$689,805	$13,318
Shallow water snappers	$24,362	$10,111	$41,884	$2,483,091	
Mid-shelf snappers	$1,083,541	$481,999	$1,025,725	$581,215	
Triggerfish / Spadefish	$119,604	$29,671	$72,314	$30,884	
Jacks	$103,690	$51,803	$144,306	$640,809	
Red Porgy	$34,969	$3,854	$24,191	$12,338	
Grunts and other porgies	$77,769	$5,269	$44,746	$32,770	
Sea basses	$771,669	$3,770	$196,278	$6,361	

Table 5.2.3-13. Average ex-vessel value of species in this amendment by state for 1999-2004. Source: Southeast logbook database, NMFS, Beaufort Lab.

Species	Florida	Georgia	North Carolina	South Carolina	Other
Vermilion snapper	$338,130	$418,213	$979,303	$925,389	<$300
Snowy grouper	$263,791	<$15,000	$253,189	$203,832	<$2,000
Red porgy	$11,593	<$5,000	$34,110	$22,562	

Black sea bass	<$10,000	<$5,000	$771,802	$221,026	<$500
Golden tilefish	$597,194	<$5,000	$38,733	$222,970	<$10,000

Table 5.2.3-14. Proportional contribution of each unit (proposed in Snapper Grouper Amendment 13B) to the total ex-vessel revenue from all snapper grouper species by state, averaged over 1999-2003. Source: SEFSC logbook database, NMFS, Beaufort Lab.

Group	North Carolina	Georgia	South Carolina	Florida
Shallow water groupers	29%	26%	38%	17%
Deep water groupers	8%	2%	7%	6%
Tilefishes	3%	1%	8%	12%
Shallow water snappers	1%	1%	1%	43%
Mid-shelf snappers	29%	59%	31%	10%
Triggerfish / Spadefish	3%	4%	2%	1%
Jacks	3%	6%	4%	11%
Red Porgy	1%	0%	1%	0%
Grunts and other porgies	2%	1%	1%	1%
Sea basses	21%	0%	6%	0%
	100%	100%	100%	100%

Landings Distribution by Gear Type

Except for golden tilefish and black sea bass, most of the harvest of the remaining species addressed by this amendment is taken by hook and line gear. For black sea bass, 85% of the catch is taken by traps and 13% is harvested by hook and line gear. The longline fishery is primarily responsible for harvesting golden tilefish. Also, 28% of the snowy grouper catch is harvested by vessels employing longline gear. The longline vessels, which report to the southeast logbook program, also operate in other fisheries such as the shark fishery (Table 5.2.3-15). A more in-depth description of the trap and longline components within the snapper grouper fishery can be found in the subsequent sections.

Table 5.2.3-15. The relative importance of different gear types used to harvest species addressed in this amendment. Percentage of species caught by gear type during 1999-2004. Source: SEFSC Logbook, NMFS.

Species	Hook and line	Longline	Traps	Other
Vermilion snapper	99%	0%	0%	1%
Snowy grouper	70%	28%	0%	2%
Red porgy	97%	0%	2%	1%
Black sea bass	13%	0%	85%	1%
Golden tilefish	6%	93%	0%	1%

The black sea bass fishery

The majority of the black sea bass catch is harvested by trap gear in the South Atlantic, with a smaller portion is taken by hook and line gear (Table 5.2.3-15). During 1999-2003, a total of 112 different vessels employed trap gear to catch black sea bass in the South Atlantic and a total of 394 different vessels employed hook and line gear (Table 5.2.3-16, 5.2.3-17). Most of these vessels land their catch in North Carolina and South Carolina. For both sectors in the black sea bass fishery there was a decline in the number of vessels, trips, and revenue during 1999 through 2003 (Table 5.2.3-16, 5.2.3-17).

There are fewer trap vessels than hook and line vessels in this fishery. However, vessels in the trap fishery are more dependent on black sea bass compared to the hook and line sector. Approximately 10% of the hook and line fleet harvest more than 1,000 lbs of black sea bass per vessel annually. In comparison, at least 76% of the trap fleet harvests more than 1,000 lbs per vessel per year. Also, revenue from black sea bass comprises almost all revenue for trips where trap was that top gear utilized. In contrast, only 5% (106,037/2,049,127) of the total revenue earned by vessels that caught black sea bass in the hook and line sector came from black sea bass landings (Table 5.2.3-17). These hook and line vessels are primarily dependent on revenue from the mid-shelf complex and shallow water groupers (Figure 5.2.3-15).

Table 5.2.3-16. Characteristics of the trap fishery for black sea bass. Source: SEFSC Logbook database, NMFS, Beaufort Lab.

Item	1999	2000	2001	2002	2003	Total*
Number of vessels	71	64	59	50	50	112
North Carolina	42	41	40	35	35	72
South Carolina	29	23	18	14	14	39
Number of trips for black sea bass	1,021	806	1,074	788	747	
Trip length (trap was top gear)	1.2	1.1	1.2	1.3	1.3	
Number of vessels with more than 10,000 lbs (% of total vessels)	22 (31%)	14 (22%)	16 (27%)	15 (30%)	13 (26%)	
Number of vessels with more than 1,000 lbs (% of total)	58 (82%)	49 (77%)	49 (83%)	40 (80%)	38 (76%)	
Trips where sea bass was top revenue earner for the traps	1,009	792	1,065	771	743	
Total number of trips for all traps	1,035	825	1,082	798	752	
Revenue from black sea bass	$1,102,636	$793,564	$811,200	$629,539	$796,238	
Revenue from all trips where trap was the top gear	$1,262,066	$913,913	$887,241	$730,878	$835,526	

*The total number of different vessels that participated in this fishery from 1999 through 2003.

Table 5.2.3-17. Characteristics of the hook and line fishery for black sea bass. Source: SEFSC Logbook database, NMFS, Beaufort Lab.

Item	1999	2000	2001	2002	2003	Total*
Number of vessels with reported landings	247	207	204	199	181	394
North Carolina	142	113	107	116	105	219

South Carolina	63	58	62	50	49	98
Number of trips for black sea bass	1,902	1,551	1,785	1,728	1,398	
Trip length (hook and line was top gear)	1.7	1.8	1.8	1.8	1.7	
Number of vessels with more than 100 lbs of black sea bass (%)	147 (60%)	115 (59%)	128 (63%)	130 (65%)	111 (61%)	
Number of vessels with more than 1,000 lbs (%)	31 (13%)	19 (9%)	20 (10%)	22 (11%)	18 (10%)	
Number of hook and line trips - black sea bass top revenue earner	219	148	110	98	105	
Trips where hook and line was top gear and vessel caught black sea bass	3,395	2,979	3,214	3,302	2,587	
Revenue from black sea bass	$216,425	$129,961	$121,610	$110,957	$106,037	
Revenue from all trips where hook and line was the top gear and the vessel caught black sea bass	$2,863,818	$2,634,123	$2,360,183	$2,724,406	$2,049,127	

*The total number of different vessels that participated in this fishery from 1999 through 2003.
**this item represents all trips for the hook and line vessels that caught black sea bass in a given year

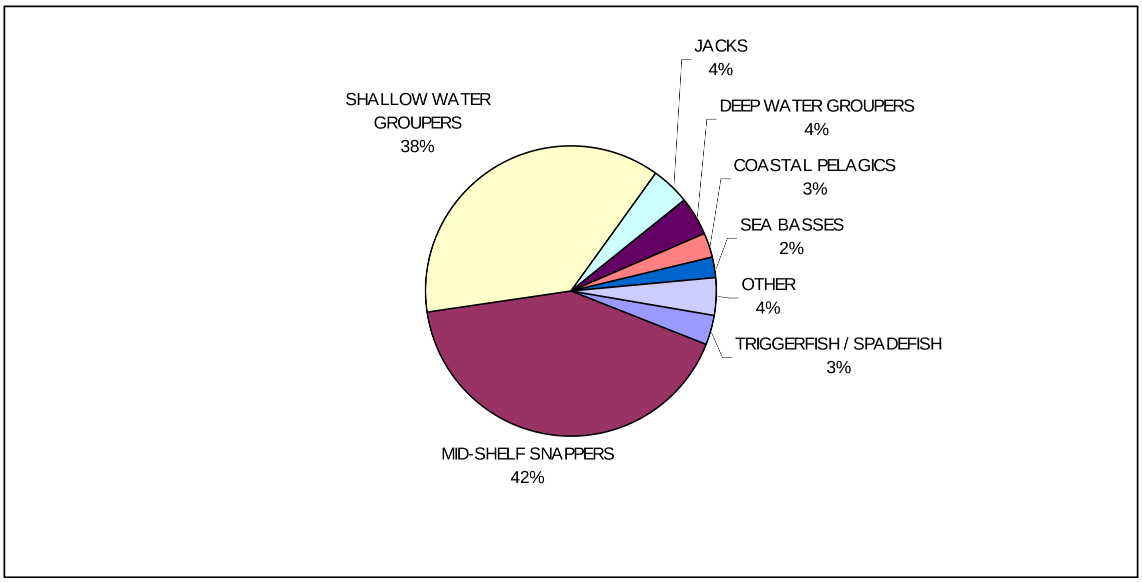


Figure 5.2.3-15. Distribution of revenue in the hook and line sector that harvested black sea bass during 1999-2003. Source: SEFSC Logbook database, NMFS, Beaufort Lab.

<u>The tilefish and deepwater grouper fisheries</u>
Longline vessels, which harvest both tilefish and snowy grouper, primarily land their harvest of these species in Florida and South Carolina (Table 5.2.3-15). Golden tilefish dominates the tilefish group and are primarily landed in South Carolina and Florida. On trips where snapper grouper species are caught, the longline vessels in the South Atlantic are more dependent on revenue from tilefish and snowy grouper. For example, in 2003 the total dockside value of snowy grouper and tilefish was $799,869 ($197,765+$602,104) while the total revenue from all species on longline trips targeting

snapper grouper species was $1.21 million (Table 3-15a). The average catch per trip for tilefish (1,558 lb/trip) is substantially higher than the catch per trip for snowy grouper (501 lbs/trip).

Vessels utilizing hook and line gear harvest the majority of the total snowy grouper landings. However, these vessels take more trips and the harvest per trip is lower than for the longline fleet (Table 5.2.3-18). There are a few vessels which harvest a large portion (more than 1,000 lbs annually) of snowy grouper. In contrast, hook and line vessels harvest a relatively smaller proportion of the overall tilefish catch. In conclusion, hook and line vessels, which land tilefish, appear to be less dependent on the revenue from this species because only a few vessels land more than 1,000 lbs of tilefish annually (Table 5.2.3-18).

Table 5.2.3-18. Characteristics of the longline fishery for snowy grouper and golden tilefish. Source: SEFSC logbook, NMFS, Beaufort Lab.

Item	1999	2000	2001	2002	2003
Number of longline vessels in the snapper grouper fishery	42	40	40	43	29
Florida	31	30	29	29	21
South Carolina	8	6	5	6	5
North Carolina	4	4	4	9	3
Number of vessels – snowy grouper	24	28	29	32	21
Number of vessels – golden tilefish	22	25	28	24	17
Total trips (days) with long line gear (snapper grouper fishery)	339	437	362	409	334
Number of trips for snowy grouper	174	237	216	172	171
Number of trips for golden tilefish	264	341	284	249	212
Revenue from snowy grouper	$201,981	$224,305	$255,066	$229,592	$197,765
Revenue from golden tilefish	$900,247	$1,369,913	$822,335	$702,250	$602,104
Revenue from all species on trips where snapper grouper are caught	$1,433,724	$2,138,777	$1,482,869	$1,518,522	$1,207,274
Trip length - longline is top gear	4.6	4.6	4.6	4.1	4.3
Lbs/trip – snowy grouper	558	454	530	577	501
Lbs/trip – golden tilefish	1,940	2,167	1,628	1,568	1,558
Number of vessels with more than 1,000 lbs snowy grouper	13	19	15	11	12
Number of vessels with more than 10,000 lbs of snowy grouper	Confidential				

Number of vessel with more than 1,000 lbs of golden tilefish	18	23	24	17	16
Number of vessels with more than 10,000 lbs of golden tilefish	14	15	14	11	12

Table 5.2.3-19. Characteristics of the hook and line fishery for snowy grouper and golden tilefish. Source: Southeast logbook, NMFS, Beaufort Lab.

Item	1999	2000	2001	2002	2003
Number of vessels with reported landings – snowy grouper	212	195	195	184	176
Florida	113	103	110	96	96
North Carolina	64	58	44	47	44
South Carolina	32	27	35	35	31
Number of trips for snowy grouper	1,503	1,374	1,441	1,335	1,145
Trip length (days) - hook and line was top gear	2.82	2.50	2.87	2.86	2.97
Number of vessels with more than 100 lbs of snowy grouper	148	140	137	122	118
Number of vessels with more than 1,000 lbs of snowy grouper	71	64	55	57	47
Number of vessels with more than 10,000 lbs of snowy grouper	Confidential data	Confidential data	Confidential data	Confidential data	Confidential data
Lbs/trip of snowy grouper harvested	103	92	79	68	78
Revenue from snowy grouper	$719,507	$608,047	$500,253	$432,658	$436,523
Number of vessels with reported tilefish landings	56	63	57	64	49
Florida	44	52	47	54	37
North Carolina	10	9	8	9	8
Number of trips for tilefish	256	346	180	310	179
Trip length (days) - hook and line was top gear	1.5	1.3	1.7	1.4	1.5
Lbs/trip of tilefish harvested	111	119	145	152	99
Number of vessels with more than 100 lbs of tilefish	26	34	24	38	26
Number of vessels with more than 1,000 lbs	9	10	Confidential data	9	Confidential data
Revenue from golden tilefish	$50,267	$77,724	$43,961	$82,138	$31,788

Seasonal Variability

In terms of seasonal variability in landings and revenue, the only unit proposed in Snapper Grouper Amendment 13B that really stands out is the sea bass unit where most of the harvest is taken in the winter months from November to February in North Carolina and South Carolina (Table 5.2.3-20, 5.2.3-21, 5.2.3-22).

The peak harvest months for the shallow water grouper fishery are May, June and July in the entire South Atlantic (Table 5.2.3-20). There is a prohibition on the harvest of gag and black grouper during March and April and in Georgia the fishery shifts over to the mid-shelf complex during the closed season (Table 5.2.3-23). Also, the peak month for the shallow water grouper fishery in Georgia occurs in May, which falls immediately after the closure for gag and black grouper.

For the deep water groupers, the peak harvest months are May and June for the entire fishery (Table 5.2.3-20). In North Carolina, most of the harvest of the deep water groupers is taken in May and June and the shallow water groupers are primarily harvested from May through August (Table 5.2.3-21). In South Carolina, the shallow water grouper season is from May through July and the deep water grouper season extends from March through July (Table 5.2.3-22).

Although there is a prohibition on harvest of greater amberjack during April, the peak months for harvest of the jack unit occurs in March and May in the South Atlantic (Table 5.2.3-20) and Florida (Table 5.2.3-24).

Table 5.2.3-20. Percent revenue from important species units by month for the South Atlantic averaged over 1999-2003. Source: Southeast logbook database, NMFS, Beaufort Lab.

Month	Shallow water grouper	Deep water grouper	Tilefish	Shallow water snapper	Mid-shelf snapper	Triggerfish/ spadefish	Jack	Red porgy	Grunt/ porgy	Sea bass
Jan	8.4%	6.06%	4.3%	6.6%	5.3%	6.1%	8.1%	11.2%	6.6%	**21.0%**
Feb	8.6%	9.23%	5.1%	7.3%	5.0%	5.5%	9.1%	4.6%	7.1%	**15.6%**
Mar	3.0%	10.91%	**8.7%**	**10.9%**	7.5%	7.9%	**13.5%**	0.1%	7.1%	8.5%
Apr	4.0%	10.73%	**11.1%**	**11.1%**	9.3%	8.9%	2.9%	0.6%	6.4%	5.4%
May	**12.8%**	**11.95%**	**10.5%**	**10.1%**	8.8%	7.1%	**17.0%**	12.9%	7.9%	5.2%
Jun	**11.5%**	**12.32%**	**9.1%**	**9.8%**	9.2%	7.9%	8.1%	13.9%	8.7%	3.0%
Jul	**10.8%**	9.54%	5.8%	**10.6%**	7.5%	5.7%	7.2%	12.5%	9.8%	3.8%
Aug	9.0%	8.31%	11.3%	7.1%	9.9%	8.2%	6.6%	14.1%	10.2%	4.1%
Sep	6.2%	7.18%	8.7%	5.8%	9.9%	**12.1%**	7.3%	8.1%	9.1%	2.2%
Oct	9.1%	5.39%	9.6%	7.0%	11.4%	**13.2%**	7.3%	7.2%	9.6%	3.9%
Nov	8.8%	4.14%	8.1%	6.4%	9.6%	9.3%	6.4%	8.4%	8.5%	9.3%
Dec	7.9%	4.23%	7.6%	7.4%	6.8%	8.2%	6.7%	6.4%	9.0%	**17.8%**

Table 5.2.3-21. Percent revenue from important species units by month for North Carolina averaged over 1999-2003. Source: Southeast logbook database, NMFS, Beaufort Lab.

Month	Shallow water grouper	Deep water grouper	Tilefish	Mid-shelf snappers	Triggerfish/ spadefish	Jack	Grunt/ porgy	Sea bass
Jan	5.3%	5.97%	1.18%	4.5%	5.6%	6.3%	5.6%	**19.4%**
Feb	5.0%	11.39%	5.34%	4.1%	5.2%	5.6%	5.6%	**14.7%**
Mar	2.7%	8.37%	7.13%	4.8%	6.3%	5.0%	3.9%	8.0%
Apr	4.6%	10.92%	8.34%	6.3%	6.2%	4.3%	4.1%	5.0%
May	**13.1%**	**18.37%**	**11.48%**	10.9%	7.3%	**10.0%**	8.3%	5.3%
Jun	**13.9%**	**14.54%**	**13.67%**	9.7%	10.4%	**16.2%**	**10.6%**	3.1%
Jul	**11.3%**	9.45%	**14.18%**	7.5%	7.4%	**11.4%**	**11.3%**	4.3%
Aug	**11.6%**	7.74%	**18.99%**	13.1%	10.6%	**10.2%**	**13.5%**	4.8%
Sep	6.5%	5.31%	**11.92%**	10.8%	11.8%	6.6%	9.6%	2.5%
Oct	10.3%	3.34%	4.69%	12.5%	13.7%	9.4%	10.8%	4.5%
Nov	9.1%	2.46%	2.19%	10.0%	9.1%	8.3%	8.6%	**10.8%**
Dec	6.5%	2.14%	0.90%	5.8%	6.5%	6.6%	8.2%	**17.5%**

*Note: Information on jacks and shallow water snappers are not included.

Table 5.2.3-22. Percent revenue from important species units by month for South Carolina averaged over 1999-2003. Source: Southeast logbook database, NMFS, Beaufort Lab.

Month	Shallow water grouper	Deep water grouper	Tilefish	Mid-shelf snappers	Triggerfish/ spadefish	Grunt/ porgy	Sea bass
Jan	6.6%	3.88%	5.21%	4.8%	6.3%	5.9%	**27.5%**
Feb	7.6%	7.64%	6.31%	4.3%	5.6%	6.8%	**19.3%**
Mar	2.8%	15.92%	10.47%	8.8%	10.0%	7.2%	**10.3%**
Apr	3.7%	10.32%	10.37%	12.6%	12.3%	7.3%	6.9%
May	**12.1%**	9.19%	8.45%	7.5%	5.9%	7.7%	4.7%
Jun	**11.6%**	10.96%	8.64%	8.3%	5.3%	8.0%	2.0%
Jul	**12.5%**	11.24%	5.38%	6.7%	3.6%	10.6%	1.8%
Aug	8.8%	7.85%	11.72%	8.1%	5.4%	9.3%	1.5%
Sep	7.2%	7.94%	7.11%	10.2%	13.0%	9.3%	1.0%
Oct	9.2%	7.02%	10.37%	11.5%	12.8%	8.7%	1.4%
Nov	10.0%	5.17%	10.42%	10.4%	9.2%	9.1%	3.9%
Dec	7.9%	2.87%	5.55%	6.8%	10.5%	10.0%	**19.7%**

Table 5.2.3-23. Percent revenue from important species units by month for Georgia averaged over 1999-2003. Source: Southeast logbook database, NMFS, Beaufort Lab.

Month	Shallow water grouper	Mid-shelf snapper
Jan	8.6%	5.9%
Feb	10.3%	5.9%
Mar	3.0%	10.1%
Apr	4.5%	9.3%
May	15.4%	7.4%
Jun	8.4%	9.4%
Jul	8.0%	8.0%
Aug	5.5%	8.3%

Sep	5.7%	9.5%
Oct	11.6%	10.0%
Nov	10.5%	7.6%
Dec	8.6%	8.5%

Table 5.2.3-24. Percent revenue from important species units by month for Florida averaged over 1999-2003. Source: Southeast logbook database, NMFS, Beaufort Lab.

Month	Shallow water grouper	Deep water grouper	Tilefish	Shallow water snapper	Mid-shelf snapper	Jack
Jan	**14.1%**	7.72%	4.52%	6.6%	7.0%	8.5%
Feb	**13.3%**	8.93%	4.74%	7.3%	7.2%	9.4%
Mar	3.5%	9.35%	8.50%	**11.0%**	8.1%	**17.1%**
Apr	3.5%	9.89%	11.89%	**11.3%**	8.8%	2.2%
May	**12.8%**	8.70%	11.18%	**10.2%**	8.4%	**20.8%**
Jun	**9.4%**	11.77%	8.65%	**9.8%**	9.6%	6.6%
Jul	8.6%	8.30%	4.64%	**10.6%**	8.5%	5.5%
Aug	7.1%	9.18%	9.89%	7.1%	8.1%	4.8%
Sep	4.7%	8.35%	9.03%	5.7%	8.3%	7.5%
Oct	7.0%	6.14%	10.20%	6.9%	10.0%	6.3%
Nov	6.5%	4.87%	8.17%	6.2%	9.1%	5.6%
Dec	9.4%	6.79%	8.58%	7.3%	6.8%	5.8%

Description of the Trip Cost Data

This section presents results from the first two years of an economic survey appended to the Federal Logbook Trip Report Form used by fishermen to report fishing activity in the South Atlantic snapper grouper, dolphin wahoo, mackerel, and shark fisheries. The population for the economic survey consisted of all federally permitted South Atlantic snapper grouper, mackerel, and shark vessels in 2001. Approximately, one-fifth of the population was randomly selected for the survey based on state and gear stratifications. Details of the sample selection methodology and non-response rates are available in the Appendix E of Snapper Grouper Amendment 13C (SAFMC 2006).

The results of the survey for 2002-03 as well as trip-level effort variables are summarized in Table 5.2.3-25. Trips are categorized by primary gear employed to account for heterogeneity throughout the fleet. Means, standard deviations, and ranges are used to summarize effort variables and fuel prices. Considerable variability remains for revenue and cost measurements within each gear classification, so median values are used to measure central tendency (i.e., an average trip) for these variables (Larkin et al. 2000).

On average, sampled vessels primarily using traps and longlines were significantly larger and employed more crew than other trips, and longliners fished more days than all other trips. The typical hook and line or troll trip lasted from 1-2 days with 1-2 crew members, while dive trips were of similar duration and on average employed two crew members. The vast majority (over 90%) of non-longline trips included the permit-holder/vessel-owner aboard suggesting a significant subgroup of the South Atlantic snapper grouper fleet were owner-operators explicitly covered under the Regulatory Flexibility Act.

The trip-level economic performance of the fleet can be characterized across the different primary gear types. Minimum and maximum figures for revenues and expenses again illustrate the diversity of the South Atlantic snapper grouper fleet even when stratified by primary gear types. Looking across gear types, longline and trap trips clearly incurred higher expenses but typically generated higher trip revenues as well as higher per day net operating revenues. Median values suggest that fuel expenditures were the biggest expenditure for all types of trips; however, longline and trap trips also spent a significant amount on bait, ice, and miscellaneous expenses. For hook and line, troll, and diving trips median statistics suggest that bait, ice, and other expenses were relatively minor for at least half of these trips (in many cases these trips incurred zero expenses for these inputs); however, these cost figures are a bit misleading. The figures for bait and ice expense can be viewed as conservative estimates due to implicit costs. For instance, some South Atlantic snapper grouper fishermen receive free ice prior to departure; however, this perceived benefit is usually counterbalanced with depressed ex-vessel price paid by the fish house. Also, South Atlantic snapper grouper fishermen sometimes catch their own bait yet are not explicitly compensated for their effort (i.e., "time is money").

Median statistics can also give managers an idea about how regulations may affect marginal members of the fleet. For instance, at least half of all sampled vertical line, troll, and dive trips made less than $142, $134, and $181 in net operating revenues per day fished, respectively. Crew shares and amortized fixed expenses (e.g., insurance, loan, and engine repair payments) must still be subtracted from net operating revenues. These modest operating profits suggest economic shocks (e.g., rising fuel prices, increased import pressures) or regulatory effects, which curtail revenue generation (e.g., size limits, quotas) or increase operating costs (e.g., closures), could drive operating margins below zero for a significant portion of these types of trips causing a short-run (and possibly permanent) exit from the industry.

Table 5.2.3-25. Summary of trip-level economic data and effort variables by primary gear for the South Atlantic snapper grouper fishery (2002-03). Source: Southeast logbook trip cost database and catch effort database, NMFS, SEFSC, Miami.

GEAR	Hook and Line[1] (n=2,715)			Traps (n=110)			Longline (n=123)		
	Mean	Std. Dev.	Range[3]	Mean	Std. Dev.	Range	Mean	Std. Dev.	Range
Variable									
Days away	1.7	1.9	13	1.1	0.3	1	4.6	3.1	12
Crew	1.9	0.9	5	2.4	0.5	1	2.4	0.5	2
Vess. Length[4]	28.0	6.0	32	42.6	3.6	23	37.7	8.6	23
Fuel Price/ gal.[5]	$1.43	$0.31	$2.28	$1.21	$0.18	$0.93	$1.09	$0.18	$0.64
	Median	Min	Max	Median	Min	Max	Median	Min	Max
Revenue	$218	$3	$12,414	$1,485	$100	$5,450	$1,658	$37	$15,386
Fuel exp.[6]	$28	$2	$650	$172	$63	$480	$295	$18	$950
Bait exp.	$15	$0	$700	$104	$10	$360	$293	$0	$1,845
Ice exp.	$0	$0	$256	$0	$0	$80	$85	$0	$300
Misc. Exp.[7]	$0	$0	$3,373	$20	$0	$700	$200	$0	$2,052

Net Oper. Rev.[8] per Day Fished	$142	-$554	$2,961	$979	-$115	$5,154	$330	-$2,038	$1,755

GEAR	Trolling (n=987)			Divers[2] (n=161)		
	Mean	Std. Dev.	Range	Mean	Std. Dev.	Range
Variable						
Days away	1	0.2	2	1.1	0.6	4
Crew	1.3	0.6	4	2.1	0.6	4
Vess. Len.[4]	28.1	5.5	38	26.5	7.3	30
Fuel Price/gal.[5]	$1.37	$0.22	$1.05	$1.55	$0.26	$1.05
	Median	Min	Max	Median	Min	Max
Revenue	$183	$2	$3,931	$252	$8	$7,137
Fuel exp.[6]	$32	$4	$422	$41	$6	$246
Bait exp.	$5	$0	$225	$0	$0	$260
Ice exp.	$0	$0	$50	$0	$0	$110
Misc. Exp.[7]	$0	$0	$325	$10	$0	$210
Net Oper. Rev.[8] per Day Fished	$134	-$310	$2,323	$181	-$87	$1,298

[1] This category includes the following gear: rods and reels; handlines; and electric and bandit reels.
[2] 25% of these trips utilized an explosive device.
[3] The range is the difference between the maximum and minimum observations for each variable.
[4] Mean vessel length is weighted by each vessel's number of trips.
[5] Fuel prices are not adjusted for inflation.
[6] This figure does not include oil expense.
[7] This includes other trip-related expenditures, such as groceries, oil and other lubricants, gas for dive tanks, packing fees, and other costs that are typically incurred during a trip.
[8] Net operating revenues are defined as gross trip revenues minus variable trip expenses excluding labor (i.e., fuel, bait, ice, and miscellaneous expenses).

Recreational fishery

The South Atlantic recreational fishery is comprised of a private recreational sector and a for-hire recreational sector. The former includes anglers fishing from shore (including dock), piers and from private/rental boats. In the subsequent description of the recreational fishery, the for-hire recreational sector is divided into the charterboat and headboat segments. Where possible catch, effort, and economic data pertaining to snapper grouper fishing and the individual species addressed in Snapper Grouper Amendment 13C (SAFMC 2006) are presented for each sector of this fishery. Relevant databases for 2004 were not available for these analyses. A snapshot of the fishery is contained in Table 5.2.3-26.

Table 5.2.3-26. The recreational fishery for snapper grouper species in the South Atlantic.
Average values calculated over the period 1999-2003.

Item	Headboat Mode	Charter Mode	Private Mode	Total
Snapper grouper harvest	1,524,487	1,548,191	6,564,245	9,636,923

(lb.)				
Number of fish harvested*	1,200,896	1,219,569	5,170,905	7,591,370
Value of fish caught (consumer surplus)	$2,978,223	$3,024,531	$12,823,845	$18,826,599
Number of trips on which snapper grouper species were caught	235,130	112,600	2,771,074	3,118,804
Expenses by anglers on trips where snapper grouper species are caught ($2003)**	$42,609,193	$20,450,664	$211,344,466	$274,404,323

* Number of fish for other sectors estimated using average weight per fish from the headboat sector.
**For the headboat sector - multiplied expenditure estimate for the charter mode by angler days to estimate total expenditures and adjusted for inflation to $2003.
*** The figures in this table were summarized from data presented in subsequent tables as follows: total snapper grouper harvest was summarized from data in Table 3-25; value of fish caught was calculated using a per fish value of $2.48 as explained in Appendix E; number of trips was summarized from the data in Table 5.2.3-26, Table 5.2.3-25;angler expenditures on snapper grouper trips were summarized from estimates contained in Table 5.2.3-25.

Recreational Fishing Participation
Charts depicting the number of saltwater anglers in the South Atlantic include participants engaged in all fisheries and those anglers who either fished from private/rental boats, from charter boats or by shore/beach bank mode (Figure 5.2.3-16). Most South Atlantic saltwater anglers fish on the east coast of Florida and North Carolina. In Florida, there was an increasing trend in the number of saltwater anglers from 1981 to 2001 and a slight decline in 2002 and 2003. The number of participants engaged in saltwater fishing increased from 1981 through 2003 in North Carolina and by 2003 this figure was at almost the same level as observed in Florida during 2003 (Figure 5.2.3-16). The number of anglers fishing off South Carolina appears to have peaked in 1988, declined in 1989 and fluctuated with no apparent trend thereafter. In Georgia, the number of anglers increased in the 1990s up until 1995, declined until 1999 and began increasing from 2000 (Figure 5.2.3-16).

Anglers targeted a variety of species including species in the South Atlantic snapper grouper complex (Figure 5.2.3-16). It is not possible to extract the estimated number of participants who targeted or caught snapper grouper species from this dataset. A more specific estimate of recreational activity in the snapper grouper fishery can be obtained from the effort data reported in Section 3.4.2.2.2 of Snapper Grouper Amendment 13C (SAFMC 2006).

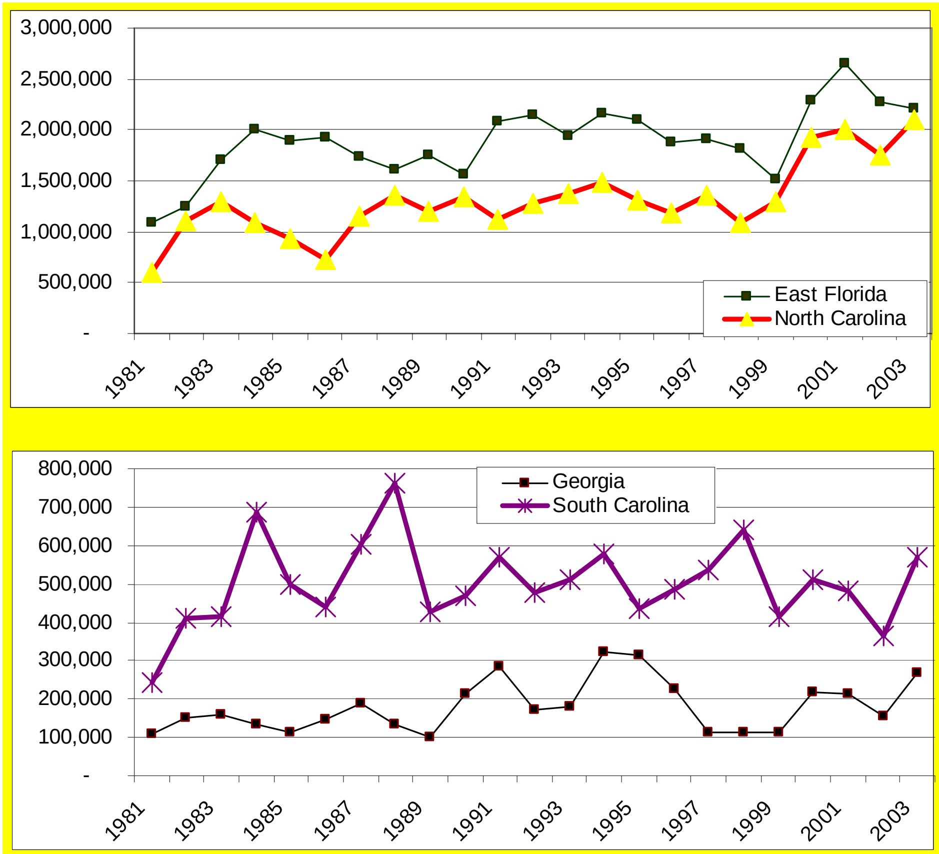


Figure 5.2.3-16. Number of anglers participating in all saltwater fisheries by state. Source: MRFSS, NMFS (http://www.st.nmfs.gov/st1/recreational/data.html). Note: Data for the east coast of Florida does not include Monroe County. Also, these numbers are not additive across states since an angler can fish in multiple states.

Recreational Fishing Effort

The analysis on angler effort in the snapper grouper fishery has been separated into a discussion of the data from the MRFSS, which covers the charter segment of the for-hire sector and the private recreational fishing sector (all modes), and the data collected from a separate survey of headboats operating in the South Atlantic.

The estimates of saltwater angling effort derived from the MRFSS can be characterized as follows:

- Target effort - The number of individual angler trips, regardless of duration, where the intercepted angler indicated that the species or a species in the species group was targeted as either the first or second primary target for the trip. The species did not have to be caught.
- Catch effort - The number of individual angler trips, regardless of duration and target intent, where the individual species or a species in the species group was caught. The fish did not have to be kept.
- Harvest effort - The number of individual angler trips, regardless of duration and target intent, where the individual species or a species in the species group was caught and harvested (not released).

- Total recreational trips - The total estimated number of recreational trips in the South Atlantic, regardless of target intent or catch success.

In the charter and private recreational fishing sectors, snapper grouper species were caught on 15.3% of all saltwater fishing trips during the period 1999-2003 (Table 5.2.3-27). This proportion declines to 6.9% when considering only those trips where snapper grouper species were actually harvested. Furthermore, snapper grouper species were harvested on about 45% of trips on which they were caught (1,305,882/2,883,874). Apart from individual preferences for particular species and catch and release ethics, this difference could be explained by regulatory constraints such as bag limits and size limits. Only a relatively small percentage of total trips indicated a target preference for snapper grouper species (Table 5.2.3-27).

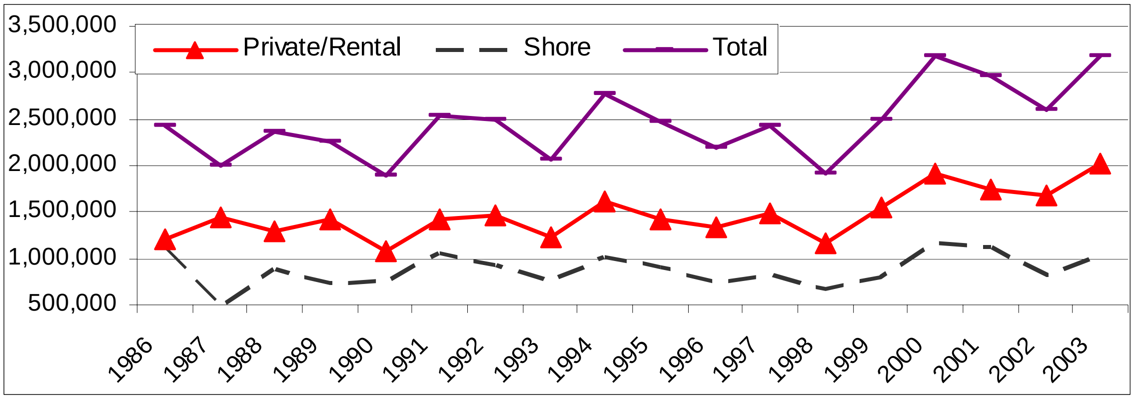
Table 5.2.3-27. South Atlantic recreational effort for species in the snapper grouper fishery management unit 1. Source: MRFSS, Fisheries Economics Office, SERO, NMFS.

	Target Effort		Catch Effort		Harvest Effort	
Year	Trips	% Total	Trips	% Total	Trips	% Total
Average 1986-2003	761,592	4.29%	2,456,758	13.85%	1,240,388	6.99%
Average 1999-2003	680,552	3.55%	2,883,874	15.29%	1,305,882	6.93%

The total number of trips where snapper grouper species were caught from 1986 to 2003 is shown in Figure 5.2.3-17. These snapper grouper catch trips fluctuated between 1.9 million and 3.2 million trips annually and there appears to be an increasing trend from 1998 to 2003. During this period, there was considerable fluctuation in the charter sector with no discernable trend. Most snapper grouper trips are taken by either private/rental or shore modes, and for the private/rental mode there appears to be an increasing trend in effort during the period 1998 to 2003 (Figure 5.2.3-17).

In terms of catch trips, snapper grouper species are relatively more important for the charter and private/rental modes compared to the shore mode. For the charter sector and private/rental boat sector, snapper grouper species were caught on 18% of all recreational trips while snapper grouper species were caught on 9% of all recreational shore mode trips in 2003 (Table 5.2.3-28). Among other factors an angler’s choice of mode can depend on the species targeted, location of the trip, and the cost of fishing.

In the South Atlantic, during the period 2000 to 2003 an average of 85% of all snapper grouper catch trips (private recreational and charter sector) were either inland or inshore of three miles (SAFMC 2003). Some of the factors that determine the location of a recreational fishing trip are the species targeted, the cost of the trip, the angler’s available time, and the mode of fishing.



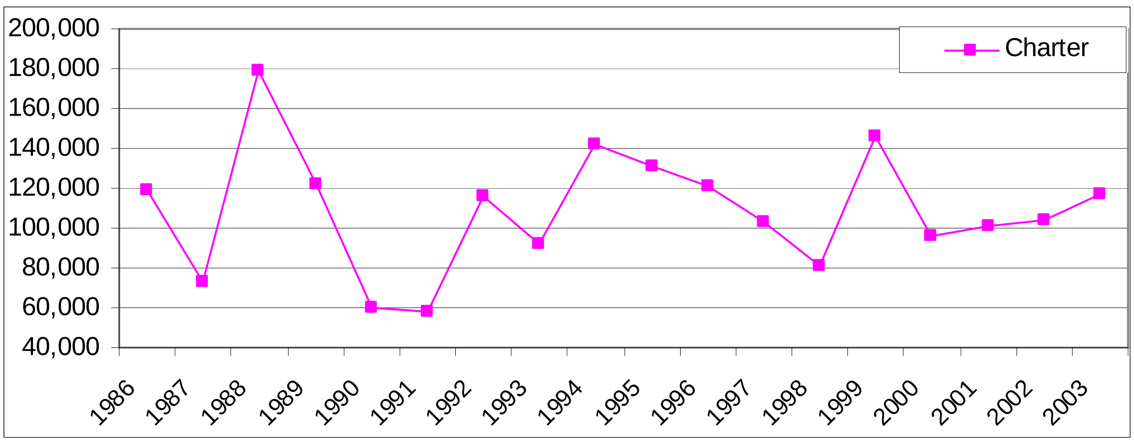


Figure 5.2.3-17. Recreational fishing trips (private and charter) where snapper grouper species were caught (catch effort) in the South Atlantic by mode. Source: MRFSS, NMFS, SERO.

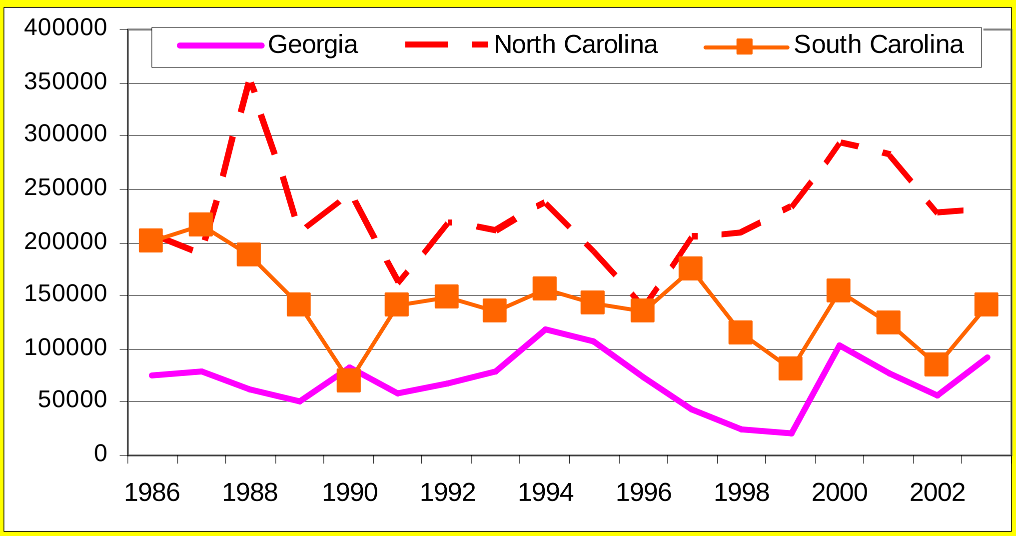
Table 5.2.3-28. Recreational fishing trips where snapper grouper species were caught (catch effort) in the South Atlantic by mode 1999-2003. Source: MRFSS, NMFS, Washington DC.

	Number of snapper grouper catch trips				Percent of total recreational trips			
Year	**Charter**	**Private/Rental**	**Shore**	**Total**	**Charter**	**Private/ Rental**	**Shore**	**Total**
1999	145,524	1,546,316	796,956	2,488,796	21.9	22.3	11.7	17.2
2000	95,864	1,914,054	1,162,330	3,172,248	18.4	21.0	11.1	15.8
2001	100,743	1,743,299	1,127,365	2,971,408	20.3	18.2	9.8	13.8
2002	103,777	1,673,346	830,325	2,607,448	23.6	20.2	9.2	14.7
2003	117,090	2,025,667	1,035,712	3,178,470	28.4	20.3	9.5	15.0

A breakdown of saltwater angling effort for snapper grouper in the South Atlantic by state is shown in Table 5.2.3-29. Consistent with total participation, the majority of trips where snapper grouper species were caught occurred in Florida. For example, in 2003 snapper grouper species were caught on 2.72 million trips in Florida compared to 0.46 million trips for the other three states combined (Table 5.2.3-29). Also, snapper grouper species appear to be relatively more important to the recreational fishery in Florida compared to the other three states. In 2003, snapper grouper species were caught on 23.7% of all recreational trips in Florida compared to less than 10% for the other South Atlantic states (Table 5.2.3-29).

Table 5.2.3-29. Recreational fishing trips where snapper grouper species were caught in the South Atlantic by state. Source: MRFSS, FEO, NMFS, SERO.

Year	Number of snapper grouper catch trips				Percent of all recreational trips			
	East Florida	Georgia	North Carolina	South Carolina	East Florida	Georgia	North Carolina	South Carolina
1999	2,153,349	20,857	233,677	80,912	26.3	4.4	5.1	6.7
2000	2,620,737	103,385	293,875	154,252	22.8	13.0	4.6	11.5
2001	2,489,972	76,705	281,553	123,178	20.0	9.5	4.2	7.4
2002	2,240,008	56,760	226,532	84,148	21.7	9.2	4.1	6.7
2003	2,716,431	92,124	228,998	140,917	23.7	9.5	3.4	6.7



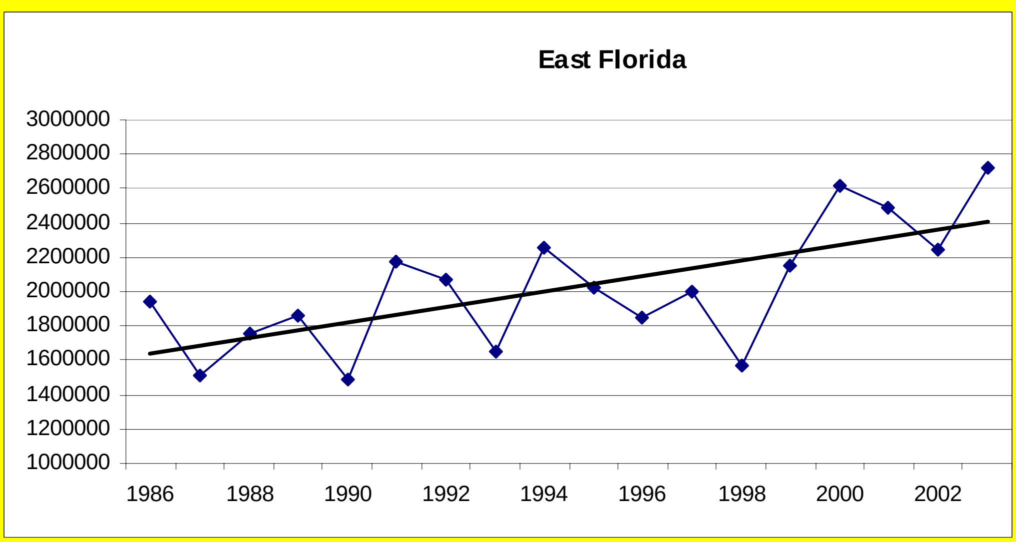


Figure 5.2.3-18. Recreational fishing trips (private and charter) where snapper grouper species were caught (catch effort) in the South Atlantic by state. Source: MRFSS, NMFS, SERO.

Two sets of averages for target, catch, and harvest effort for each species group in the South Atlantic snapper grouper complex, calculated during 1986-2003 and 1999-2003, are shown in Table 5.2.3-30 – 5.2.3-37). These statistics provide another measure to gauge the relative importance of the various species groups. The relative magnitudes of the catch effort and harvest effort shares suggests species in the shallow water snapper unit (Table 5.2.3-31), the grunt and porgy unit (Table 5.2.3-34) the jack unit (Table 5.2.3-33), and the sea bass unit (Table 5.2.3-34) are most important to snapper grouper anglers in the South Atlantic. Furthermore, these statistics also indicate black sea bass, white grunt, Atlantic spadefish, blue runner, yellowtail snapper, and vermilion snapper are among the most popular species in this complex to South Atlantic anglers. In contrast, species in the deep water grouper and tilefish units are of little importance in the charter and private sectors of the recreational fishery.

Table 5.2.3-30. South Atlantic recreational effort for the shallow water grouper (SWG) unit 1. Source: MRFSS database, NMFS, SERO.

	Target Effort							
	SWG Unit 1		Gag		Black Grouper		Red Grouper	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit
Avg 1986-2003	72,750	0.41%	64,842	89.13%	4,797	6.59%	3,323	4.57%
Avg 1999-2003	71,045	0.37%	62,811	87.64%	6,230	9.89%	2,357	3.35%
	Catch Effort							
	SWG Unit 1		Gag		Black Grouper		Red Grouper	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit
Avg 1986-2003	132,670	0.75%	60,397	45.52%	12,466	9.40%	42,695	32.18%
Avg 1999-2003	179,062	0.95%	81,454	45.61%	16,309	9.27%	59,805	32.91%
	Harvest Effort							
	SWG Unit 1		Gag		Black Grouper		Red Grouper	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit
Avg 1986-2003	54,795	0.31%	28,617	52.23%	5,162	9.42%	12,803	23.37%
Avg 1999-2003	60,503	0.32%	29,005	47.75%	4,581	7.59%	14,940	24.80%

[1] The shallow water grouper unit 1includes gag, red grouper, red hind, rock hind, yellowmouth grouper, tiger grouper, black grouper yellowfin grouper, graysby, coney, and scamp.

Table 5.2.3-31. South Atlantic recreational effort for the shallow water snapper (SWS) unit 1. Source: MRFSS database, NMFS, SERO.

	Target Effort							
	SWS Unit 1		Yellowtail Snapper		Mutton Snapper		Gray Snapper	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit

Avg 1986-2003	252,943	1.43%	39,122	15.47%	64,883	25.65%	145,253	57.43%
Avg 1999-2003	169,800	0.89%	15,289	8.87%	32,252	18.32%	113,376	67.02%
	Catch Effort							
	SWS Unit 1		Yellowtail Snapper		Mutton Snapper		Gray Snapper	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit
Avg 1986-2003	596,378	3.36%	100,797	16.90%	68,250	11.44%	398,190	66.77%
Avg 1999-2003	828,512	4.42%	89,899	10.80%	83,233	10.06%	611,814	73.78%
	Harvest Effort							
	SWS Unit 1		Yellowtail Snapper		Mutton Snapper		Gray Snapper	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit
Avg 1986-2003	276,220	1.56%	50,492	18.28%	45,951	16.64%	155,173	56.18%
Avg 1999-2003	349,863	1.87%	43,013	12.16%	53,011	15.10%	220,980	63.06%

[1] The shallow water snapper unit 1 includes yellowtail snapper, mutton snapper, gray snapper, lane snapper, mahogany snapper, dog snapper, schoolmaster, cubera snapper, sand tilefish, puddingwife, and hogfish.

Table 5.2.3-32. South Atlantic recreational effort for the triggerfish unit1. Source: MRFSS database, NMFS, SERO.

	Target Effort					
	All Triggerfish		Gray Triggerfish		Atlantic Spadefish	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit
Avg 1986-2003	17,403	0.10%	2,374	13.64%	14,924	85.76%
Avg 1999-03	21,551	0.11%	1,565	9.46%	20,053	91.72%
	Catch Effort					
	All Triggerfish		Gray Triggerfish		Atlantic Spadefish	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit
Avg 1986-2003	212,509	1.20%	86,124	40.53%	116,016	54.59%
Avg 1999-03	228,769	1.21%	78,535	35.43%	141,750	60.86%
	Harvest Effort					
	All Triggerfish		Gray Triggerfish		Atlantic Spadefish	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit
Avg 1986-2003	127,325	0.72%	39,377	30.93%	78,894	61.96%
Avg 1999-03	129,164	0.69%	39,771	31.95%	84,489	64.16%

[1] The triggerfish unit includes gray triggerfish, ocean triggerfish, queen triggerfish, and Atlantic spadefish.

Table 5.2.3-33. South Atlantic recreational effort for the jacks unit1. Source: MRFSS database, NMFS, SERO.

	Target Effort					
	All Jacks		Greater Amberjack		Blue Runner	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit

Avg 1986-2003	77,873	0.44%	7,329	9.41%	25,784	33.11%
Avg 1999-03	74,622	0.40%	4,784	6.83%	22,576	28.47%
	Catch Effort					
	All Jacks		Greater Amberjack		Blue Runner	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit
Avg 1986-2003	965,294	5.44%	57,265	5.93%	354,428	36.72%
Avg 1999-03	1,127,689	5.99%	54,558	4.88%	425,743	37.46%
	Harvest Effort					
	All Jacks		Greater Amberjack		Blue Runner	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit
Avg 1986-2003	351,171	1.98%	37,250	10.61%	177,294	50.49%
Avg 1999-03	394,677	2.10%	35,992	9.27%	222,337	55.50%

[1] The jacks unit includes greater amberjack, lesser amberjack, almaco jack, banded rudderfish, yellow jack, blue runner, bar jack, and crevalle jack.

Table 5.2.3-34. South Atlantic recreational effort for the grunts and porgies (GP) unit 1. Source: MRFSS database, NMFS, SERO.

	Target Effort							
	GP Unit 2		White Grunt		Black Margate		Sheepshead	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit
Avg 1986-2003	312,165	1.76%	1,271	0.41%	667	0.21%	294,122	94.22%
Avg 1999-03	308,470	1.60%	944	0.31%	932	0.31%	304,738	98.74%
	Catch Effort							
	GP Unit 2		White Grunt		Black Margate		Sheepshead	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit
Avg 1986-2003	617,545	3.48%	115,798	18.75%	22,776	3.69%	371,751	60.20%
Avg 1999-03	681,382	3.63%	96,849	14.41%	31,524	4.60%	415,289	60.79%
	Harvest Effort							
	GP Unit 2		White Grunt		Black Margate		Sheepshead	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit	Trips	% Unit
Avg 1986-2003	430,029	2.42%	73,747	17.15%	17,759	4.13%	274,541	63.84%
Avg 1999-03	421,822	2.24%	67,084	16.24%	25,560	6.03%	268,044	63.15%

[1] The grunts and porgies unit 2 includes white grunt, porkfish, margate, black margate, tomtate, bluestriped grunt, french grunt, Spanish grunt, smallmouth grunt, cottonwick, sailors choice, grass porgy, jolthead porgy, saucereye porgy, whitebone porgy, knobbed porgy, longspine porgy, sheepshead, and scup.

Table 5.2.3-35. South Atlantic recreational effort for the sea bass unit1. Source: MRFSS database, NMFS, SERO.

	Target Effort				Catch Effort			
	Sea Bass Unit		Black Sea Bass		Sea Bass Unit		Black Sea Bass	
Year	Trips	% Total	Trips	% Unit	Trips	% Total	Trips	% Unit

Avg 1986-2003	36,306	0.20%	35,379	97.45%	416,247	2.35%	379,417	91.15%
Avg 1999-03	30,618	0.16%	29,831	96.65%	455,186	2.41%	436,915	96.04%
	Catch Effort				Harvest Effort			
	Sea Bass Unit		Black Sea Bass		Sea Bass Unit		Black Sea Bass	
Year	Trips	% Total	Trips	% Unit	Trips	% Total	Trips	% Unit
Avg 1986-2003	416,247	2.35%	379,417	91.15%	170,975	0.96%	162,106	94.81%
Avg 1999-03	455,186	2.41%	436,915	96.04%	136,611	0.72%	132,510	96.93%

[1] The sea bass unit includes black sea bass, rock sea bass, and bank sea bass.

Table 5.2.3-36. South Atlantic recreational effort for the deepwater grouper and tilefish units 2A and 2B, and red porgy. Source: MRFSS database, NMFS, SERO.

Deep water groupers (includes snowy grouper, yellowedge grouper, Warsaw grouper, speckled hind, misty grouper, and queen snapper						
	Target Effort		Catch Effort		Harvest Effort	
Year	Trips	% Total	Trips	% Total	Trips	% Total
Avg 1986-2003	688	0.00%	14,419	0.08%	11,294	0.06%
Avg 1999-03	444	0.00%	19,388	0.10%	14,669	0.08%
Deep water tilefish (includes golden tilefish and blueline tilefish)						
	Target Effort		Catch Effort		Harvest Effort	
Year	Trips	% Total	Trips	% Total	Trips	% Total
Avg 1986-2003	465	0.00%	10,266	0.06%	2,818	0.02%
Avg 1999-03	981	0.00%	18,773	0.10%	4,592	0.02%
	Red Porgy					
	Target Effort		Catch Effort		Harvest Effort	
Year	Trips	% Total	Trips	% Total	Trips	% Total
Avg 1986-2003	145	0.00%	20,245	0.11%	17,911	0.10%
Avg 2001-03	0	0.00%	20,490	0.10%	15,143	0.07%

Table 5.2.3-37. South Atlantic recreational effort for the mid-shelf snapper (MSS) unit1. Source: MRFSS database, NMFS, SERO.

	Target Effort					
	MSS Unit [1]		Vermilion Snapper		Red Snapper	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit
Avg 1986-2003	59,004	0.33%	1,934	3.28%	57,006	96.61%
Avg 1999-03	64,239	0.33%	2,204	3.44%	61,884	96.45%
	Catch Effort					
	MSS Unit [1]		Vermilion Snapper		Red Snapper	

Year	Trips	% Total	Trips	% Unit	Trips	% Unit
Avg 1986-2003	91,219	0.51%	48,454	53.12%	50,985	55.89%
Avg 1999-03	129,171	0.69%	75,194	58.34%	74,696	57.92%
	Harvest Effort					
	MSS Unit [1]		Vermilion Snapper		Red Snapper	
Year	Trips	% Total	Trips	% Unit	Trips	% Unit
Avg 1986-2003	65,163	0.37%	37,001	56.78%	31,439	48.25%
Avg 1999-03	82,992	0.44%	55,836	67.50%	35,288	42.43%

[1] The mid-shelf snapper unit includes vermilion snapper, silk snapper, red snapper, black snapper, and blackfin snapper.

The total number of angler days for the headboat sector in the U.S. South Atlantic represents all headboat effort and not only those trips where snapper grouper species were caught. Since the database does not associate catch with a specific angler on the trip due to the bottom-fishing nature of the industry. However, a large portion of these trips probably target snapper grouper species. Since 1987, there has been a declining trend in headboat angler days in the South Atlantic (Table 5.2.3-38). The number of angler days peaked at 443,448 in 1987 and steadily declined to 204,565 in 2003 (Table 5.2.3-38). This represents an overall decrease of 54%. This decline in the number of angler days from 1987 to 2003 was observed in all South Atlantic states. Headboat effort on the east coast of Florida comprises a large proportion (70%) of the headboat trips in the South Atlantic. This is followed by South Carolina (18%), North Carolina (11%) and Georgia (1%) (Table 5.2.3-38).

Table 5.2.3-38. Estimated headboat angler days for the U.S. South Atlantic. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab.

YEAR	FLORIDA	GEORGIA	NORTH CAROLINA	SOUTH CAROLINA	TOTAL
1986	317,058		31,187	67,227	415,472
1987	329,799		34,843	78,806	443,448
1988	301,775		42,421	76,468	420,664
1989	316,864		32,933	62,708	412,505
1990	322,895		43,240	57,151	423,286
1991	280,022		40,936	67,982	388,940
1992	264,523		41,176	61,790	367,489
1993	236,973		42,786	64,457	344,216
1994	242,296	485	36,691	63,231	342,703
1995	206,852	3,214	40,295	61,739	312,100
1996	197,173	2,684	35,142	54,929	289,928
1997	170,367	2,906	37,189	60,150	270,612
1998	153,339	2,002	37,399	61,342	254,082
1999	162,195	1,857	31,596	55,499	251,147
2000	180,097	2,152	31,351	40,291	253,891
2001	161,052	2,337	31,779	49,265	244,433
2002	149,274	2,272	27,601	42,467	221,614
2003	143,585	1,426	22,998	36,556	204,565

Headboat operators usually offer their passengers options for choosing trip packages of different durations (Table 5.2.3-39). The majority of headboat trips are of half-day duration in Florida (78%) and South Carolina (59%). In North Carolina and Georgia, the majority of trips are full-day trips (Table 5.2.3-39).

Table 5.2.3-39. Average number of headboat trips (1999-2003) by trip length and percent of total trips by trip length. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab.

Average Number of trips 1999-2003					Percent of total trips		
State	**Full day**	**¾ day**	**½ day**		**Full day**	**¾ day**	**½ day**
NC	561	17	374		56%	2%	38%
SC	642	110	1,144		33%	6%	59%
GA	152	1	10		93%		6%
FLA	1,972	546	9,038		17%	5%	78%
Total	1,014	123	2,079		23%	5%	72%

Harvest in the Recreational Fishery

The harvest of recreational snapper grouper species peaked in 1988 at 12.4 million lbs. Thereafter, landings decreased to 6.5 million lbs in 1998, and subsequently increased to between 8.0 million lbs and 11.06 million lbs (Table 5.2.3-40). A similar trend was observed in the private recreational sector (private/rental boat mode and shore mode), which accounted for 62% to 78% of total snapper grouper landings. Harvest by the headboat sector has been on a steadily declining trend since 1988. Snapper grouper harvest by the charterboat sector fluctuated considerably during this period with no distinct trend (Table 5.2.3-40).

Table 5.2.3-40. Harvest of snapper grouper species by mode in the South Atlantic. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab and MRFSS database, NMFS, NMFS, SERO.

Year	Charterboat[1]	Headboat[2]	Shore and Private/Rental Boat[1]	Total
1986	821,343	2,661,961	5,437,568	9,164,407
1987	2,201,804	3,227,294	6,258,376	11,981,897
1988	2,392,740	3,417,107	6,184,386	12,375,317
1989	1,752,468	2,574,910	6,064,567	10,693,382
1990	786,090	2,557,352	4,612,202	8,127,407
1991	1,029,716	2,713,513	6,339,784	10,269,025
1992	1,540,113	2,160,642	7,338,270	11,265,107
1993	1,142,815	2,328,911	5,854,258	9,491,894
1994	2,337,545	2,119,554	6,477,448	11,066,395
1995	1,681,809	1,990,254	5,996,957	9,860,827
1996	1,433,353	1,801,595	6,161,361	9,610,711
1997	1,216,907	1,751,509	4,700,150	7,761,398
1998	975,980	1,582,317	3,857,407	6,496,673

1999	2,341,051	1,603,627	4,966,208	8,995,706
2000	1,108,396	1,553,842	7,401,989	10,086,883
2001	1,347,783	1,655,941	7,984,642	11,062,432
2002	1,363,388	1,433,118	5,184,057	8,042,689
2003	1,580,336	1,375,908	7,284,329	10,240,573
Average 1999-2003**	**1,548,191**	**1,524,487**	**6,564,245**	**9,685,657**

[1] Pounds of A and B1 fish estimated from the MRFSS Survey.
[2] The total annual estimate of headboat catch derived from data collected through the NMFS headboat survey.

The previous discussion focused on harvest trends of all snapper grouper species in the South Atlantic. Graphics depicting harvest trends for black sea bass, vermilion snapper and red porgy are presented in Figure 5.2.3-19 through 5.2.3-21. Black sea bass harvests were at higher levels prior to 1993 for all three sectors. After 1993, harvest in the private recreational sector fluctuated between 250,000-500,000 lbs and harvest in the headboat sector varied between 100,000 and 200,000 lbs annually. For the charterboat sector, there was an unusually high level of black sea bass harvest in 1988. However, more recently, during the period 1998-2003 charterboat harvest of black sea bass was at or below 100,000 lbs per year (Figure 5.2.3-19).

Vermilion snapper is one of the most frequently harvested species in the headboat sector (Figure 5.2.3-20) and harvest was at the highest levels prior to 1992. Since 1992, headboat harvest of vermilion snapper was at or below 300,000 lbs annually until 1999, after which harvest increased to levels between 300,000 and 400,000 lbs annually. The decrease in headboat harvest after 1991 could be partly attributed to the declining trend in headboat effort and the 10 fish bag limit and 10 inch minimum size limit measures implemented in 1992. Landings of vermilion snapper in the charterboat and private recreational sectors have fluctuated widely from year to year and remained below 200,000 lbs throughout the period 1986 to 2003. Harvests attributed to these two sectors of the recreational fishery were at the lowest levels during the period 1992 through 1997. Subsequent to 1997, landings increased and appear to have stabilized around the 100,000 lbs level annually during the period 2001 to 2003 (Figure 5.2.3-20).

In the headboat sector, there has been a continuous decline in the harvest of red porgy over the entire period 1986 through 2003 (Figure 5.2.3-21). The decline in headboat effort could be a contributing factor in the reduction in headboat harvest of this species. Also, restrictive regulations that were implemented in 1999 and 2000 accounted for the very low harvest levels observed in the recreational fishery during 1999 and 2000.

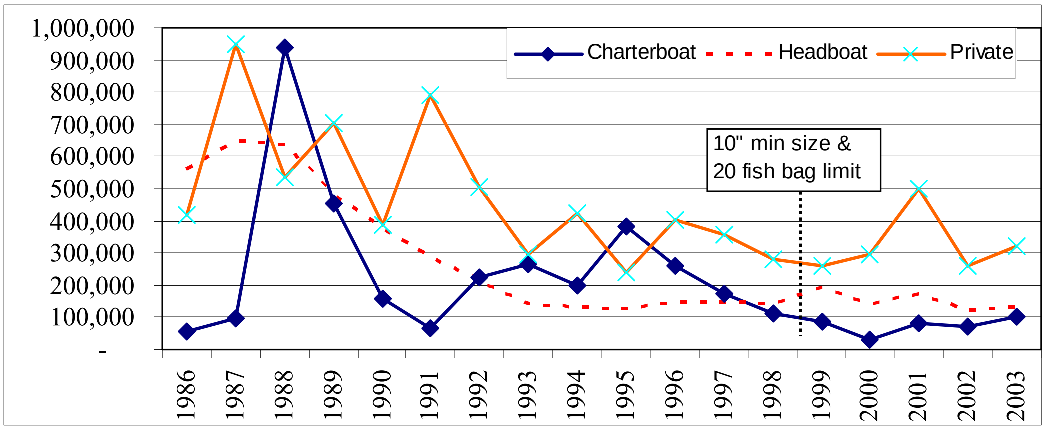


Figure 5.2.3-19. Black sea bass harvest (lbs) in the recreational fishery by sector from 1986 to 2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab and MRFSS database, NMFS, SERO.

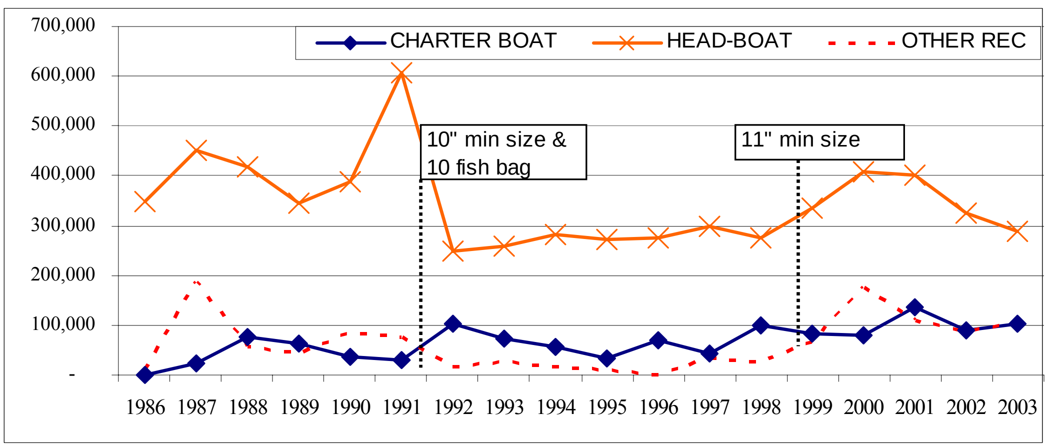


Figure 4.2.3-20. Vermilion snapper harvest (lbs) in the recreational fishery by sector from 1986 to 2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab and MRFSS database, NMFS, SERO.

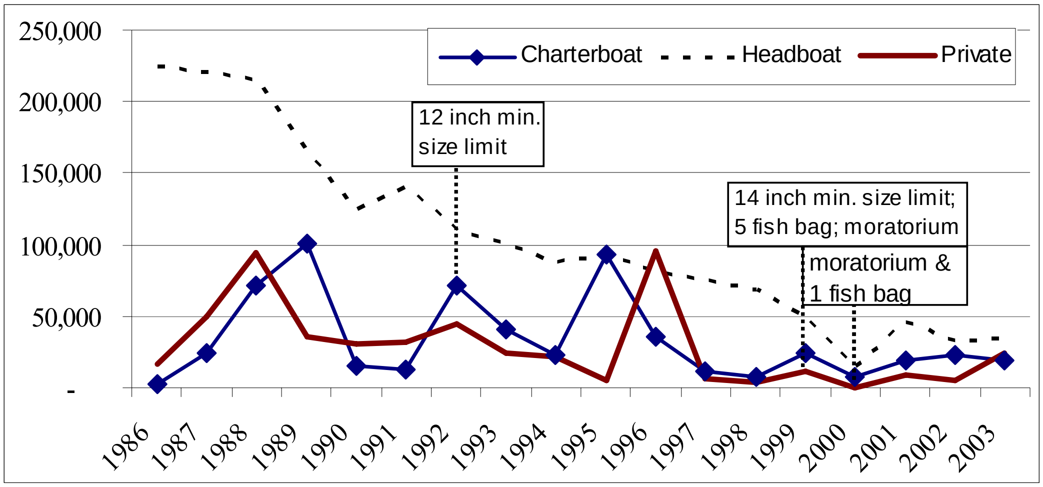


Figure 5.2.3-21. Red porgy harvest (lbs) in the recreational fishery by sector from 1986 to 2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab and MRFSS database, NMFS, SERO.

Of the species addressed in this amendment, black sea bass and vermilion snapper are more frequently harvested in the South Atlantic recreational snapper grouper fishery (Table 5.2.3-41). The largest share of the black sea bass recreational harvest is taken by sport anglers in the private recreational sector while the largest share of the vermilion snapper recreational harvest is taken by passengers on headboats in the South Atlantic.

Table 5.2.3-41. Average harvest (lbs) during 1999-2003 for species in this amendment by sector. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab and MRFSS database, NMFS, SERO.

Sector	Black Sea Bass	Vermilion snapper	Red porgy*	Snowy grouper*	Golden tilefish*
Charterboat	74,114	98,779	18,734	13,233	12,958
Headboat	153,911	351,804	35,417	605	2
Private	327,094	108,478	10,150	2,190	5,271

*Estimates of the total harvest of these species are based on very small sample sizes in the MRFSS. Also, in the headboat survey harvest of snowy and golden tilefish were reported on few trips. During this period golden tilefish were reported on two headboat trips in 1999.

The harvest of snowy grouper and golden tilefish is relatively minor in the recreational sector (Table 5.2.3-41). Also, the estimates of harvest from the MRFSS survey for both golden tilefish and snowy grouper during the time period 1999 to 2003 are associated with very high proportional standard errors (PSE) (Table 5.2.3-42, 5.2.3-43). These high PSEs indicate high variability around these estimates and the estimates may not be a reliable indicator of the harvest.

Table 5.2.3-42. Estimates of golden tilefish harvest (A+B1 fish) and proportional standard error (PSE) in the South Atlantic recreational fishery from 1999-2003. Combined estimates for the charterboat and private recreational sector. Source: MRFSS.

Year	Number of fish	PSE (%)*	Weight (lbs)	PSE (%)*

1999	1,950	62	4,409	78.3
2000	3,171	76.9	1,803	46.2
2001	3,150	44.9	26,799	59.2
2002	2,036	45.4	9,246	52.7
2003	7,833	40.8	28,029	41.7

*Proportional standard error (PSE) is the standard error of the estimate expressed as a percentage of that estimate.

Table 5.2.3-43. Estimates of snowy grouper harvest (A+B1 fish) and proportional standard error (PSE) in the South Atlantic recreational fishery from 1999-2003. Combined estimates for the charterboat and private recreational sector. Source: MRFSS.

Year	Number of fish	PSE (%)	Weight (lbs)	PSE (%)
1999	7,856	43.7	14,978	52.8
2000	1,341	54.9	963	
2001	9,603	47.1	39,248	47.2
2002	1,643	55.2	8,512	66.4
2003	3,090	62.3	13,417	76.2

*Proportional standard error (PSE) is the standard error of the estimate expressed as a percentage of that estimate.

There are regional differences in the composition of the catch in the South Atlantic recreational fishery. The relative abundance of the various units in the overall snapper grouper harvest across the different sectors in the recreational fishery can differ considerably by state. Also, there are variations in the relative importance of the five species in this amendment and units proposed in Snapper Grouper Amendment 13B by fishing mode.

The mid-shelf snapper unit makes up the largest component of the headboat harvest in the South Atlantic (Figure 5.2.3-25). Thus, it is not surprising vermilion snapper comprises 24% of the headboat harvest in the South Atlantic and 30% of the total headboat harvest when the harvest south of North Florida are excluded (Figure 5.2.3-22, 5.2.3-23). Black sea bass is the second most abundant species in the headboat harvest in North Carolina, South Carolina, Georgia and North Florida (Figure 5.2.3-23). A number of other units such as the shallow water snappers, grunts and porgies, jacks, and shallow water groupers also comprise a substantial amount of the total headboat harvest in the South Atlantic. Even though most headboat angler trips occur off Florida, a larger proportion of the headboat harvest is taken from North and South Carolina (Figure 5.2.3-27).

Species in the jack unit dominate snapper grouper harvests in the charterboat sector (Figure 5.2.3-31). The jack unit comprised an average of 48% of the entire snapper grouper harvest in the charter sector during the period 1999 to 2003 (Figure 5.2.3-31). Black sea bass and vermilion snapper only comprised 5% and 6% of the total South Atlantic charterboat harvest respectively (Figure 5.2.3-28). A vastly different composition emerges when the harvest from east Florida is excluded. The jack unit comprises only 14% of the total charterboat harvest and the mid-shelf snapper, sea bass, and shallow water grouper units make up a substantially larger proportion of the total charterboat harvest (Figure 5.2.3-32). This is not surprising since 73% of the total charterboat harvest is taken on trips in east Florida where species in the jack unit and the shallow water snapper unit are relatively more abundant (Figure 5.2.3-33). Also, when the harvest from East Florida is excluded from the total catch, black sea bass and vermilion snapper comprise 16% and 13% of the total charterboat harvest respectively (Figure 5.2.3-29).

Species in this amendment are relatively less important to the private recreational sector in the South Atlantic compared to other snapper grouper species (Figure 5.2.3-34, 5.2.3-35). For example, black sea bass and vermilion snapper comprised about 7% of the total snapper grouper harvest in this sector (Figure 5.2.3-34). Harvest in the private recreational sector in the South Atlantic is dominated by the jacks, grunts, and porgies (Figure 5.2.3-37). These two units comprised almost 60% of the total snapper grouper harvest during the period 1999 to 2003 (Figure 5.2.3-37). Similar to the charterboat sector, a substantial proportion (80%) of the harvest is taken in Florida (Figure 5.2.3-39). When East Florida harvest is removed it is clear that black sea bass is important to the private recreational sector that harvests snapper grouper species, as black sea bass now comprises 16% of the total harvest (Figure 5.2.3-35).

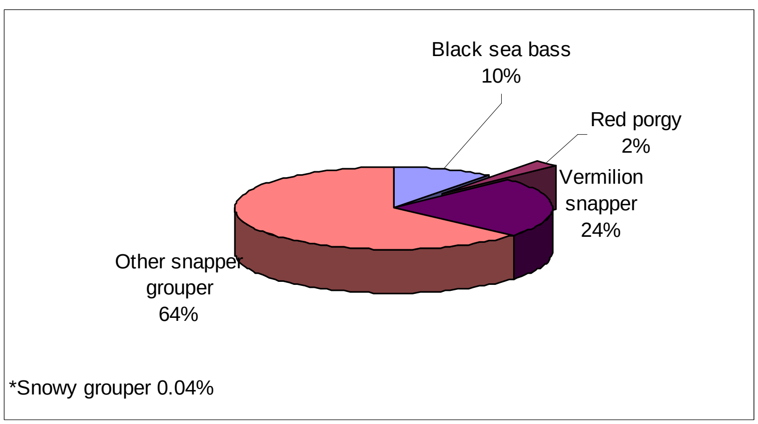


Figure 5.2.3-22. Composition of the headboat harvest by species addressed in this amendment averaged over the period 1999-2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab.

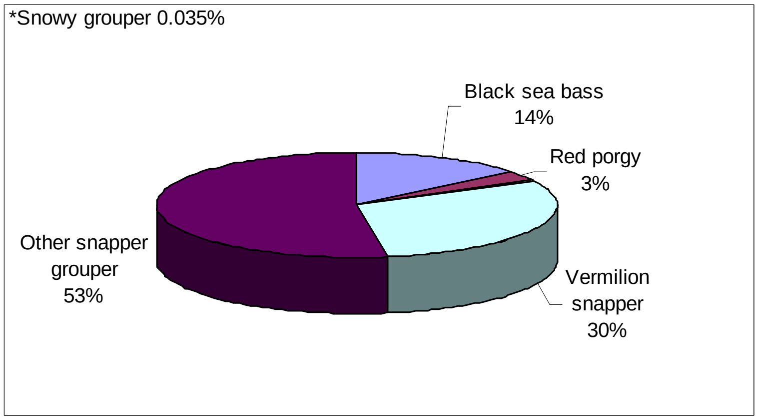


Figure 5.2.3-23. Composition of the headboat harvest in North Carolina, South Carolina, Georgia, and North Florida by species in this amendment averaged over the period 1999-2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab.

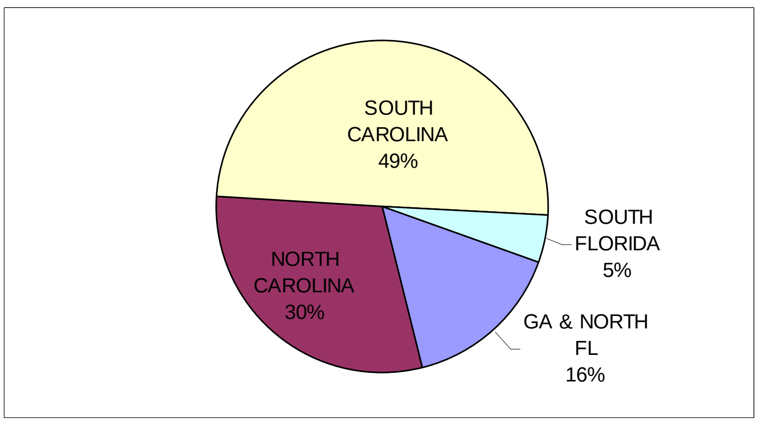


Figure 5.2.3-24. Distribution of headboat harvest of species addressed in this amendment by state averaged over the period 1999-2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab.

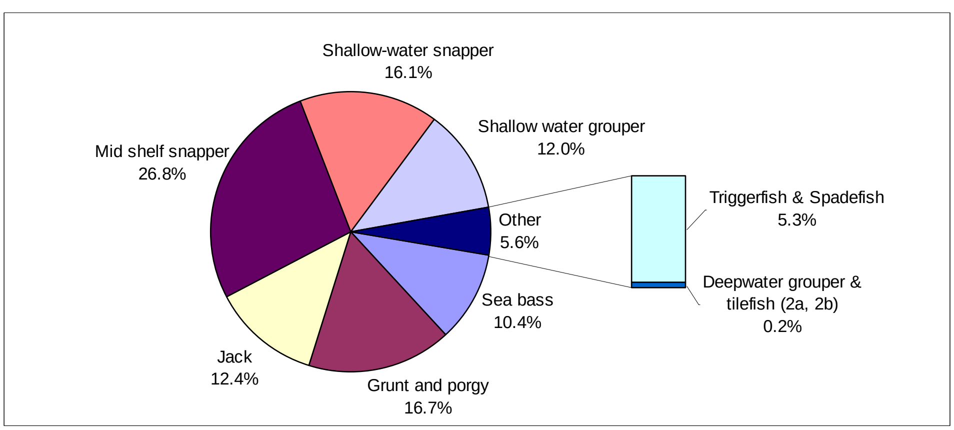


Figure 5.2.3-25. Composition of the headboat harvest by proposed fishery management unit averaged over the period the period 1999-2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab.

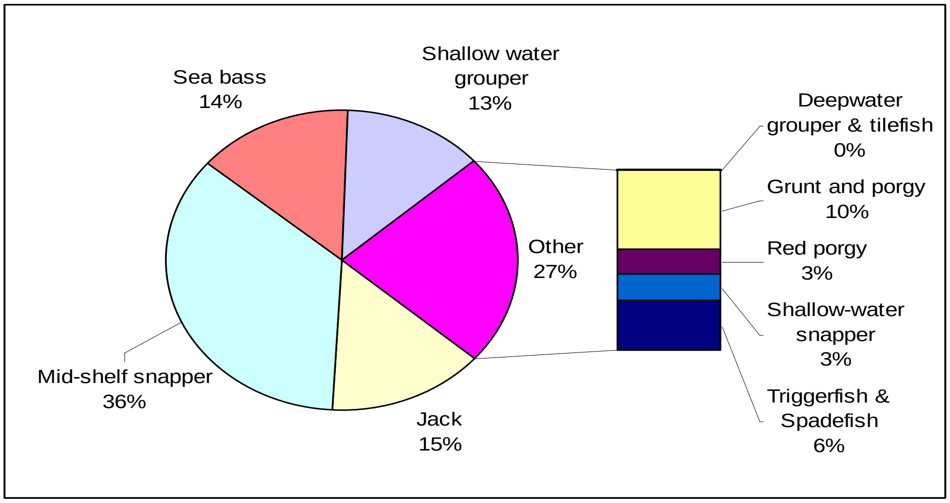


Figure 5.2.3-26. Composition of the headboat harvest in North Carolina, South Carolina, Georgia, and North Florida by proposed fishery management unit averaged over the period 1999-2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab.

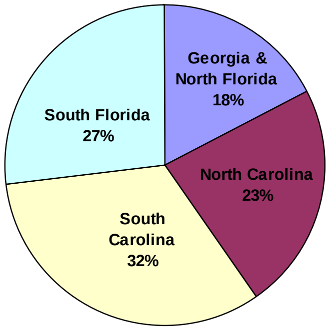


Figure 5.2.3-27. Distribution of headboat harvest by state/region averaged over the period 1999-2003. Source: The Headboat Survey, NMFS, SEFSC, Beaufort Lab.

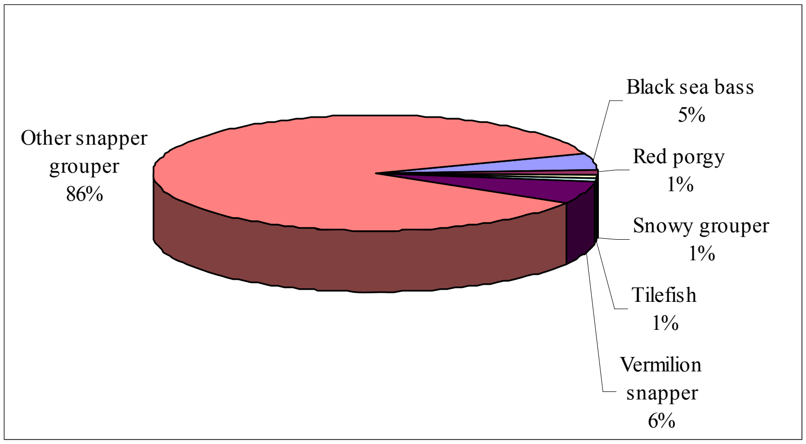


Figure 5.2.3-28. Composition of the charterboat harvest by species in this amendment averaged over the period the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

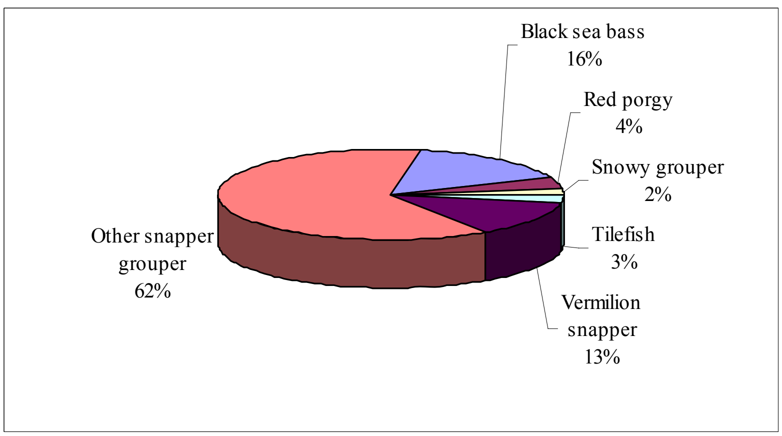


Figure 5.2.3-29. Composition of the charterboat harvest in North Carolina, South Carolina, and Georgia by species in this amendment averaged over the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

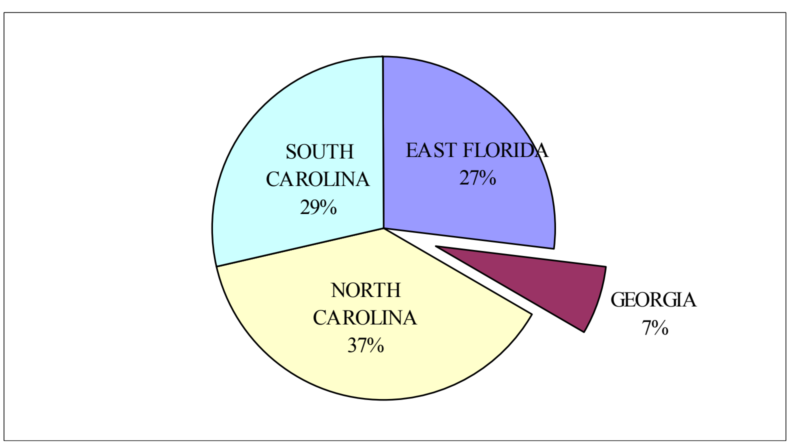


Figure 5.2.3-30. Distribution of charterboat harvest of species in this amendment by state averaged over the period 1999-2003.

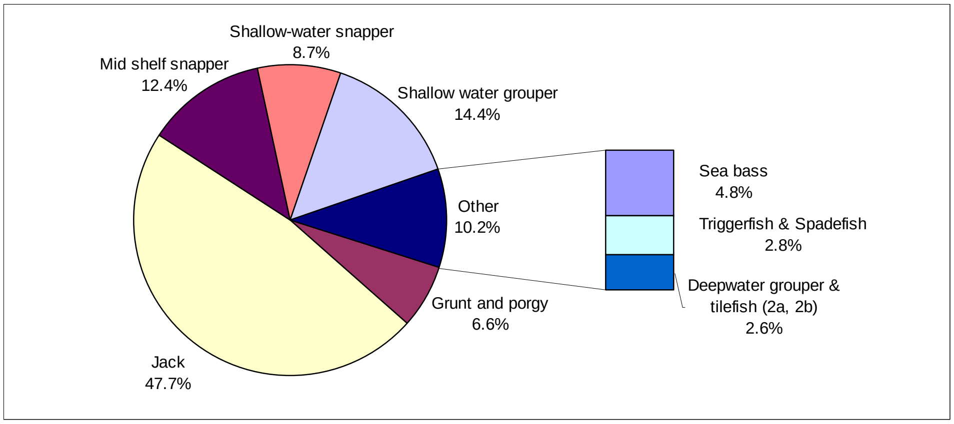


Figure 5.2.3-31. Composition of the charterboat harvest by proposed fishery management unit averaged over the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

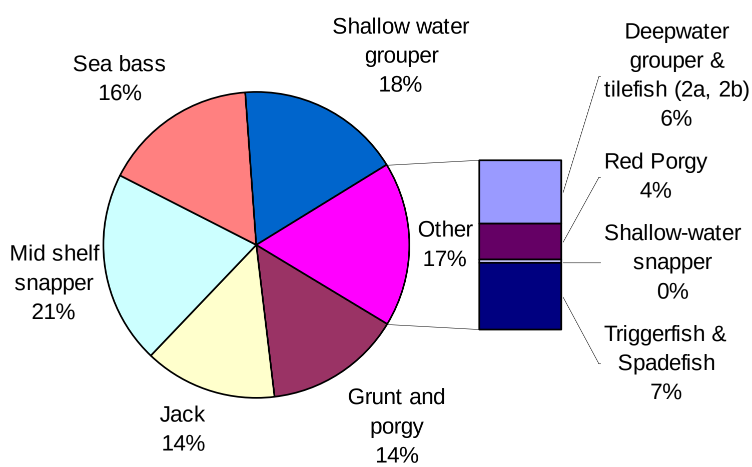


Figure 5.2.3-32. Composition of the charterboat harvest in North Carolina, South Carolina, and Georgia by fishery management unit averaged over the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

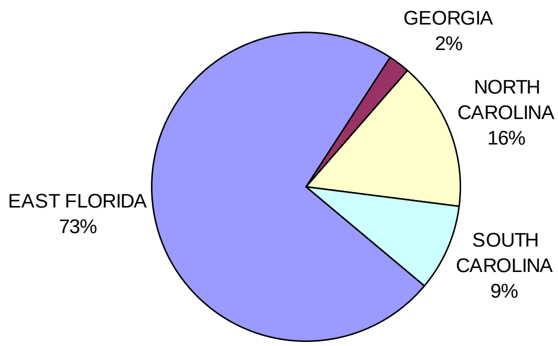


Figure 5.2.3-33. Distribution of charterboat harvest by state averaged over the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

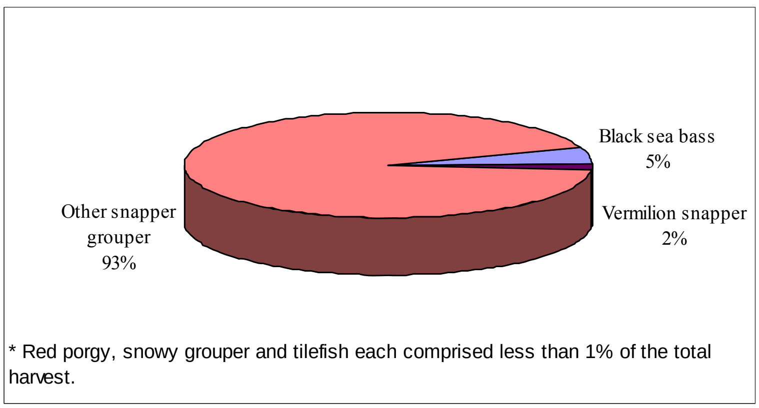


Figure 5.2.3-34. Composition of the private recreational sector's harvest by species in this amendment averaged over the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

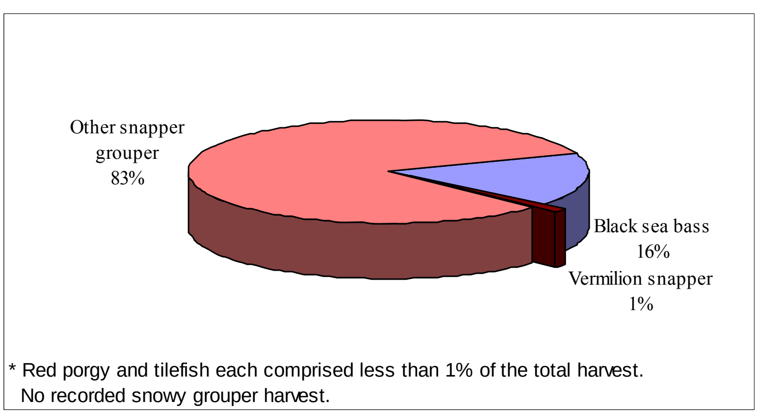


Figure 5.2.3-35. Composition of the private recreational sector's harvest in North Carolina, South Carolina, and Georgia by species in this amendment averaged over the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

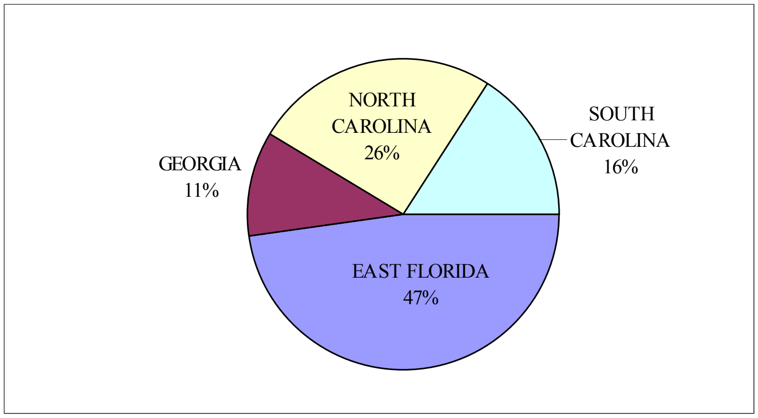


Figure 5.2.3-36. Distribution of the private recreational sector's harvest of species addressed in this amendment by state averaged over the period 1999-2003.
Source: MRFSS database, NMFS, NMFS, SERO.

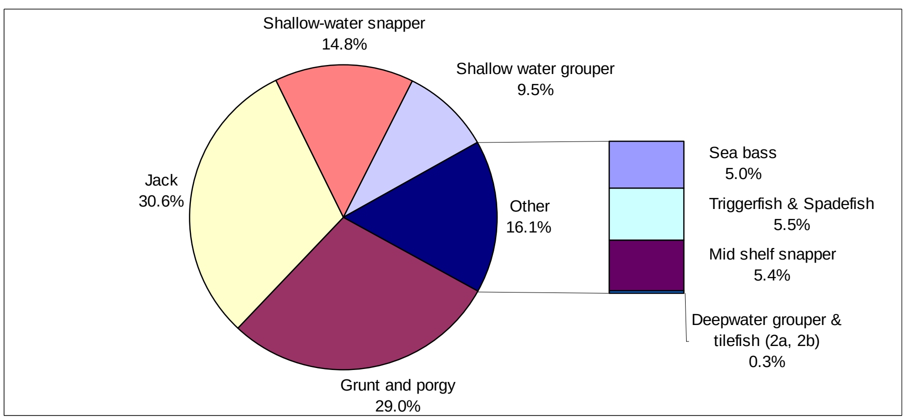


Figure 5.2.3-37. Composition of the private recreational sector's harvest by proposed fishery management unit averaged over the period 1999-2003.
Source: MRFSS database, NMFS, NMFS, SERO.

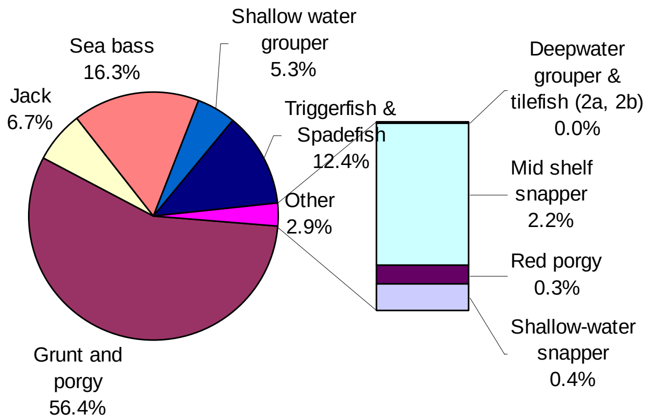


Figure 5.2.3-38. Composition of the private recreational sector's harvest in North Carolina, South Carolina, and Georgia by proposed fishery management unit averaged over the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

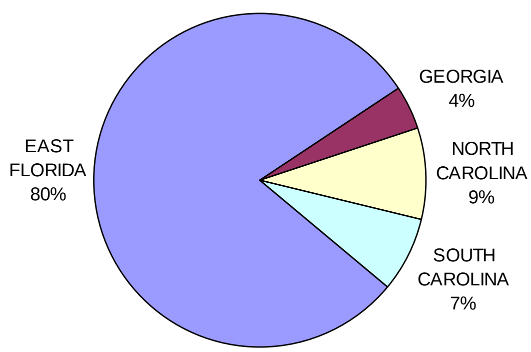


Figure 5.2.3-39. Distribution of the private recreational sector's harvest by state averaged over the period 1999-2003. Source: MRFSS database, NMFS, NMFS, SERO.

Headboats in the South Atlantic are dependent on other fisheries apart from the snapper grouper complex. During 1999-2003, an average of 643,113 lbs of non-snapper grouper species were harvested annually by headboats in the South Atlantic (Table 5.2.3-44). The average headboat landings of snapper grouper species during the period 1999-2003 amounted to 1.52 million lbs. Thus, these non-snapper grouper species comprised 30% (643,111*100/(643,113+1,524,487)) of the total headboat harvest in the South Atlantic, and the most frequently harvested species in this group are king mackerel and little tunny. Of lesser importance are sharks, wahoo, dolphin, cobia, and bluefish (Table 5.2.3-44).

Table 5.2.3-44. Percent composition of the headboat harvest of species not included in the snapper grouper complex. Source: Annual survey of headboats in the South Atlantic, NMFS, SERO.

Species/Group	Percent of non-snapper grouper species

King Mackerel	29.3%
Little Tunny	26.1%
Sharks	8.8%
Wahoo	7.7%
Dolphin	6.1%
Cobia	5.0%
Bluefish	4.0%
Average harvest of 1999-2003 (lbs)	643,113

Characteristics of the Charter and Headboat Sectors

There is no specific economic information on the for-hire sector that currently operates in the South Atlantic snapper grouper fishery. The information presented below comes from two sources. Holland et al. (1999) conducted a study of the charterboat sector in 1998 and provided information on charterboats and headboats engaged in all fisheries. The Southeast permits database contains information on each vessel issued a snapper grouper commercial permit and/or a snapper grouper for-hire recreational permit. In the South Atlantic, charterboats and headboats are required to have a snapper grouper for-hire permit to fish for or possess snapper grouper species in the South Atlantic EEZ. The for-hire fishery operates as an open access fishery and not all of the permitted snapper grouper for-hire vessels are necessarily active in this fishery. Some vessel owners have been known to purchase open access permits as insurance for uncertainties in the fisheries in which they currently operate.

Since 1998, there has been an increasing trend in the numbers of permits issued to for-hire operations in the South Atlantic (Table 5.2.3-45). In 2004, there were 1,594 for-hire permits issued compared to 611 in 1999. The increase in South Atlantic permits might be attributed, in part, to anticipation of the charter permit moratorium in the Gulf of Mexico region that was announced in 1999, but not implemented until 2005.

Table 5.2.3-45. Snapper grouper for-hire permit holders by home port state. Source: Southeast Permits Database, NMFS, SERO.

	Number of vessels issued for-hire vessel permits						**Number of vessels with both a for-hire permit and a commercial snapper grouper permit**					
Home Port State	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Florida	361	419	675	776	957	1,084	133	133	144	145	148	151
North Carolina	134	130	180	195	206	232	37	41	39	35	45	42
South Carolina	73	76	137	129	122	108	29	32	39	34	34	33
Georgia	8	9	25	27	36	27	3	3	4	5	4	2
Virginia	3	7	10	11	5	13	2	5	6	6		4
Other States	13	23	33	38	69	48	2	5	3	2	8	3

Gulf States	19	21	35	44	82	82						
Total	**611**	**685**	**1,095**	**1,220**	**1,477**	**1,594**	**206**	**219**	**235**	**227**	**239**	**235**

Some vessels with commercial snapper grouper permits also hold for-hire recreational snapper grouper permits in the South Atlantic. The number of commercial snapper grouper vessel owners purchasing these for-hire permits was greater in 2004 compared to 1999. In 2004, a total of 235 commercial snapper grouper vessel owners purchased a snapper grouper for-hire permit compared to 206 vessel owners in 1999 (Table 5.2.3-45). This increase in vessel permit issuance is somewhat at odds with the declining trend in headboat effort and the fact that there has been no observed increase in catch trips in the party/charter sector for snapper grouper species.

There is a lot of mobility in the for-hire fishery. A vessel can be moved from area to area within a state and between states in a given year. The number of permits by state represents the vessel's location (address provided to the NMFS SER Permits Office) at the latest date within a particular year. The majority, 1,084, vessels, are home-ported in Florida (Table 5.2.3-45).

In addition to the permits data, Table 5.2.3-46 contains estimates of the active for-hire sector in the South Atlantic during 1997 (Holland et al. 1999). A total of 1,080 charter vessels and 96 headboats supplied for-hire services in all fisheries during 1997. Most of the active for-hire vessels were located in Florida during 1997 (Table 5.2.3-46).

Table 5.2.3-46. Charterboats and headboats operating in the South Atlantic during 1998. Source: Holland et al. (1999).

State	Number of Headboats	Number of Charter Boats
North Carolina	18	207
South Carolina	18	174
Georgia	2	56
Florida-Atlantic Coast	42	413
Florida –Keys	16	230
Total	96	1,080

Holland et al. (1999) surmised charterboats in Florida tend to be less specific in terms of species targeting behavior when compared to charterboats in the other South Atlantic states. In their study, 47.7% of all captains in Atlantic Florida said they don't have specific targets but spend their time trolling or bottomfishing for any species. The most popular species for the Florida Atlantic vessels that had specific targets were king mackerel, dolphin, billfish, wahoo, and amberjack.

Information on the size of for-hire vessels can be obtained from the Southeast Permits Database. In 2003, the majority, 86%, of these permitted vessels were between 21 and 49 feet in length (Table 5.2.3-47).

Table 5.2.3-47. Proportion of permitted charter/headboat vessels in each length category.
Source: Southeast Permits Database, NMFS, Southeast Region.

Category	2000	2001	2002	2003
Less than 20 feet	2%	3%	3%	2%
21-29 feet	32%	31%	34%	31%
30-39 feet	33%	33%	31%	32%
40-49 feet	22%	21%	19%	23%
50-59 feet	7%	8%	8%	9%
60-69 feet	2%	2%	3%	2%
70-79 feet	1%	1%	2%	1%
80-89 feet	0%	0%	0%	0%
90-117 feet	1%	0%	0%	0%

Economic Value and Economic Impact of the Recreational Fishery
The statistics presented in the preceding section document marine recreational fishing participation, recreational effort, and harvest of snapper grouper species. Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above their costs of fishing. The monetary value of this satisfaction is referred to as consumers surplus, which is a non-market value since it cannot be observed in the marketplace. The magnitude of this non-market benefit derived from the recreational experience is dependent on several quality determinants, which include fish size, catch success rate, the number of fish kept, and aesthetics. These quality variables are important not only in their determination of the value of a recreational fishing trip but also in their influence on total demand for recreational fishing trips. For example, as the population of fish increases, it is expected angler success rate would increase and the marginal value of the fishing trip to the angler would increase, provided all other conditions remain the same.

Recent estimates of the economic value of a day of saltwater recreational fishing are available for the South Atlantic from different sources. Some of these estimates are not specific to snapper grouper fishing trips but shed some light on the magnitude of an angler's willingness to pay for this recreational experience. The mean value of access per marine recreational fishing trip was estimated at $109.31 for the South Atlantic (Haab et al. 2001). Such values can be considered good estimates of the opportunity cost of time for saltwater recreational fishing.

Other types of willingness to pay estimates represent the marginal value to the angler from a change in the bag limit or the value per fish caught per trip. Willingness to pay for an incremental increase in catch and keep rates per trip amounted to $3.01 for bottom fish species (Haab et al. 2001). Contingent valuation results from the same survey group yielded marginal valuation estimates of $1.06 to $2.20 to avoid a one fish red snapper bag limit decrease (Whitehead and Haab 2001). The latter are averages across all recreational anglers and not only those anglers who targeted or caught red snapper. Results from a valuation study conducted in 1997 provided an estimate of $2.49 per fish when calculated across recreational anglers in the boat mode category targeting snapper grouper species in the South Atlantic (Haab et. al. 2001). This represents the value of an additional fish taken in all four states. Additional estimates used in calculation of the impacts of the proposed management actions in this amendment are discussed in Appendix E.

The valuation estimates previously discussed should not be confused with angler expenditures or economic activity generated as a result of these expenditures. Angler expenditures benefit a number of sectors that provide goods and services for salt-water sport fishing. A recent study conducted by NMFS (Gentner et al. 2001) provides estimates of saltwater recreational fishing trip expenditures (Table 5.2.3-49). The average expenditure per trip varies depending on the state, type of trip, duration, travel distance, and other factors (Table 5.2.3-48). As expected, trip expenditures for non-residents are higher than for in-state residents. Compared to in-state residents, non-residents generally travel longer distances and incur greater expenses for food and lodging. Some in-state residents will incur higher trips expenses if they reside far from the coast. These estimates do not include expenditures on recreational fishing in Monroe County or expenditures made on headboat angler trips.

Table 5.2.3-48. Summary of expenditures on saltwater trips estimated from a 1999 MRFSS add-on survey. Source: Gentner et al. 2001.

	North Carolina		South Carolina		Georgia		Florida	
Item	Resident	Non Resident	Resident	Non Resident	Resident	Non Resident	Resident	Non Resident
Shore mode trip expenses	$63.61	$75.53	$54.12	$104.27	$31.78	$115.13	$36.90	$141.30
Private/rental boat trip expenses	$71.28	$92.15	$35.91	$67.07	$161.34	$77.51	$66.59	$94.15
Charter mode trip expenses	$201.66	$110.71	$139.72	$220.97	$152.45	$155.90	$96.11	$196.16
Charter fee-average-per day	$133.76	$70.59	$114.26	$109.97	$73.68	$80.99	$71.37	$100.79

Estimated expenses per trip presented in Table 5.2.3-48 were used to calculate expenditures in the snapper grouper recreational fishery by mode and state. However, weighted average expenditure estimates per trip by mode and state regardless of the resident status of the angler were required, since data on snapper grouper catch and harvest trips were not available separately for residents and non-residents. First, total expenditures by resident status, mode and state were calculated for the 1999/2000 fishing year (the period during which the NMFS angler expenditure study was conducted) as the product of the number of marine recreational fishing trips by state, mode, and resident status for 1999/2000 (Gentner et al. 2001) and the corresponding expenditure per trip data contained in Table 5.2.3-48. Then the total expenditures by state and mode were calculated by summing across total expenses in each resident category. Finally, weighted expenditure estimates per trip by state and mode were calculated by dividing the total expenditures by state and mode by the number of saltwater trips in the corresponding state and mode. These average weighted expenditure per trip estimates are presented in Table 5.2.3-49 and Table 5.2.3-50 along with corresponding data on number of snapper grouper catch trips used to calculate total angler expenditures associated with snapper grouper trips.

On average, during the period 1999-2003, it is estimated recreational fishermen incurred a total of $209 million in trip expenses to fish for snapper grouper species in the South Atlantic (Table 5.2.3-49). A relatively large portion (84%) of these expenses impacted the economy in east Florida. The trip expenditures for fishing off Florida were estimated at $174.8 million (Table 5.2.3-50). The economic impact of this fishery is larger than the figures presented in Table 5.2.3-49 and Table 5.2.3-50. Angler expenses for fishing tackle, gear, and vessel purchase and maintenance are not included in these estimates. Also, expenditures incurred for trips in the Florida Keys (Monroe County) are not included in these calculations.

Table 5.2.3-49. Estimated trip expenditures on snapper grouper trips in the South Atlantic by state.

State	Average number of catch trips 1999-2003	Average weighted expenditures per trip[1]	Revenue associated with catch trips	Revenue adjusted for inflation to $2003
Florida	2,444,099	$71.53	$174,826,401	$193,178,344
Georgia	69,966	$111.97	$7,834,093	$8,656,456
North Carolina	252,927	$76.11	$19,250,274	$21,271,021
South Carolina	116,681	$63.45	$7,403,409	$8,180,562
South Atlantic			$209,314,178	$231,286,385

[1] Expenses per trip for saltwater fishing were calculated across all modes from data collected from a 1999 expenditure survey (NMFS 2001). Used total expenditures calculated for the state divided by the total number of trips (resident and non-resident) presented in Gentner et al. (2001).

Table 5.2.3-50. Estimated trip expenditures on snapper grouper trips in the South Atlantic by mode.

Mode	Average number of catch trips 1999-2003	Average weighted expenditures per trip[1]	Revenue	Revenue adjusted for inflation to $2003
Charter	112,600	$164	$18,507,851	$20,450,664
Private/Rental	1,780,536	$72	$127,342,992	$140,710,488
Shore	990,538	$65	$63,923,750	$70,633,978

[1] Expenses per trip for saltwater fishing were calculated across all states from data collected from a 1999 expenditure survey (NMFS 2001).

Financial Operations of the Charter and Headboat Sectors

Holland et al. (1999) defined charterboats as boats for-hire carrying 6 or less passengers, which charge a fee to rent the entire boat. Data from their study conducted in 1998 indicated this trip fee reportedly ranged from $292 to $2,000. The actual cost to the passenger depended on state, trip length, and the variety of services offered by the charter operation. In the South Atlantic, depending on the state, the average fee for a half-day trip ranged from $296 to $360, for a full day trip the range was $575 to $710, and for an overnight trip the range in average fee was $1,000 to $2,000. Most (>90%) Florida charter operators offered half day and full day trips and about 15% of the fleet offered overnight trips. In comparison, in the other South Atlantic states about 3% of the total charter trips were overnight trips.

Headboats tend to be larger, diesel powered and generally can carry a maximum of around 60 passengers. The average vessel length of the headboats whose owners responded to the survey was around 62 feet. In Florida, the average headboat fee was $29 for a half day trip and $45 for a full day trip. For North and South Carolina, the average base fee was $34 per person for a half-day trip and $61 per person for a full day trip. Most of these headboat trips operated in Federal waters in the South Atlantic (Holland et al. 1999).

The demand for charter and headboat trips will depend on the fee charged and the quality of the fishing experience. As noted previously, variables such as catch success rates, bag (keep) limits, and aesthetics are determinants of the quality of the experience to the angler. Profits within the for-hire sector will depend on trip demand, the fee charged and cost of the fishing operation. The cost of fishing will bear some inverse relationship to the population size of the targeted species as it is expected costs of searching for fish will decrease as the population size increases.

On the east cost of Florida, the average charter vessel length and horsepower was 39 feet and 617 hp respectively. The average vessel length in North Carolina was comparable to Florida. Also, for the other states it appears charter vessels tended to be smaller than vessels in Florida and North Carolina. Electronics such as global positioning systems (GPS) and fish finders are common on most charter vessels in the South Atlantic. Capital investment in charter vessels averaged $109,301 in Florida, $79,868 for North Carolina, $38,150 for South Carolina and $51,554 for Georgia (Holland et al. 1999). Charterboat owners incur expenses for inputs such as fuel, ice, and tackle in order to offer the services required by their passengers. Most expenses incurred in 1997 by charter vessel owners were on crew wages and salaries and fuel (Holland et al. 1999). The average annual charterboat business expenditures incurred was $68,816 for Florida vessels, $46,888 for North Carolina vessels, $23,235 for South Carolina vessels, and $41,688 for vessels in Georgia in 1997. The average capital investment for headboats in the South Atlantic was around $220,000 in 1997. Total annual business expenditures averaged $135,737 for headboats in Florida and $105,045 for headboats in other states in the South Atlantic.

The 1999 study on the for-hire sector in the Southeastern U.S. presented two sets of average gross revenue estimates for the charter and headboat sectors in the South Atlantic (Holland et al. 1999). The first set of estimates of average gross revenue per vessel were those reported by survey respondents and were as follows: $51,000 for charterboats on the Atlantic coast of Florida; $60,135 for charterboats in North Carolina; $26,304 for charterboats in South Carolina; $56,551 for charterboats in Georgia; $140,714 for headboats in Florida; and $123,000 for headboats in the other South Atlantic states (Holland et al. 1999). The authors also generated a second set of estimates using the reported average trip fee, average number of trips per year, and average number of passengers per trip (for the headboat sector) for each vessel category for Florida vessels. Using this method, the resultant average gross revenue figures were $69,268 for charterboats and $299,551 for headboats. Since the calculated estimates were considerably higher than the reported estimates (22% higher for charterboats and 113% higher for headboats), the authors surmised that this was due to sensitivity associated with reporting gross receipts, and subsequent under reporting. Although the authors only applied this methodology to Florida vessels, assuming the same degree of under reporting in the other states results in the following estimates in average gross revenues: $73,365 for charterboats in North Carolina, $32,091 for charterboats in South Carolina; $68,992 for charterboats in Georgia; and $261,990 for headboats in the other South Atlantic states.

While the reported gross revenue figures may be underestimates of true vessel income, these calculated values could overestimate gross income per vessel from for-hire activity (Holland et al., 1999). Some of these vessels are also used in commercial fishing activities and that income is not reflected in these estimates.

5.2.3.3 Social and cultural environment

While general identification of fishing communities has taken place in the past few years, there has been less social or cultural investigation into the nature of the snapper grouper fishery itself. Waters et al. (1997) covered the general characteristics of the fishery in the South Atlantic, but those data are now almost 10 years old and do not represent some of the important changes that have occurred in the fishery such as the implementation of a limited entry permit system. Some survey work has been done by Dr. Brian Cheuvront of the North Carolina Division of Marine Fisheries, but it did not include ethnographic examination of communities dependent upon fishing. No recent study has examined the changing nature of the fishery in the South Atlantic, nor have the cumulative impacts of many earlier regulations been quantified. Some of these changes will be discussed in a qualitative manner below.

To help fill some of the gaps, members of the South Atlantic Council’s Snapper Grouper Advisory Panel were asked to help designate which communities they believed would be most impacted by the proposed management measures. The results are displayed in Table 5.2.3-51. Because of the great many communities in the South Atlantic, which have a presence of snapper grouper fishing – be it commercial, private recreational or charter and/or headboat fishermen – we have had to limit further descriptions to what we are calling “indicator communities”. The status of indicator communities represents the condition of the overall fishing communities.

Table 5.2.3-51. Potentially impacted snapper grouper communities in the South Atlantic.

An empty cell reflects a lack of data about a community not a determination on whether a community is important to a certain fishery sector. Recreational information by specific community is more difficult to obtain as it is not available from MRFSS data. Information presented below for the recreational sector was obtained from Council members, Advisory Panel members, and from the recreational angling public.

CH = CHARTER/HEADBOAT/FOR HIRE	1= NOT IMPORTANT
C = COMMERCIAL	2= SOMEWHAT IMPORTANT
R = PRIVATE RECREATIONAL	3= VERY IMPORTANT

Potentially Affected Community	**SNOWY GROUPER**	**GOLDEN TILEFISH**	**VERMILION SNAPPER**	**RED PORGY (Pinkies)**	**BLACK SEA BASS**
NORTH CAROLINA					
Hatteras	C3, R1, CH 2	-		-	C3
Manteo	C1, CH1, R1	C1, CH1, R1	C1, CH1, R2	C1, CH1, R2	R3, CH2, C1(for traps)
Wanchese	C2, R1, CH 2	C1, R1, CH1	C1, R?, CH?	-	C3, R3, CH3
Beaufort	C2, CH?, R1	C1	C3	C2	C3
Morehead City	C3, CH3, R1	R1, C1, CH1	R3, C3, CH3	R3, C3, CH3	R3, C3, CH3
Atlantic Beach	C1, CH3, R1	CH3	CH3		
Swansboro	N/A -- Most of the effort in Swansboro is recreational with a few charter boats and smaller private vessels – no specific data.				
Sneads Ferry	C1	C1	R3, C3, CH3	R3, C3,CH3	R3, C3, CH3
Carolina Beach	C2, CH2, R2	C1. CH1, R1	C3, CH3, R3		C3
Hampstead	Mostly recreational effort around Hampstead located in other areas such Wrightsville Beach and Wilmington.				C3,
Wrightsville Beach	C2, CH1, R1	C1. CH1, R1	C3, CH3, R3	R3, C3, CH3	R3, C3, CH3
Wilmington	C1, CH1, R1	C1. CH1, R1	C3, CH3, R3	R3, C3,CH3	R3, C3, CH3
Supply		C3			
Southport	C1, CH1, R1	C2	C3		

Potentially Affected Community	**SNOWY GROUPER**	**GOLDEN TILEFISH**	**VERMILION SNAPPER**	**RED PORGY (Pinkies)**	**BLACK SEA BASS**
SOUTH CAROLINA Due lack of in-depth databases for SC, determinations are approximations.					
Little River			C3, R3, CH3	C3, R3, CH3	C3, R3, CH3
Murrells Inlet	C3, R3	C3, R3	R3	C3,CH3,R3	R3, CH3
Georgetown	C3, CH3	C3, CH3	R3	C3, CH3	R3
Charleston Area		C2	CH3	CH3	CH3
Hilton Head	CH1, R1	CH1, R1	CH2, R2	?	?

Potentially Affected Community	**SNOWY GROUPER**	**GOLDEN TILEFISH**	**VERMILION SNAPPER**	**RED PORGY (Pinkies)**	**BLACK SEA BASS**
GEORGIA					

Tybee Island	CH1	CH1	CH3	CH2	CH3
Savannah	CH1	CH1	CH3	CH2	CH3
Townsend	C1	C1	C3,R3,CH3	C3,	C3
Brunswick	No commercial effort for Snapper Grouper; Recreational effort on St. Simons and Jekyll Islands is less than but mirrors that of Tybee Island and Savannah.				

Potentially Affected Community	**SNOWY GROUPER**	**GOLDEN TILEFISH**	**VERMILION SNAPPER**	**RED PORGY (Pinkies)**	**BLACK SEA BASS**
FLORIDA					
Mayport	C2, R1,CH2	C1, R1, CH1	C3	C3 Prior to Am12	C1
Jacksonville	C1	C1	R3, CH3, C3	C3 Prior to Am12	C1
St. Augustine	C3	C2	C3	C3 Prior to Am12	C3
Port Orange	C2	C3			
Cape Canaveral	C2, R1, CH1		C2. R2, CH2	C2, R2, CH2	
Merritt Island	C2, R1, CH1		C2. R2, CH2	C2, R2, CH2	
Titusville	C2, R1, CH1		C2. R2, CH2	C2, R2, CH2	
Cocoa Beach	C2, R1, CH1		C2. R2, CH2	C2, R2, CH2	
Melbourne	C2, R1, CH1		C2. R2, CH2	C2, R2, CH2	
Sebastian					
Vero					
Fort Pierce	C2	C2	C1		
Port St. Lucie	C1	C1	C1		
Jupiter	C1	C1			
Palm Beach, West Palm	?	?	?	?	?
Deerfield Beach	C1	C1	C1	C1	C1
Ft. Lauderdale	C1	C1	C1	C1	C1
Miami	C2	C2	C2	C1	C1
Key Largo	CH1, R1, C2	**N/A**	CH1, R1, C2	CH1,R1, C1	N/A
Islamorada	CH1, R1, C2	**N/A**	CH1, R1, C2	CH1,R1, C1	C1
Marathon	CH1, R1, C2	**N/A**	CH1, R1, C2	CH1,R1, C1	C1
Key West	CH1, R1, C2	**N/A**	CH1, R1, C2	CH1,R1, C1	C1
Stock Island	CH1, R1, C2	**N/A**	CH1, R1, C2	CH1,R1, C1	C1

It is our intention to let Table 5.2.3-51 be the most efficient manner for quickly identifying which communities potentially face the most severe impacts. The different types of fishing have been simplistically broken down into three sectors in accordance with standard practice at NMFS: Commercial, For-hire (CH), and Recreational. While we realize that subsistence fishing may be important in the South Atlantic, we have assumed it would fall under one of these other categories.

The communities identified in Table 5.2.3-51 have varying degrees of dependency on and level of engagement with the five species dealt with in Snapper Grouper Amendment 13C (SAFMC 2006). Some of these species make up an important proportion of commercial and/or recreational catches. These fisheries are not homogenous and attempting to describe the fisheries throughout the entire South Atlantic is difficult. However, there are some similarities among commercial and recreational sectors. There seems to be a broad similarity, however, between the snapper grouper effort north of the Georgia-Florida state line, and then a different type of effort south of the same state line.

Florida, then, stands out as different from the other states, for a number of reasons: greater amount of coastal development, one of the top three states in the U.S. for population; one of the top states for number of recreational fishermen; a more severe history of restrictions on commercial fisheries (the Net Ban of 1996, the closed area of the Oculina Bank; the Florida Keys Marine Sanctuary); and having two coasts, which can be easily crossed to fish, but have different data accounting systems (Gulf of Mexico vs. South Atlantic). All of these factors must be taken into account when determining future impacts of management measures.

Furthermore, impacts on fishing communities from coastal development, rising property taxes, decreasing access to waterfront due to increasing privatization of public resources, rising cost of dockage and fuel, lack of maintenance of waterways and ocean passages, competition with imported fish, and other less tangible (often political) factors have combined to put all these communities and their associated fishing sectors under great stress. These exogenous threats increase the severity of the immediate, short-term adverse impacts of the actions proposed in this amendment. In general, privatization of public resources refers to waterfront property and beach access being developed into private condominiums, gate communities, etc., most of which had been held as common property resources until the past few decades. This means that it is not solely or even primarily fishery regulations that are impacting the fishing community; rather changes from outside fishing are having larger impacts.

Changes in harvesting strategies were noticed across gear types for the fleet during 1998-2002. Vertical line effort, especially bandit gear, increased and was focused more towards vermilion snapper and shallow water groupers. The reclassification of bandit gear on logbook forms, which became significant in 2002, highlighted that king mackerel were being landed in large quantities by traditional rods and reels and handlines while bandit gear was being used to target higher valued snapper and grouper species. This distinction was not clear from the data for 1998-2001. Vertical lines also landed or incidentally caught snowy grouper, scamp and red grouper, red snapper, amberjacks, black sea bass, porgies, and triggerfish. Trolling and trap effort stayed consistently focused on king mackerel and black sea bass, respectively. Gillnet effort increased pressure on South Atlantic shark species and Spanish mackerel, and longliners reacted to increased regulations on deepwater species by shifting effort away from tilefish and snowy grouper toward sharks in 2002 (Logbook Data, SEFSC 1998-2002).

Throughout the South Atlantic, snapper grouper fishermen employ similar gear. However, it is important to delineate potential impacts of certain gear and the manners in which they are fished as compared to other fishermen when discussing levels of efficiency or appropriate management strategies. For example, in the Black Sea Bass (BSB) fishery in central and southern North Carolina, pots/traps are the primary technique for targeting BSB. One must consider the kinds of traps that are used, the seasons they are fished, and the manner in which they are fished can vary based upon factors such as climate and geographic location. If managers determine a reduction in traps is the most effective manner to reduce effort for the BSB commercial fishery throughout the South Atlantic, the differential impact it would have on fishermen based on where and how they fish should be understood.

Furthermore, while it may be easier to administer the region as a whole, the fisheries in North Carolina are prosecuted quite dissimilarly from those in, for example, the Florida Keys. Certain species are targeted at different times of the year in both areas due to climate differences, which affect such things as tourism flows and hence, effort shifts, primarily in recreational fisheries.

There are also differences in the species targeted by fishermen living in different areas, and this will affect how the regulations impact them. State regulations will also interact with how the snapper grouper fishery is prosecuted; for example, some North Carolina fishermen might move more inshore to estuaries to fish, while south Florida fishermen may just shift to a different species in the snapper grouper complex. Regulations affecting king and Spanish mackerel, along with new regulations in the Highly Migratory Species division of NMFS (tuna, sharks, swordfish) will also have differential impacts on fishermen in the South Atlantic region.

Throughout the South Atlantic the private and for hire recreational fisheries are to varying degrees dependent on many of the species identified in this amendment. The cause of the variance in terms of the level of dependency on certain species is to a large extent related to abundance of the species and geographic area. For example, yellowtail snapper are much more abundant and desired in central and south Florida as compared to North Carolina simply because yellowtail snapper are found in South Florida in greater numbers than anywhere else in the continental U.S. However, in North Carolina, fishermen are more apt to target species such as black sea bass than their central and south Florida counterparts. Some of the most commonly sought after and desired species are the shallow water groupers, especially gag and black grouper, and certain snappers and wrasses, such as mangrove (grey) snapper, vermilion snapper, red snapper and hogfish. Grunts and triggerfish are also commonly caught throughout the region.

Recreational fishermen are most likely to either troll for pelagic species or go bottom-fishing for species from the snapper grouper complexes. Consistent throughout all kinds of recreational fisheries, the primary gear used to target snapper grouper species is some form of hook and line, be it electric reel, regular rod and reel fishing, or handlines. One interesting growth in the recreational industry, which can be seen throughout North Carolina and Florida, is the increasing numbers of spear fishermen who desire and target many of these species. There has also been an observed and reported increase in the number of anglers practicing “deep-dropping” for snapper and grouper species off of central and south Florida. Some websites (e.g., www.kristalusa.com) indicate a number of recreational fishermen are now practicing a modified form of longlining in Florida.

It is also known from discussions with dealers and fishermen that there is some sale of recreationally caught snapper and grouper, along with other species. This sale may well take place in accordance with state regulations and is therefore not illegal sale of the bag limits. There is no good way to document this, other than public hearing testimony and anecdotal data. How this behavior is changing fishing behavior is not known at this time, nor is it known how this affects prices and dependency of dealers on recreationally caught fish.

Overview of the Age of Snapper Grouper Permit Holders
Overall 12% of permit holders are 70 or older, 27% are 55-69 old, 32% are 40-54 years old, 15% are 25-39 years old, and 15% are younger than 25 years old.

Table 5.2.3-52. Breakdown of ages of snapper grouper permit holders by age range and type of permit. Source: NMFS Permit Files, 2004.

	70 Years Old or Older	55 – 69 Years	40 – 54 Years	25 – 39 Years	Younger than 25	TOTAL
Unlimited Permits	84 (10%)	219 (26%)	285 (33.8%)	123 (14.6%)	126 (15%)	837*
Limited Permits	46 (20.6%)	63 (28%)	52 (23%)	31 (13.9%)	31 (13.9%)	223**
TOTAL	130 (12%)	282 (27%)	337 (32%)	154 (15%)	157 (15%)	1060

* Four permit files are missing Owner's Date of Birth information.
** Two permit files are missing Owner's Date of Birth information.

Community Profiles of Key Indicator Communities

This section highlights and describes certain communities determined to be potentially impacted by the proposals in this amendment. They have been chosen based on whether they are particularly important to one sector of the snapper grouper fishery (e.g. recreational fishing) or to all sectors (commercial, for hire and recreational).

Figure 5.2.3-40. North Carolina fishing communities.

<u>Overview of North Carolina's Fishery</u>

Of all the four states in the South Atlantic region, North Carolina (Figure 5.2.3-40) is often recognized as possessing the most "intact" commercial fishing industry; that is, it is more robust in terms of viable fishing communities and fishing industry activity than the other three states. The same might be said for the recreational sector of North Carolina. The state offers a wide variety of fishing opportunities, from sound fishing, to trolling for tuna, to bottom fishing or shrimping. Perhaps because of the wide variety of fishing, fishermen have been better able to weather regulations and coastal development pressures, adjusting their annual fishing routine as times have changed.

In Table 5.2.3-53, one notes the steady decline of federal unlimited Snapper Grouper permits in North Carolina since 1998 when Amendment 8 was implemented. The 1999 value is a more accurate accounting of the number of permits than 1998, when regulations (federal and state) that were in effect may have undercounted permit holders. All permit data fluctuate as permits are renewed based on the permit holder's birth date, and thus the numbers of permit holders is not stable. There is also no good method at this time for determining which of the permits actually have landings of snapper grouper species associated with them.

Table 5.2.3-53. Number federal snapper grouper permits by type for North Carolina. Source: NMFS 2004.

Type of Permit	1998	1999	2000	2001	2002	2003	2004
Charter/Headboat for Snapper Grouper	**33**	**37**	**38**	**39**	**35**	**204**	**42**
Snapper Grouper Unlimited	**147**	**194**	**167**	**162**	**146**	**142**	**139**
Snapper Grouper Limited	**30**	**36**	**33**	**25**	**22**	**18**	**16**

At the state level, in 2002, there were over 9,500 state licenses sold with the capability of sale and over 5,500 reported sales in 2002 (Table 5.2.3-54). Although the overall number of licenses sold has been increasing since 1994, the number of licenses reporting sales has been decreasing.

Table 5.2.3-54. Number of licenses sold by the North Carolina Division each license year.
The number of licenses with selling privileges that potentially can report catch on trip tickets by license year, and the number of licenses actually used to report catches. Individuals may hold more than one license with selling privileges. Source: NCDMF 2002.

License Year	Number of licenses sold*	Number of licenses reporting sales	Number of licenses sold, but did not report sales
1994	6,781	Not available	Not available
1994/1995	7,535	6,710	825
1995/1996	7,898	7,285	613
1996/1997	8,173	6,700	1,473
1997/1998	8,595	7,000	1,595
1998/1999**	8,426*	6,515	1,911
1999/2000+***	9,711	6,015	3,696
2000/2001*	9,677	6,057	3,620
2001/2002*	9,712	5,509	4,203

*Licenses from 1994 to June 1999 are Endorsement to Sell licenses. Licenses from 1999 to the present include number of SCFL, RSCFL, Shellfish, Menhaden License for Non-Residents without SCFL, Recreational Fishing Tournament License to Sell Fish, and Land or Sell licenses. License year is July to June. Source: 1994-1997/98 license year sales were derived from historical reports. 1998/99-2001/2002 from FIN license sales reports.
**1998/99 was a transition year and not all dBase licenses were migrated to FIN. The numbers provided were from FIN.
***1999/00 to 2001/02 include licenses sold that were subsequently surrendered without a refund.
+1999/2000 license counts were stated as much higher in other documents. This was due to the grace period when switching from ETS to SCFL. The number above is correct.

A good overview of North Carolina commercial snapper grouper fishermen can be found in Cheuvront and Neal's 2003 survey of North Carolina federal snapper grouper permit holders (Cheuvront and Neal 2004). The complete results of this study can be found in the NOAA Fisheries 2005 SAFE Report (NMFS 2005a). The report is instructive for most of the commercial snapper grouper fishermen that fish from ports in North Carolina, South Carolina, and Georgia. Florida, as noted above, poses different problems in the analysis due to the greater importance of recreational fishing, a changed coastline, and different climate, offshore conditions and species of fish, cannot be assumed to be represented by the results in the Cheuvront and Neal (2004) study. Because it is illustrative of how fishing activities among North Carolina snapper grouper fishermen are carried out, the section from the Cheuvront and Neal (2004) report describing targeted species is reproduced in whole below along with the related tables (Cheuvront and Neal 2004; Table 5.2.3-55; 5.2.3-56).

Table 5.2.3-55. Socio-demographics of snapper grouper fishermen (N=124) in North Carolina, 2004. Source: Cheuvront and Neal 2004.

	Frequency	Percent			Frequency	Percent
Gender				Annual Household Income		
Male	122	98.4%		Less than $15,000	4	3.2%
Female	2	1.6%		$15,001 - $30,000	26	21.0%
Age				$30,001 - $50,000	36	29.0%
Average	46.6			$50,001 - $75,000	22	17.7%
Minimum	18			$75,001 - $100,000	14	11.3%
Maximum	73			More than $100,000	9	7.3%
Racial/Ethnic Background				Refused to Answer	13	10.5%
White	121	97.6%		County of Residence		
Asian/Pacific Islander	2	1.6%		Brunswick	16	12.9%
Native American	1	0.8%		Carteret	20	16.1%
Education				Craven	1	0.8%
Less than High School	13	10.5%		Currituck	1	0.8%
High School Graduate	40	32.3%		Dare	8	6.5%
Some College	32	25.8%		Hyde	2	1.6%
College Graduate	39	31.5%		New Hanover	27	21.8%
Marital Status				Onslow	24	19.4%
Married	98	79.0%		Pamlico	2	1.6%
Divorced	12	9.7%		Pender	11	8.9%
Separated	0	0.0%		Other NC County	9	7.3%
Widowed	2	1.6%		Out of State	3	2.4%
Never Married	11	8.9%		Years Fishing		
# of People in Household				Average	18.1	
One	10	8.1%		Minimum	1	
Two	51	41.1%		Maximum	60	
Three	30	24.2%		Years in Community		
Four	24	19.4%		Average	26.6	
Five	5	4.0%		Minimum	2	
Six	2	1.6%		Maximum	65	

Eighty-one (65.3%) of the fishermen indicated year around fishing. Table 4 shows the main species landed by these fishermen in each month. The percentage listed for each month indicates the overall percentage of the respondents who reported fishing activity in that month in 2002. The species listed are the ones reported as being landed by at least 5% of the fishermen who fished in that month. Non-snapper/grouper complex species were included to show the fishermen's progression through fisheries during the year. NC DMF trip ticket species codes were used to record the species fishermen said they targeted. Gag is the fish most frequently targeted by these fishermen. The season for gag is effectively closed for the months of March and April because of the SAFMC restricted bag limit. Also, during those months it cannot be sold commercially. Beeliner and black sea bass are the next most frequently landed species. There is a significant number of fishermen who land king mackerel each month of the year. Over 20% of fishermen target *king mackerel between October and May. During the gag closed season, king mackerel are targeted by about 35% of the fishermen. Other snapper/grouper complex species landed by at least 5% of the fishermen in any given month were red grouper, scamp, snowy grouper, grunts, and triggerfish. Non-snapper/grouper complex species landed by at least 5% of the fishermen in any given month included Atlantic croaker (Micropogonias undulatus), yellowfin tuna (Thunnus albacares), bluefin tuna (Thunnus thynnus), dolphin (Coryphaena hippurus), and shrimp (Penaeid spp.).*

Table 5.2.3-56. Fisheries participation and major species landed by month. (All figures are in percents). Source: Cheuvront and Neal (2004).

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Overall Effort	**85%**	**83%**	**82%**	**86%**	**91%**	**93%**	**95%**	**94%**	**92%**	**95%**	**93%**	**90%**
Gag	41	40	6	5	46	54	58	57	54	56	52	46
Red Grouper	12	14	21	25	28	31	31	30	28	27	25	20
BSB	34	32	26	25	19	18	17	14	18	23	29	32
Vermilion Snapper	21	23	23	26	34	39	39	39	36	33	29	23
Snowy Grouper	--	--	--	7	8	9	7	7	--	--	--	--
Scamp	--	8	9	14	20	21	18	19	18	18	14	13
Triggerfish	--	--	--	--	--	--	--	8	7	5	--	--
Grunts	--	--	--	--	--	--	10	11	10	10	8	6
King Mackerel	23	25	35	--	21	16	17	17	18	22	23	21
Yellowfin Tuna	--	--	--	11	13	11	9	8	7	--	--	10 (Blue fin)
Dolphin	--	--	--	--	--	11	5	5	6	5	--	
Shrimp	--	--	--	--	--	7	7	7	7	5	--	--
Croaker	--	8	7	--	--	--	--	--	--	--	--	--

At some point in the year gag are targeted by 61.3% of fishermen. Red grouper were landed by 39.5%. Scamp were reported as being landed by 27.4%. All three species are primarily landed using vertical lines or diving spears. Black sea bass are targeted by 46% of the fishermen with 40% using fish pots and 60% using vertical line gear.

Beeliners were landed by 36.3% of fishermen. Likewise, 14.5% reported landing grunts, and 13.7% reported triggerfish. Less frequently mentioned species included golden tilefish (5.6%), amberjack, American red snapper (4.8%), pink snapper (1.6%), and *jolthead and knobbed porgies (1.6%). Each of these species was primarily landed using vertical line gear.*

Hogfish, targeted by 1.6% of the respondents were caught primarily using diving spears. Snowy grouper were targeted by 9.7% of the fishermen at some point in the year using primarily vertical lines or longline gears.

As can be seen from this selection above, all the species targeted for action under in this amendment are the same species that are heavily targeted by North Carolina's snapper grouper fishermen. As fishing practices are similar in South Carolina and Georgia, it may be safe to assume the impacts will also be the same for these fishermen and their communities. As will be discussed in Section Four, Management Measures, the impacts of this proposed amendment will disproportionately affect the fishermen (commercial and recreational) of southern North Carolina, South Carolina and Georgia.

Recreational fishing is well-developed in North Carolina, and due to natural geography, is not limited to areas along the coast, as is demonstrated in the two maps of public boat ramps shown below. While most of these boat ramps are located on the sounds and rivers, the two maps below serve as one type of indicator of recreational fishing activity. The North Carolina Department of Transportation and the North Carolina 2003 Coastal Boating Guide list 109 marinas and boatworks for the state (Figures 5.2.3-41, 5.2.3-42). North Carolina is now almost on par with Florida for total recreational fishing effort.

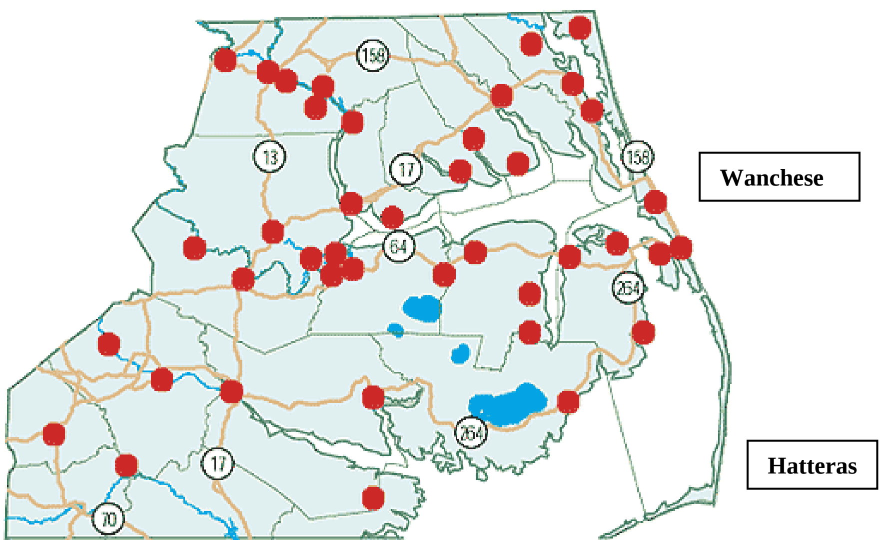


Figure 5.2.3-41. Public boat ramps for North Carolina, Currituck through Carteret Counties.
Source: http://www.rbff-education.org/cgi-bin/search/rbff.cgi?ID=981848282

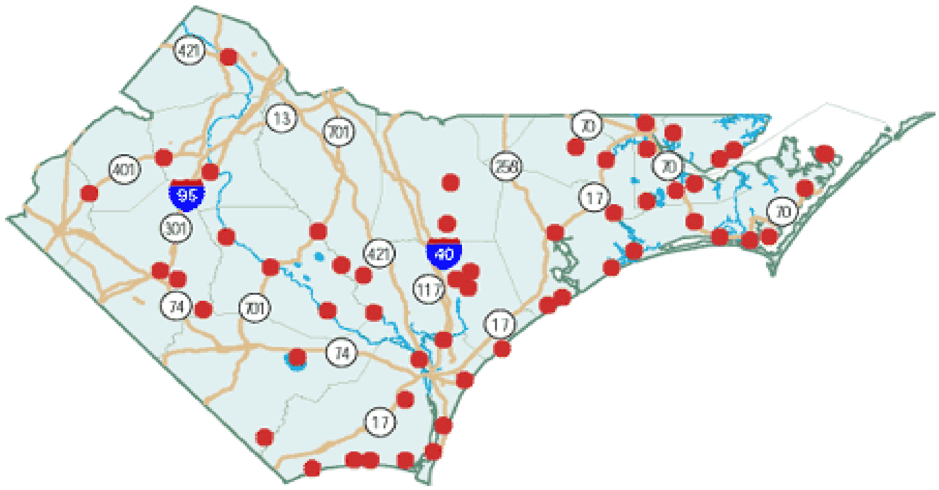


Figure 5.2.3-42. Public boat ramps, Onslow through Brunswick Counties.
Source: http://www.rbff-education.org/cgi-bin/search/rbff.cgi?ID=981848282

Other than the large national organizations (often with regional or state chapters) such as the Recreational Fishing Alliance (RFA) and the Coastal Conservation Association, there are other clubs for recreational anglers that are locally based and give members a sense of community based on a favorite pastime. While there are other fishing clubs that focus on inland, lake fishing such as the Jon Boat Fishing Club, the following clubs are dedicated mostly to saltwater fishing.

Charlotte Offshore Sportfishing Club
Piedmont Offshore Fishing Club
Raleigh Saltwater Sportfishing Club
Hatteras Marlin Club
Sandhills Saltwater Fishing Club, Inc.
Nags Head Surf Fishing Club

Tarboro Association SaltwaterSportsman
Cape Hatteras Anglers Club
Cape Fear Blue Water Fishing Club
Topsail Island Fishing Club
Carteret County Light Tackle Club

These clubs offer a sense of camaraderie and community, and members are usually involved in fishing and fishing-related events all year long. Often clubs will offer discounted group rates so that members can travel abroad to experience different types of recreational fishing. Local community volunteer work is also an event that different clubs participate in, and often proceeds from fishing tournaments go to benefit local community causes.

There are also numerous websites catering to recreational marine fishing, ranging from lone charterboats with their own site for booking charters to larger mega-sites that serve as types of fishing information clearinghouses, for example NC Watermen (http://www.ncwaterman.com) or North Carolina Sportsman (http://www.northcarolinasportsman.com).

Most fishing tournaments in North Carolina focus on catching pelagic species such as king mackerel, dolphin, wahoo, and tuna. Far fewer tournaments have categories for bottom fish such as snappers and groupers. A comprehensive list of North Carolina tournaments is offered at http://www.ncfisheries.net/download/2005tourn.pdf.

In 2005, the North Carolina State Legislature approved the creation of a state recreational saltwater fishing license to be implemented in January 2007. While still subject to revision by the legislature, the license has created controversy for both recreational and commercial fishermen, each believing it will hurt or help their access to marine resources.

Community Profiles

Because of the large commercial landings of blueline tilefish, snowy grouper, and black sea bass, and because Wanchese still is considered a predominantly commercial fishing village, it will be profiled below. Hatteras Village offers itself as a combination of commercial fishing and recreational fishing; however, it appears that the commercial landings for blueline tilefish and snowy grouper are more significant than the recreational targeting of snapper grouper species.

Hatteras Village

History

The history of Hatteras Village is a long one: the Italian explorer Amerigo Vespucci landed in the area in the 16th Century. It was not until the mid-1880s when a storm opened up both Oregon and Hatteras Inlets, did a fishing village really take root here. The first post office was established in Hatteras in 1858 (http://www.hatteras-nc.com/history/hattehis.htm). By the turn of the century, a US weather station was established on the island. In the mid-1930s, the Army Corps of Engineers dredged a deeper channel, which allowed for better access from the Pamlico Sound to Hatteras Inlet. Soon after this development, a sizable fishing fleet was established at Hatteras. During World War II, this area was known as "Torpedo Junction" due to more than 100 ships that were lost due to German submarines (www.hatteras-nc.com/history/hattehis.html).

After WWII, a private ferry service was established and began operating across the inlet to connect Hatteras and Ocracoke Island. The state took over the ferry service in 1957. In 1953, a 72-mile stretch of the Outer Banks from Nags Head to Ocracoke Island was set aside as the nation's first National Seashore. This is still a matter of contention for the inhabitants of the island, as they feel much of their island was taken away by the US government. Today most of Hatteras Island remains protected. In 1999, the Cape Hatteras Lighthouse was moved away from the sea in an effort to save it from the erosion of the shoreline (www.hatteras-nc.com).

Figure 5.2.3-42. Hatteras Island and Village, Outer Banks, North Carolina.
Source: Yahoo Maps, http://www.yahoo.com.

Current Situation
As seen in Table 5.2.3-57, there has not been a significant increase in population since 1990. However, this table hides the number of seasonal visitors and tourists to the island in the late spring through early fall each year. Furthermore, the demographics of the island have been shifting, as is evidenced in the 1) decreasing percentage of the population of that is actively in the workforce, reflecting a larger number of retirees in the community and 2) the increasing proportion of residents with higher education, also reflecting a retired, professional segment of the population. However, there has been a significant increase in the percent of the population in the farming, fishing and forestry occupations from 5.6 percent to 10.8 percent. This may be reflective of the increasing number of persons employed in businesses related to recreational fishing, such as charter boat captains and crew, boat repair and sales, marinas, etcetera.

While Hatteras Village is located on an island and its growth is constrained by this geographical feature and by the federal National Seashore Park as seen in Figure 3-26, the area of the Outer Banks in general has grown considerably in the past two decades. Beginning in Nags Head and stretching north and south along the banks, the growth of vacation homes, condominiums, hotels, restaurants, and amusement and shopping centers has overwhelmed the area in the past 15 years. The Outer Banks, including Hatteras Island, give the visitor and social scientist a first impression of being communities geared to nothing much more than summer tourism and its associated activities.

Table 5.2.3-57. Community demographics for Hatteras Township, North Carolina. Source: US Bureau of the Census.

	1990	**2000**
Total population	2584	2642
Gender (Percent of total population)		
Male	50.5	50.1
Female	49.5	49.9
Age (Percent of total population)		
Under 18 years of age	22.3	20.1
18 to 64 years of age	64.6	65.4
65 years and over	13.1	14.5
Ethnicity or Race (Number)		
White	2567	2605
Black or African American	5	4
American Indian and Alaskan Native	8	2
Asian*	N/A	1
Native Hawaiian and other Pacific Islander*	N/A	2
Some other race	2	13
Two or more races*	N/A	15
Hispanic or Latino (any race)	17	27
Educational Attainment (Population 25 and over)		
Percent with less than 9th grade	7.1	5.0
Percent high school graduate or higher	74.4	83.7
Percent with a Bachelor’s degree or higher	20.6	22.5
Language Spoken at Home (Population 5 years and over)		
Percent who speak a language other than English at home	2.0	5.0
And Percent who speak English less than very well	0.8	2.8
Median household income	$24,667	$39,881

Poverty Status (% of population with income below poverty line)	6.4	2.3
Percent female headed household	6.8	7.9
Home Ownership (Number)		
Owner occupied	798	902
Renter occupied	279	269
Value Owner-occupied Housing (Median $)	$109,000	$149,400
Monthly Rent (Median $)	$478	$610
Employment Status (Population 16 yrs and over)		
Percent in the labor force	70.1	66.4
Percent of civilian labor force unemployed	4.2	8.5
Occupation		
Management, professional, and related occupations*	N/A	23.2
Service occupations*	N/A	16/2
Sales and office occupations	14.9	23.3
Farming, fishing, and forestry occupations	5.6	10.8
Construction, extraction, and maintenance occupations*	N/A	17.7
Production, transportation, and material moving occupations*	N/A	8.8
Industry		
Agriculture, forestry, fishing, hunting and mining	6.4	10.4
Manufacturing	3.4	2.4
Percent government workers	21.0	10.8
Commuting to Work (Workers 16 yrs and over)		
Percent in carpools	17.5	13.6
Percent using public transportation	0.9	0.0
Mean travel time to work (those who did not work at home)*	N/A	17.3
Percent worked outside of county of residence*	N/A	N/A

* Some values could not be determined accurately due to changes in the way the Census Bureau tabulates responses, or to changes in the categories themselves.

Commercial Fishing

Hatteras is host to several prestigious fishing tournaments and is homeport for the island's famous charter fishing fleet. In addition, there are numerous restaurants that offer fresh caught seafood.

According to conversations with residents in 2002 (Jepson et al. 2005), there were once as many as 10 or 12 fish houses. The largest fish house was lost to condominium development; there were four fish houses left by 2002. All the fishermen are "getting put out of the fishing business" according to one individual. Tourism is taking over, and the businesses are catering to tourists. He further commented that the quality of the water has changed and there used to be shellfish on the shoreline; now it is all gone due to development. He suggested that the bridges could have changed the currents of the inlet.

Again, as in other communities in the South Atlantic, the numbers of commercial snapper grouper permits has declined since the limited access program was instituted in 1998 (Table 5.2.3-58). The number of state permits by type is illustrated in Table 5.2.3-59. Employment in fishing related industry was dominated by individuals working at marinas (Table 5.2.3-60).

Table 5.2.3-58. Number of federal snapper grouper permits by type for Hatteras, North Carolina. Source: NMFS 2002.

Type of Permit	1998	1999	2000	2002	2003	2004
Charter/Headboat for Snapper Grouper	1	1	1	0	20	28
Snapper Grouper Unlimited	7	9	8	6	5	5
Snapper Grouper Limited	3	3	1	3	3	3

Table 5.2.3-59. Number of state permits by type for Hatteras, North Carolina. Source: North Carolina Division of Marine Fisheries 2002.

Type	Permits
Commercial Fishing Vessel Registration	81
Dealer License	10
Flounder License	0
Land or Sell License	0
Non-resident Menhaden License	0
Ocean Fishing Pier License	0
Spotter Plane License	0
Retired Standard Commercial Fishing License	5
Standard Commercial Fishing License	73
Shellfish License	21
Recreational Fishing Tournament to Sell License	1
Total	190

Table 5.2.3-60. Employment in fishing related industry for Hatteras, North Carolina. Zip code Business Patterns, U.S. Census Bureau 1998). Source: Jepson et al. (2005).

Category	NAIC Code	Number Employed
Total Other Employment		
Fishing	114100	0
Seafood Canning	311711	0
Seafood Processing	311712	0
Boat Building	336612	0
Fish and Seafoods	422460	0
Fish and Seafood Markets	445220	4
Marinas	713930	16
Total Fishing Employment		20

While there are many festivals and events in the Outer Banks that are geared to tourists, there is a general mix of locals and tourists at such activities. However, Hatteras Village, after persistent efforts from some of its residents, have had their town named a Preserve America Community, which now entitles it to certain benefits (http://www.preserveamerica.gov/communities.html). There is has also been a rebirth of the Blessing of the Fleet Festival, and in 2005 there will be added another festival, the Day at the Docks - A Celebration of Hatteras Island Watermen. Both of these festivals and special community designations resulted from the efforts of mostly fishermen's wives who believe their way of life is threatened by both regulations and development. As one woman wrote recently, "our fishing families are dissolving under the pain [of change]."

There is one commercial fishing organization in the area, the Hatteras/Ocracoke Chapter of the Auxiliaries of the North Carolina Fisheries Association.

Recreational Fishing

The following is a listing of marinas available at Hatteras Village: Frisco Cove Marina, Hatteras Harbor Marina, Hatteras Landing Marina, Oden's Dock, Teach's Lair Marina, and Village Marina.

There are numerous bait and tackle stores in the immediate area; a partial listing is below: Hatteras Jack Bait and Tackle, The Fishin' Hole, Frank and Fran's, Dillon's Corner, Red Drum Tackle Shop, Frisco Rod and Gun, Frisco Tackle, and The Roost.

There are also two to three public boat ramps and two fishing piers on Hatteras Island that cater to recreational fishermen. While there is a large charter boat fleet that is based on the Outer Banks, most of these for-hire vessels do not target snapper or grouper species.

<u>Wanchese</u>

History

The history of Wanchese is deeply entwined in its neighboring town of Manteo and is further embedded in the long history of Roanoke Island, on which Wanchese is located (See Figure 5.2.3-43). The two towns were named for two Native Americans – Wanchese and Manteo – who traveled back to England with some of the first colonists to arrive on North Carolina's shores. Roanoke is the island of Sir Walter Raleigh's Lost Colony, and much of today's tourists to the area are drawn by the colonial history of the area.

Figure 5.2.3-43. Map of Roanoke Island, North Carolina showing both Wanchese and Manteo. Source: Kathi Kitner.

From Wilson, McCay et al. (1998:88), more of the recent history of Wanchese is recounted:

Throughout the nineteenth century, the commercial fishing industry expanded, due in part to the involvement of the first postmaster (CNCSS 1993). This postmaster owned or financed most of the commercial fishing boats in Wanchese; he also established a system of credit for the fishermen at his store, which was paid off when they brought in their catches. During that time, almost all of the residents of Wanchese were commercial fishermen. Today the village still revolves around fishing, but has expanded to included processing plants…Wanchese' first fish house was begun in 1936 by the grandfather of the current generation that still runs two fish houses in the community, one of which related this history. His son fished the first trawler in Wanchese in the 1950s. He took a little 65' wooden boat and converted it into a fishing trawler. The grandfather stayed and helped packing boats but he was a gillnetter at heart and would rather be catching fish. In those days they were fishing more in Pamlico and Albemarle Sounds.

While Manteo has developed into a upscale tourist-based economy replete with small boutiques, tiny restaurants, and restored colonial and turn-of-the-century buildings and museums (including a Maritime Museum that documents the community's sea-going and fishing past), Wanchese has remained a small, close-knit community focused on making its living from the sea.

Current Situation

Wanchese, while feeling some pressure of development from the town of Manteo and other Outer Banks communities with high rates of growth, is still foremost a commercial fishing community. This may not be the case for many more years, as development interests and real estate agents have been making inquiries about land available for sale. There have also been some rumors of turning some of the commercial docks into docks more geared towards the recreational sector. However, the town has recently approved a version of a zoning document that would prevent unplanned growth and would help preserve working waterfronts and residential areas (Kozak 2005).

The following partial community profile has been reproduced from the Community Profiles of the Mid-Atlantic, McCay et al. 2003:
One two-lane road, US 64/264, has always carried all the local traffic plus vacationer traffic right down the spine of Roanoke Island, creating backups and bottlenecks that make being in a hurry an unfortunate but likely condition to be in. This started changing in the summer of 2002 with a new 5-mile bridge bypassing Roanoke Island. This bridge, the longest in the state, will steer vacationer traffic and much of the local traffic away from the island. One end of the bridge is in Manns Harbor and the other is at the Manteo-Wanchese junction, which leads right to the beaches. Air travel has people arriving at the Dare County Regional Airport located on the north end of Roanoke Island. Private pilots fly into this airport on a daily basis, and charter services are also available.

Once you leave Rt 64/264 and are on Rt 345 it is about three and a half miles of traveling through marsh until entering the community of Wanchese. The first major structure reached on the way into Wanchcese on Highway 345 is the Manns Red and White Store (a grocery and hardware store). Next to the store there is a small diner that seems to be a popular local place where some come to eat as well as visit one another. Adjacent to the Red and White is a gas station, the only in the community. Traveling south into the more heavily populated area, street signs with the names Tillet, Jovers, and Smith become increasingly apparent. The fact that the streets are named after prominent families, specifically fishing families, is very telling about the nature of this "tight knit" community (to be discussed much more fully later in this document). It does not take long to orient oneself in Wanchese and getting lost is almost an impossibility. Many of the houses have boats or gear stored in the yard or in an adjacent lot. Becoming even more prevalent is the sight of crab shedders constructed in people's yards. Driving along the road it is not uncommon to see someone out hanging nets to be mended much in the same way their previous generations had done.

5.2.3.4 Bycatch

The South Atlantic Council is required by MSFCMA §303(a)(11) to establish a standardized bycatch reporting methodology for federal fisheries and to identify and implement conservation and management measures that, to the extent practicable and in the following order, (A) minimize bycatch and (B) minimize the mortality of bycatch that cannot be avoided. The MSFCMA defines bycatch as "fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch-and-release fishery management program" (MSFCMA §3(2)). Economic discards are fish that are discarded because they are undesirable to the harvester. This category of discards generally includes certain species, sizes, and/or sexes with low or no market value. Regulatory discards are fish that are required by regulation to be discarded, but also include fish that may be retained but not sold.

NMFS outlines at 50 CFR §600.350(d)(3)(i) ten factors that should be considered in determining whether a management measure minimizes bycatch or bycatch mortality to the extent practicable. These are:

1. Population effects for the bycatch species;
2. Ecological effects due to changes in the bycatch of that species (effects on other species in the ecosystem);
3. Changes in the bycatch of other species of fish and the resulting population and ecosystem effects;
4. Effects on marine mammals and birds;
5. Changes in fishing, processing, disposal, and marketing costs;
6. Changes in fishing practices and behavior of fishermen;
7. Changes in research, administration, enforcement costs and management effectiveness;
8. Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources;
9. Changes in the distribution of benefits and costs; and
10. Social effects.

Agency guidance provided at 50 CFR §600.350(d)(3)(ii) suggests the Councils adhere to the precautionary approach found in the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (Article 6.5) when faced with uncertainty concerning these ten practicability factors. According to Article 6.5 of the FAO Code of Conduct for Responsible Fisheries, using the absence of adequate scientific information as a reason for postponing or failing to take measures to conserve target species, associated or dependent species, and non-target species and their environment, would not be consistent with a precautionary approach.

Population effects for the bycatch species

The directed commercial fishery for snowy grouper is prosecuted primarily with hook and line gear (70%) followed by bottom longline gear (28%). Other gear types capture 2% of the landings. Snowy grouper is largely a commercial fishery as only 4% of the landings are from recreational sources. Golden tilefish are also primarily taken by commercial fishermen (97%) and most are caught with bottom longline gear (93%). The catch of vermilion snapper is dominated by commercial landings (68%). Almost all vermilion snapper are caught with hook and line gear. Based on data from ALS, MRFSS, and the Headboat survey during 2000 to 2003, landings from the commercial and recreational sectors were evenly split for black sea bass. The SEDAR Assessment Update #1 (2005) indicated most black sea bass were taken by the recreational sector (57%) during 2002 to 2003. Most commercial landings of black sea bass (85%) are from pots. Red porgy landings are fairly evenly split between the commercial (49%) and recreational (51%) sectors, and are almost entirely taken with hook and line gear.

Restrictions, which are currently being used to manage these species, include quotas (snowy grouper, golden tilefish), size limits (vermilion snapper, black sea bass, and red porgy), bag limits (snowy grouper, golden tilefish, vermilion snapper, black sea bass, and red porgy), closed seasons (red porgy), and minimum size limits (vermilion snapper, black sea bass, and red porgy).

Management measures proposed in Amendment 13C would establish or reduce commercial quotas for snowy grouper, golden tilefish, vermilion snapper, black sea bass, and red porgy; modify trip limits for snowy grouper, golden tilefish, and red porgy; modify bag limits for snowy grouper, golden tilefish, black sea bass, and red porgy; establish a recreational closed season for vermilion snapper; and modify the size limits for black sea bass and vermilion snapper.

Commercial Fishery

During 2001 to 2005, approximately 20% of snapper grouper permitted vessels from the Gulf of Mexico and South Atlantic were randomly selected to fill out supplementary logbooks. A small number of trips that reported discards but did not report numbers or species were not included in analyses. During 2001-2005, an average of 64% of the trips in the South Atlantic reported discards. Data from 2004 and 2005 are incomplete. The average number of trips per year during 2001 to 2003 was 16,639. Fishermen spent an average of 1.72 days at sea per trip.

Table 5.2.3-61. Discard logbook gross effort for South Atlantic. Source: NMFS SEFSC Logbook Program.

YEAR	#Trips reporting Discards	#Trips reporting no Discards	# Trips Sampled	% Trips with Discard
2001	1223	514	1737	70
2002	2,747	1,216	3,963	69
2003	2,753	1,808	4,561	60
2004	1,950	1,558	3,508	56
2005	388	119	507	77
Total	9,061	5,215	14,276	64
Mean	1,812	1,043	2,855	64

Note: Data from 2004 and 2005 may be incomplete.

Table 5.2.3-62. Snapper grouper fishery effort for South Atlantic. Source: NMFS SEFSC Logbook Program.

YEAR	Trips	Days	Days per Trip
2001	16,922	29,567	1.75
2002	16,820	29,243	1.74
2003	16,176	27,227	1.68
Total	49,918	86,037	1.72

Mean	16,639	28,679	1.72

For species in Amendment 13C (SAFMC 2006), the number of trips that reported discards was greatest for red porgy followed by vermilion snapper and black sea bass (Table 5.2.3-63.). Discards of snowy grouper and golden tilefish were rare. The percentage of trips that reported discards ranged from 4.03% for red porgy to 0.05% for snowy grouper (Table 5.2.3-64).

Table 5.2.3-63. Annual number of trips reporting discard of red porgy, black sea bass, vermilion snapper, snowy grouper, and golden tilefish in the South Atlantic.
Source: NMFS SEFSC Logbook Program.

YEAR	Red Porgy	Black Sea Bass	Vermilion Snapper	Snowy Grouper	Golden Tilefish
2001	92	70	107	4	125
2002	242	112	212	2	0
2003	151	111	116	1	0
2004	81	61	63	0	0
2005	10	9	9	0	0
Total	576	363	507	7	125
Mean	115.2	72.6	101.4	1.4	25

YEAR	Red Porgy	Black Sea Bass	Vermilion Snapper	Snowy Grouper	Golden Tilefish
2001	92	70	107	4	125
2002	242	112	212	2	0
2003	151	111	116	1	0
2004	81	61	63	0	0
2005	10	9	9	0	0
Total	576	363	507	7	125
Mean	115.2	72.6	101.4	1.4	25

Note: Data from 2004 and 2005 may be incomplete.

Table 5.2.3-64. Percentage of trips that discarded red porgy, black sea bass, vermilion snapper, snowy grouper, or golden tilefish in the South Atlantic.
Source: NMFS SEFSC Logbook Program.

YEAR	Red Porgy	Black Sea Bass	Vermilion Snapper	Snowy Grouper	Golden Tilefish
2001	46.1	612.7	78.0	1.8	0.01
2002	74.4	231.9	77.5	2.5	-
2003	62.7	195	67.2	2	-
2004	51.1	30.7	62.3	-	-
2005	104.4	25.1	66.1	-	-
Mean	67.7	219.1	70.2	1.3	<0.01

Since the discard logbook database represents a sample, data were expanded to estimate the number of discard fish in the whole fishery. The method for expansion was to (1) estimate the probability of discarding a species; (2) estimate the number of fish discarded per trip; and (3) estimate the number discarded in the whole fishery (total discarded = total trips * discard probability * discard number). During 2001-2005, an average of 124,231 black sea bass were discarded per year (Table 5.2.3-65). The number of discarded red porgy and vermilion snapper was lower (~40,000). Snowy grouper and golden tilefish were rarely discarded.

Table 5.2.3-65. Expanded number of discarded red porgy, black sea bass, vermilion snapper, snowy grouper, and golden tilefish for the South Atlantic.

YEAR	Red Porgy	Black Sea Bass	Vermilion Snapper	Snowy Grouper	Golden Tilefish
2001	41,316	417,828	81,298	68	10
2002	76,397	110,253	69,716	21	0
2003	33,604	76,780	27,646	7	0
2004	19,637	8,879	18,603	0	0
2005	34,263	7,417	19,527	0	0
Total	205,217	621,157	216,790	96	10
Mean	41,043	124,231	43,358	19	2

Black sea bass, vermilion snapper, and red porgy were the top three discarded species during 2001-2005 (Tables 5.2.3-66, 5.2.3-67).

Table 5.2.3-66. The 50 most commonly discarded species in order of occurrence from highest number of trips to lowest for the South Atlantic. Count is number of trips that reported discarding the species. Sum is the reported number discarded.

SPECIES_NAME (Table 4-43)	COUNT	SUM
SNAPPER,YELLOWTAIL	1006	9539
KING MACKEREL and CERO	579	4175
PORGY,RED,UNC	577	36910
SNAPPER,VERMILION	508	37103
GROUPER,GAG	494	3484
SCAMP	490	6207
GROUPER,RED	384	1843
SEA BASSE,ATLANTIC,BLACK,UNC	363	92613
GROUPER,BLACK	286	1950
AMBERJACK,GREATER	244	1665
SNAPPER,RED	240	8105
BONITO,ATLANTIC	217	918
SHARK,UNC	211	1151
TUNA,LITTLE (TUNNY)	192	994
SNAPPER,MANGROVE (Duplicate of 3760)	190	1588
BARRACUDA	151	338
HIND,SPECKLED	145	2097
SNAPPER,MUTTON	133	411
DOLPHINFISH	116	650
AMBERJACK	106	370
BLUE RUNNER	105	701
SEA BASS,ROCK	105	9135
GRUNTS	101	2800
TRIGGERFISH,GRAY	99	1469
SHARK,ATLANTIC SHARPNOSE	96	2232

SPECIES_NAME (Table 4-43)	COUNT	SUM
FINFISHES,UNC FOR FOOD	93	730
TRIGGERFISHES	91	926
SCUPS OR PORGIES,UNC	85	992
REMORA	82	205
SHARK,BLACKTIP	75	487
GRUNT,WHITE	63	4469
COBIA	60	101
GROUPERS	60	3837
SHARK,NURSE	52	143
PARROTFISH	50	90
SPANISH MACKEREL	50	593
CERO	44	138
RUDDERFISH (SEA CHUBS)	44	312
FINFISHES,UNC,BAIT,ANIMAL FOOD	42	4251
CREVALLE	41	129
KING MACKEREL	38	151
GROUPER,WARSAW	37	226
GROUPER,NASSAU	33	47
TILEFISH,SAND	33	223
BALLYHOO	27	1449
BONITO,UNC	27	216
SHARK,SANDBAR	27	251
BLUEFISH	26	236
SNAPPERS,UNC	26	597
PINFISH,SPOTTAIL	25	487

Table 5.2.3-67. The top 50 discarded species based on number of fish discarded ordered from highest to lowest for the South Atlantic. Count is the number of trips reporting discard of the species; sum is the total reported fish discarded.

SPECIES_NAME (Table 4-44)	COUNT	SUM
SEA BASSE,ATLANTIC,BLACK,UNC	363	92613
SNAPPER,VERMILION	508	37103
PORGY,RED,UNC	577	36910
SNAPPER,YELLOWTAIL	1006	9539
SEA BASS,ROCK	105	9135
SNAPPER,RED	240	8105
SCAMP	490	6207
GRUNT,WHITE	63	4469
FINFISHES,UNC,BAIT,ANIMAL FOOD	42	4251
KING MACKEREL and CERO	579	4175
GROUPERS	60	3837
GROUPER,GAG	494	3484
GRUNTS	101	2800
SHARK,ATLANTIC SHARPNOSE	96	2232
HIND,SPECKLED	145	2097
GROUPER,BLACK	286	1950
GROUPER,RED	384	1843

SPECIES_NAME (Table 4-44)	COUNT	SUM
AMBERJACK,GREATER	244	1665
SNAPPER,MANGROVE (Duplicate of 3760)	190	1588
TRIGGERFISH,GRAY	99	1469
BALLYHOO	27	1449
GRUNT,TOMTATE	16	1401
SHARK,UNC	211	1151
TUNA,LITTLE (TUNNY)	192	994
SCUPS OR PORGIES,UNC	85	992
TRIGGERFISHES	91	926
BONITO,ATLANTIC	217	918
FINFISHES,UNC FOR FOOD	93	730
BLUE RUNNER	105	701
DOLPHINFISH	116	650
SNAPPERS,UNC	26	597
SPANISH MACKEREL	50	593
SHARK,TIGER	14	552
SHARK,BLACKTIP	75	487
PINFISH,SPOTTAIL	25	487
AMBERJACK,LESSER	8	484
SNAPPER,MUTTON	133	411
BIGEYE SCAD	7	395
AMBERJACK	106	370
SHARK,DOGFISH,SPINY	21	345
BARRACUDA	151	338
RUDDERFISH (SEA CHUBS)	44	312
LOBSTER,SPINY	22	264
SHARK,SANDBAR	27	251
SNAPPER,SILK	22	238
BLUEFISH	26	236
GROUPER,WARSAW	37	226
TILEFISH,SAND	33	223
BONITO,UNC	27	216

Recreational Fishery

For the recreational fishery, estimates of the number of recreational discards are available from MRFSS. There are no estimates from the headboat survey. The MRFSS system classifies recreational catch into three categories:

- Type A - Fishes that were caught, landed whole, and available for identification and enumeration by the interviewers.
- Type B - Fishes that were caught but were either not kept or not available for identification.
    - Type B1 - Fishes that were caught and filleted, released dead, given away, or disposed of in some way other than Types A or B2.
    - Type B2 - Fishes that were caught and released alive.

The percentage of fish released was highest for black sea bass (79.8%) and lowest for golden tilefish (13.4%). However, estimates of released golden tilefish and snowy grouper may not be reliable due to small sample size. The number of fish released per year was greatest for black sea bass (6,685,702 individuals) and lowest for snowy grouper (3,655 individuals).

Table 5.2.3-68. Estimated number of released fish from MRFSS interviews, percent released, total catch (A+B1+B2) for South Atlantic, total number released, and average number released per year. Source: MRFSS Web Site.

Years	Species	Est Total	Est Released	% Released
2001-2003	red porgy	164,593	106,550	64.7
2000-2003	black sea bass	8,376,130	6,685,702	79.8
1999-2003	vermilion snapper	1,756,661	849,086	48.3
1999-2003	snowy grouper	27,188	3,655	13.4
1999-2003	golden tilefish	22,228	4,088	18.4

Finfish Bycatch Mortality

Snowy grouper are primarily caught in water deeper than 300 feet and golden tilefish are taken at depths greater than 540 feet; therefore, release mortality of the species is extremely high. The Council's Scientific and Statistical Committee (SSC) indicates release mortality rates are probably near 100%.

Release mortality rates for vermilion snapper are also considered to be high. SEDAR 2 (2003) estimates release mortality rates of 25% and 40% for vermilion snapper taken by recreational and commercial fishermen, respectively. However, release mortality rates might be higher than 40%. Release mortality rates from SEDAR 2 (2003a) are based on cage studies conducted by Collins (1996) and Collins et al. (1999). Burns et al. (2002) suggest that release mortality rates of vermilion snapper may be higher than estimated from cage studies because cages protect vermilion snapper from predators. A higher release mortality rate is supported by low recapture rates of vermilion snapper in tagging studies. Burns et al. (2002) estimate a 0.7% recapture rate for 825 tagged fish; whereas, recapture rates for red grouper, gag, and red snapper range from 3.8% to 6.0% (Burns et al. 2002). McGovern and Meister (1999) estimate a 1.6% recapture rate for 3,827 tagged vermilion snapper. Higher recapture rates are estimated for black sea bass (10.2%), gray triggerfish (4.9%), gag (11%), and greater amberjack (15.1%) (McGovern and Meister 1999; McGovern et al. 2005). Burns et al. (2002) suggest released vermilion snapper do not survive as well as other species due to predation. Vermilion snapper that do not have air removed from swim bladders are subjected to predation at the surface of the water. Individuals with a ruptured swim bladder or have air removed from the swim bladder are subject to bottom predators since fish would not be able to join schools of other vermilion snapper hovering above the bottom (Burns et al. 2002). Alternatively, recapture rates could be low if population size was very high or tagged fish were unavailable to fishing gear. However, preliminary results from a Cooperative Research Program proposal indicate that approximately 50% of released vermilion snapper caught by one commercial fisherman were unable to return to the bottom. As a certain percentage of vermilion snapper that do return to the bottom probably die, it is possible release mortality rates could be greater than 50%.

Release mortality of black sea bass is considered to be low (15%) indicating minimum size limits are probably an effective management tool for black sea bass. SEDAR 2

(2003b) recommends a release mortality rate of 15% for black sea bass based on cage studies conducted by Collins (1996) and Collins et al. (1999). McGovern and Meister (1999) report a recapture rate of 10.2% for 10,462 that were tagged during 1993-1998 suggesting that survival of released black sea bass is high. It is likely release mortality rates of black sea bass taken by recreational fishermen is lower than those caught by commercial fishermen. Recreational catch is mainly in shallow water with hook and line gear; whereas, most of the commercial catch is with pots and in deeper water. Individual fish caught with hook and line gear have a better chance of returning to the bottom than many undersized fish caught in pots. The Council's SSC supports use of minimum size limits for black sea bass.

SEDAR 1 (2002) recommended release mortality rates of 35% be used for red porgy caught by commercial fishermen and 8% for red porgy taken by the recreational sector.

Practicability of Management Measures in Directed Fisheries Relative to their Impact on Bycatch and Bycatch Mortality

Snowy Grouper

Bycatch of snowy grouper is very low (Table 5.2.3-65). Since there is no size limit and the current quota is rarely met, there is little incentive to release this species. Snowy grouper is in the five grouper per person per day aggregate; however, the aggregate limit is rarely met. Therefore, there are very few recreational discards (Table 5.2.3-68).

The preferred measures to reduce fishing mortality of snowy grouper could increase the number of regulatory discards. The earliest Amendment 13C would be implemented is April 2006. Without the 100 lbs gutted weight trip limit, it is expected that the quota of 151,000 lbs gutted weight would be met during June 2006 (Table 5.2.3-69). Once Amendment 13C is implemented, the 100 lb gutted weight bag limit should allow the fishery to stay open all year in 2007 onwards. However, it is possible that after the trip limit is met, snowy grouper could still be caught when fishermen target co-occurring species.

If a quota is met for snowy grouper before the end of the year or when a 100 lbs gutted weight trip limit is met, discards of snowy grouper could occur when fishermen target golden tilefish or blueline tilefish in deep water and while targeting mid-shelf species. For longline trips that caught at least 100 lbs of golden tilefish, snowy grouper made up about 10% of the catch. Therefore, incidental catch of snowy grouper could occur when fishermen were targeting golden tilefish. However, fishermen might be able to avoid taking snowy grouper by setting longline gear over mud away from hard bottom areas that hold snowy grouper.

If fishermen target blueline tilefish, incidental catch of snowy grouper could be high since both species occur over rough bottom. For longline trips that landed at least 100 lbs of blueline tilefish during 1999-2003, golden tilefish and snowy grouper constituted 32.0%, and 18.7% of the landings, respectively. However, it is likely catch of blueline tilefish would remain incidental to the targeted catch of snowy grouper or golden tilefish.

Blueline tilefish do not appear to be as abundant or as desirable to fishermen as snowy grouper and golden tilefish. An economic analysis in Section 3 indicated blueline tilefish are less valuable than golden tilefish and many other snapper grouper species.

Golden tilefish

Bycatch of golden tilefish is very low (Table 5.2.3-68). Since there is no size limit and the current quota is rarely met, there is little incentive to release this species. Golden tilefish is in the five grouper per person per day aggregate; however, the aggregate limit is rarely met. Therefore, there are very few recreational discards (Table 5.2.3-68).

The preferred measures to reduce fishing mortality of golden tilefish could increase the number of regulatory discards. The preferred alternative reduces the quota to 295,000 lbs gutted weight and reduces the trip limit from 5,000 to 4,000 lbs gutted weight until 75% of the quota is met, at which point, the quota would be reduced to 300 lbs. The trip limit would not be reduced if 75% of the quota was not achieved by September 1. Since the trip limit would not be reduced until April 2006, at the earliest, there is a chance that the quota could be met before December. Therefore, the number of regulatory discards could be higher in 2006 than in 2007 and onwards.

The lower quota and trip limit could be expected to increase the number of discarded golden tilefish. However, most (93%) golden tilefish are taken with bottom longline gear. Some snowy grouper, blueline tilefish, blackbelly rosefish, and other deepwater species are taken with golden tilefish when longline gear is deployed near rocky bottom. The Snapper Grouper Advisory Panel indicated that interaction with these species could be avoided by fishing longline gear away from the rocks and on mud bottom.

Restricting harvest is going to increase the number of regulatory discards. However, overall mortality is expected to decrease even after accounting for the expected increase in bycatch mortality. The Council is considering ways to further minimize bycatch in Snapper Grouper FMP Amendment 13B.

Table 5.2.3-69. Average cumulative commercial landings (lbs gutted weight) for snowy grouper (99-03), golden tilefish (99-03), vermilion snapper (99-03), black sea bass (00-03), and red porgy (01-03).
Source: Accumulative Landings System.

Species	January	February	March	April	May	June	July	August	September	October	November	December
Snowy Grouper	18,689	49,244	80,461	**111,726**	150,248	190,300	219,803	244,957	264,952	281,951	294,797	307,684
Golden Tilefish	18,314	43,279	79,022	**123,745**	173,230	218,408	237,488	283,837	323,879	371,085	418,964	457,302
Vermilion Snapper	51,473	102,865	182,089	**276,172**	365,659	476,010	559,931	670,121	788,712	911,157	1,020,266	1,097,405
Black Sea Bass	337,741	399,088	435,034	**461,872**	490,332	17,324	34,295	57,294	70,636	95,099	150,253	250,099
Red Porgy	1,091	1,182	1,216	**1,427**	16,138	24,931	33,114	41,382	47,768	52,763	58,479	63,307

NOTES:
Only 2000-2003 and 2001-2003 are considered for black sea bass and red porgy since management measures probably affected landings in 1999 (black sea bass) and 1999-2000 (red porgy). Shaded area represents time when an increase in the number of regulatory discards could be expected in 2006. Start counting quota for snowy grouper, golden tilefish, vermilion snapper, and red porgy on January 1; black sea bass on June 1. Red porgy closed January-April and no sale (Shaded Area). Projected times for quota (lbs gutted weight) to be met in 2006 for snowy grouper and vermilion snapper are represented by shaded areas. Lightly shaded area for golden tilefish represents time when reduced quota of 300 lbs is expected to be implemented in 2006. There is a possibility the black sea bass fishery could close sometime during May 2007. Time of closure depends on when increased size limit is implemented in 2006. A closure in the black sea bass fishery is not expected for 2008.

April 1, 2006 = earliest possible date that regulations could be implemented.

Snowy grouper quota = 151,000 lbs gutted weight and trip limit of 275 lbs gutted weight (year 1).

Golden tilefish quota = 295,000 lbs gutted weight. Trip limit = 4,000 lbs gutted weight until 75% of quota met then trip limit = 300 lbs gutted weight. Trip limit not reduced if 75% of quota not met by September 1.

Vermilion snapper quota = 1,100,000 lbs gutted weight.

Black sea bass quota = 477,000 lbs gutted weight; quota begins June 1.

Red porgy quota = 127,000 lbs gutted weight. Closed January-April.

Greater amberjack quota = 1,169,931 lbs gutted weight; 1,000 lb trip limit until quota met.

Gag and Black Grouper, March-April Closure

Mutton Snapper May-June Closure.

Vermilion Snapper
Vermilion snapper was one of the most commonly discarded species in the commercial fishery in recent years (Table 5.2.3-67). In the recreational fishery, approximately 48% were discarded, presumably due to minimum size limits (Table 5.2.3-68). The preferred commercial alternative retains the 12" total length minimum size and sets a commercial quota of 1,100,000 lbs gutted weight. This is equivalent to the average catch during 1999-2003 and, on average, would allow the fishery to remain open all year. The number of regulatory discards could increase if the quota was met since fishermen might target co-occurring species. Vermilion snapper are commonly taken on trips where fishermen catch gag, greater amberjack, and gray triggerfish. However, if the quota was met, fishermen may be able to avoid areas where vermilion snapper occur and reduce the chances of bycatch.

The preferred recreational alternative would increase the minimum size from 11" total length to 12" total length, retain the 10 fish bag limit, and close the fishery during January and February. While the increased minimum size could be expected to increase the number of discards, a closed season could be expected to reduce bycatch. It is possible that vermilion snapper might still be caught when fishermen target co-occurring species. However, recreational fishermen may be able to avoid locations where vermilion snapper occur.

Restricting harvest is going to increase the number of regulatory discards. However, overall mortality is expected to decrease even after accounting for the expected increase in bycatch mortality. The Council is considering ways to further minimize bycatch in Snapper Grouper FMP Amendment 13B.

Black Sea Bass
Black sea bass is the most commonly discarded species in the commercial fishery (Table 5.2.3-67). In the recreational fishery (MRFSS), 80% of black sea bass are released (Table 5.2.3-68). Most black sea bass in the commercial and recreational fishery are probably discarded because they are less than the current 10" total length minimum size. Landings of black sea bass are dominated by small fish. During 2000-2003, the proportion of black sea bass less than or equal to 12" total length was 82% (headboat), 59% (MRFSS), 52% (pots), and 29% (commercial hook and line). Increasing the minimum size to 11" TL in the commercial fishery and 12" TL in the recreational fishery is likely to increase the number of regulatory discards. Furthermore, if the quota is met before the end of the June 1 to May 31, regulatory discards could increase when fishermen target species that co-occur with black sea bass.

Increasing the minimum size to 11" total length in the commercial fishery may provide enough reduction to allow the fishery to remain open all year. If the quota is met early, fishermen may be able to avoid areas where black sea bass occur. The majority of the commercial harvest (85%) is taken with pots. Since it would be less likely that pots would be used after the fishery was closed, bycatch of black sea bass might not be as much of a factor. Furthermore, the preferred alternative would increase the mesh size in the back panel of the pots, which would cull out many of the black sea bass less than 11"total length.

Restricting harvest is going to increase the number of regulatory discards. However, overall mortality is expected to decrease even after accounting for the expected increase in bycatch mortality. The Council is considering ways to further minimize bycatch in Snapper Grouper FMP Amendment 13B.

Red Porgy
Red porgy is the third most commonly discarded species in the commercial fishery (Table 5.2.3-67). Approximately 65% of red porgy are released by recreational fishermen (Table 5.2.3-68). The preferred alternative would retain the January-April commercial spawning closure and the 14"total length minimum size limit (commercial and recreational). However, the preferred alternative would specify a commercial quota of 127,000 lbs gutted weight, increase the commercial trip limit to 120 fish, and increase the recreational bag limit to 3 fish. The number of regulatory discards would probably remain high with a 14" TL minimum size limit and a January-April spawning season closure. However, an increase in the commercial quota and recreational bag limit would lower the number of regulatory discards.

Regulatory discards are expected to increase as the stock rebuilds. Proposed action would minimize bycatch to the extent practicable by allowing fishermen to retain more fish while still ensuring harvest is below the level that could compromise rebuilding.

<u>Ecological Effects Due to Changes in the Bycatch</u>
The ecological effects of bycatch mortality are the same as fishing mortality from directed fishing efforts. If not properly managed and accounted for, either form of mortality could potentially reduce stock biomass to an unsustainable level. The preferred alternative for red porgy is likely to reduce the number of discards by increasing the allowable harvest in the recreational and commercial sectors. The January-February vermilion snapper closure for the recreational sector may reduce the number of discards to some extent. Furthermore, the 2" mesh back panel in the pots is likely to substantially reduce the number of undersized black sea bass in the commercial fishery. Fisher and Rudders (2004) estimate that a 2" mesh back panel could cull out up to 73% of black sea bass less than 11" TL.

Other management alternatives for snowy grouper, golden tilefish, vermilion snapper, and black sea bass could increase the number of regulatory discards in Amendment 13C. However, overall fishing effort could decrease in the commercial and recreational sectors in response to more restrictive management measures, thereby reducing the potential for bycatch. Furthermore, the extent to which the discards increase would depend on the ability of fishermen to avoid regulated species when a quota or trip limit would be met and the extent to which effort would shift to other species and fisheries. Reduced fishing pressure would be expected to result in an increase in the mean size/age of snowy grouper, golden tilefish, vermilion snapper, and black sea bass. In addition, biomass of red porgy and black sea bass would be expected to increase. Thus ecological changes could occur in the community structure of reef ecosystems through actions that would end overfishing. These ecological changes could affect the nature and magnitude of bycatch of species in Amendment 13C as well as other species, which have spatial and temporal coincidence with snowy grouper, golden tilefish, vermilion snapper, black sea bass, and red porgy.

There is likely to be an interactive effect of the preferred management measures in Amendment 13C on bycatch of snowy grouper, golden tilefish, vermilion snapper, black sea bass, red porgy, and associated species. Once a quota or trip limit is met for a species, effort could shift to other species or fisheries. This is difficult to quantify. Species in Amendment 13C could continue to be caught when species, which have fewer regulations, are targeted. However, fishermen may be able to avoid "hot spots" where a restricted species occurs thereby reducing the potential for bycatch. Furthermore, closures are already in place for black grouper (March-April), gag (March-April), greater amberjack (April), mutton snapper (May-June), and red porgy (January-April), and a quota is in place for greater amberjack (Table 4-46). These existing management measures, in combination with new quotas and trip limits proposed in Amendment 13C, could increase the number of discards or result in effort shifts to other species and fisheries.

Data from North Carolina presented to the Council indicated fishermen with snapper grouper permits also fish in the nearshore gillnet fisheries. Fishermen with snapper grouper permits in other areas also participate in various state fisheries. It is expected that if efforts shift to these fisheries, there could be impacts to protected species.

An Individual Fishing Quota (IFQ) program is being considered for the snapper grouper fishery that could substantially reduce bycatch by providing fishery participants an incentive to fish efficiently and to better handle their catch to maximize profits. An IFQ program could stabilize markets and prices by allowing catches to be delivered on demand. This would help fishermen target when they wanted to fish, where they wanted to fish, and which species they wanted to catch thereby reducing bycatch.

Amendment 13B to the Snapper Grouper FMP will propose additional measures to reduce bycatch in the snapper grouper fishery. For example, species grouping based on biological, geographic, economic, taxonomic, technical, social, and ecological factors have been proposed in Amendment 13B. Each group would be represented by an indicator species that has been recently assessed or is scheduled for a SEDAR assessment in the future. It is likely that species in Amendment 13C would be indicator species of groups specified in Amendment 13B. One alternative in Amendment 13B would close fishing for all species in a species grouping once the quota was met for an indicator species. Since species in a group would likely be caught together, such an alternative could reduce bycatch.

Changes in the Bycatch of Other Fish Species and Resulting Population and Ecosystem Effects

Management measures proposed in Amendment 13C will end overfishing in snowy grouper, golden tilefish, vermilion snapper, and black sea bass as well as allow for increased harvest of red porgy. These regulations are expected to change the magnitude of discards for species in Amendment 13C. Increased harvest for red porgy, a recreational seasonal closure for vermilion snapper, and a 2" mesh back panel in black sea bass pots could reduce the number of discards in these fisheries.

More restrictive management measures proposed in Amendment 13C could result in an effort shift to other species and fisheries causing a change in the magnitude of harvest and number of discards in those fisheries. Reduced fishing pressure on species in Amendment 13C would be expected to result in an increase in the mean size/age of snowy grouper, golden tilefish, vermilion snapper, and black sea bass. In addition, biomass of red porgy and black sea bass would be expected to increase. The relative abundance, size structure, and age structure of other species in reef communities could be expected to changes in response to reduced fishing pressure on species in Amendment 13C as well as potential shifts in effort. Thus, ecological changes could occur in the community structure of reef ecosystems through actions that would end overfishing. These ecological changes could affect the nature and magnitude of bycatch over time.

Effects on Marine Mammals and Birds

Under Section 118 of the Marine Mammal Protection Act (MMPA), NMFS must publish, at least annually, a List of Fisheries (LOF) that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. Of the gear utilized within the snapper grouper fishery, only the black sea bass pot is considered to pose an entanglement risk to large whales. The southeast U.S. Atlantic black sea bass pot fishery is included in the grouping of the Atlantic mixed species trap/pot fisheries, which the 2004 List of Fisheries classifies as a Category II. Gear types used in these fisheries are determined to have occasional incidental mortality and serious injury of marine mammals (69 FR 153; August 10, 2004). For the snapper grouper fishery, the best available data on protected species interactions are from the Southeast Fisheries Science Center (SEFSC) Supplementary Discard Data Program (SDDP) initiated in July of 2001 and sub-samples 20% of the vessels with an active permit. To date, no interactions with marine mammals have been reported from this program (8/1/2001-7/31/2004) (Poffenberger 2004; McCarthy SEFSC database).

Although the gear type used within the black sea bass pot fishery can pose an entanglement risk to large whales due to their distribution and occurrence, sperm, fin, sei, and blue whales are unlikely to overlap with the black sea bass pot fishery operated within the snapper grouper fishery since it is executed primarily off North Carolina and South Carolina in waters ranging from 70-120 feet deep (21.3-36.6 meters). There are no known interactions between the black sea bass pot fishery and large whales. It is believed that possible negative effects resulting from the fishery are extremely unlikely. Thus, the continued operation of the snapper grouper fishery in the southeast U.S. Atlantic EEZ is not likely to adversely affect sperm, fin, sei, and blue whales.

Right and humpback whales may overlap both spatially and temporally with the black sea bass pot fishery. Measures to reduce entanglement risk in pot/trap fisheries for these two species are being addressed under the revised Atlantic Large Whale Take Reduction Plan (70 FR 118; June 21, 2005).

The Bermuda petrel and roseate tern occur within the action area. Bermuda petrels are occasionally seen in the waters of the Gulf Stream off the coasts of North and South Carolina during the summer. Sightings are considered rare and only occurring in low numbers (Alsop 2001). Roseate terns occur widely along the Atlantic coast during the summer but in the southeast region they are found mainly off the Florida Keys (unpublished USFWS data). Interaction with fisheries has not been reported as a concern for either of these species.

Efforts to reduce fishing effort has the potential to reduce the amount of interactions with marine mammals and birds. A quota for the commercial black sea bass fishery could reduce the number of pots that are fished each year and reduce the risk of entanglement with right whales and humpback whales, which may overlap both spatially and temporally with the black sea bass pot fishery. Although, the Bermuda petrel and roseate tern occur within the action area, these species are not commonly found and neither has been described as associating with vessels or having had interactions with the snapper grouper fishery. Thus, it is believed that the snapper grouper fishery is not likely to negatively affect the Bermuda petrel and the roseate tern.

<u>Changes in Fishing, Processing, Disposal, and Marketing Costs</u>
Preferred management alternatives in Amendment 13C, which are most likely to reduce bycatch, would be expected to affect the cost of fishing operations. It is likely that east Florida would be impacted most since fewer trips would be taken off North Carolina, South Carolina, and Georgia when the temperatures are cold and weather is poor. Alternatively, an increased commercial trip limit and recreational bag limit for red porgy would represent a small economic gain for some fishermen that are impacted by the restricted take of other species. The 2” mesh back panel in the pots could cull out 73% of the black sea bass less than 11” total length. This could represent a savings in term of the time required to cull out undersized fish on deck and could represent a major reduction in the number of regulatory discards.

The Council is considering an IFQ program. An IFQ program may provide greater efficiency in fishing, processing, and disposal. IFQ programs may be an effective method for controlling fishing effort, removing excess capital, generating profits, reducing the incentive to fish during unsafe conditions, and extending the availability of fresh fish products. Additionally, factors such as waterfront property values, availability of less expensive imports, etc. may affect economic decisions made by recreational and commercial fishermen.

Changes in Fishing Practices and Behavior of Fishermen

Management regulations proposed in Amendment 13C could result in a modification of fishing practices by commercial and recreational fishermen, thereby affecting the magnitude of discards. There is a potential for increased discards with new or reduced quotas, reduced trip limits, and increased size limits. It is expected some species would continue to be caught after a quota or trip limit is met since fishermen might target species, which co-occur with the restricted species. However, fishermen may be able to modify their behavior by avoiding locations where high concentrations of the restricted species occurs.

Fishermen can be educated about the methods to reduce bycatch, and enhance survival of regulatory discards. However, it is not clear that changes in behavior could substantially affect the amount of bycatch incurred. Fishermen may target species with low quotas (e.g. snowy grouper and golden tilefish) early in the year and once these quotas are met, switch to other species such as vermilion snapper. This has the potential to increase discards during 2006.

Gear changes such as hook type or hook size could have some affect on a reduction in bycatch mortality. Furthermore, closed seasons, new or reduced quotas, reduced trip limits, and increased size limits could cause some commercial and recreational fishermen to reduce effort. Measures in Amendment 13B, such as closing a species group when the quota is met for an indicator species may help to reduce bycatch. An IFQ program would likely influence fishing practices and behavior, thereby contributing to a reduction in bycatch. However, it is difficult to quantify any of the measures in terms of reducing discards until the magnitude of bycatch has been monitored over several years.

Changes in Research, Administration and Enforcement Costs and Management Effectiveness

Research and monitoring is needed to understand the effectiveness of proposed management measure in reducing bycatch. Additional work is needed to determine the effectiveness of measures being developed in Amendment 13B and by the Council (IFQs, Ecosystem Fishery Management Plan) to reduce bycatch. Some observer information has recently been provided by MARFIN and Cooperative Research Programs but more is needed. Approximately 20% of commercial fishermen are asked to fill out discard information in logbooks; however, a greater percentage of fishermen could be selected with emphasis on individuals that dominate landings. Furthermore, the use of electronic logbooks could be enhanced to enable fishery managers to obtain information on species composition, size distribution, geographic range, disposition, and depth of fishes that are released. Additional administrative and enforcement efforts will be needed to implement and enforce these regulations.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

Preferred management measures, including those that are likely to increase discards as well as those that are likely to decrease discards could result in social and/or economic impacts as discussed in Section 4.

Changes in the Distribution of Benefits and Costs

Attempts were made to ensure reductions provided by preferred management measures are equal in the commercial and recreational sectors. The extent to which these management measures will increase or decrease the magnitudes of discards is unknown. Some measures such as increased allowable catch in red porgy, a recreational seasonal closure for vermilion snapper, and a 2" back panel in the black sea bass pots could help to reduce bycatch. It is likely that some management measures such as reduced or new quotas, trip limits, increased size limits could increase the number of discards. However, this depends on if fishermen shift effort to other species, seasons, or fisheries and if effort decreases in response to more restrictive management measures as well as changes in community structure and age/size structures that could result from ending overfishing.

Despite equal reductions, it is unlikely that the magnitude of discards will be the same in the commercial and recreational sectors. For example, a very large percentage of the recreational catch of black sea bass is from small fish. Commercial fishermen catch fewer smaller fish. Furthermore, the 2" mesh back panel in the black sea bass pots will likely cull out many of the smaller fish before they reach the surface. Therefore, an increase in the minimum size in the recreational fishery is likely to produce a much higher percentage of discards than an increase in the minimum size in the commercial fishery.

Social Effects

The Social Effects of all the management measure, including those most likely to reduce bycatch are described in Section 4 of Snapper Grouper Amendment 13C (SAFMC 2006).

Conclusion

This section evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality in the South Atlantic snapper grouper fishery using the ten factors provided at 50 CFR 600.350(d)(3)(i). In summary, the preferred alternative for red porgy is likely to reduce the number of discards by increasing the allowable harvest in the recreational and commercial sectors. Furthermore, the 2" mesh back panel in the pots is likely to substantially reduce the number of undersized black sea bass. Other management alternatives for snowy grouper, golden tilefish, vermilion snapper, and black sea bass are likely to increase the number of regulatory discards in Amendment 13C. However, an increase in bycatch of vermilion snapper and golden tilefish is not expected to be substantial since the vermilion snapper commercial quota is equivalent to the average catch during 1999-2003, and the proposed golden tilefish quota would not have been met in 2003-2004. Furthermore, overall fishing effort could decrease in the commercial and recreational sectors in response to more restrictive management measures, thereby reducing the potential for bycatch.

There is likely to be an interactive effect of the preferred management measures in Amendment 13C on bycatch of snowy grouper, golden tilefish, vermilion snapper, black sea bass, red porgy, and associated species in reef ecosystems. Once a quota or trip limit is met for a species, effort could shift to other species or fisheries. Species in Amendment 13C could continue to be caught when species with fewer regulations are targeted. However, fishermen may be able to avoid areas where a restricted species occurs thereby reducing the potential for bycatch. Reduced fishing pressure on species in Amendment 13C would be expected to result in an increase in the mean size/age of snowy grouper, golden tilefish, vermilion snapper, and black sea bass. In addition, biomass of red porgy, and black sea bass would be expected to increase. The relative abundance, size structure, and age structure of other species in reef communities could be expected to change in response to reduced fishing pressure on species in Amendment 13C as well as potential shifts in effort. Thus, ecological changes could occur in the community structure of reef ecosystems through actions that would end overfishing. These ecological changes could affect the nature and magnitude of bycatch over time.

Additional measures to reduce bycatch in the snapper grouper fishery are being developed. Amendment 13B to the Snapper Grouper FMP will propose additional measures to reduce bycatch in the snapper grouper fishery. For example, species grouping based on biological, geographic, economic, taxonomic, technical, social, and ecological factors have been proposed in Amendment 13B. Each group would be represented by an indicator species, which has been recently assessed or is scheduled for a SEDAR assessment in the future. It is likely that species in Amendment 13C would be indicator species of groups specified in Amendment 13B. One alternative in Amendment 13B would close fishing for all species in a species grouping once the quota was met for an indicator species. Since species in a group would be likely to be caught together, such an alternative could reduce bycatch.

An IFQ program for the snapper grouper fishery is being discussed. Under an IFQ program, commercial fishermen are allocated percentages of a TAC, which is set by fishery managers based on estimates of what level of catch the fisher can sustain. This program has the potential to substantially reduce bycatch by providing fishermen more flexibility to decide where and when to fish. IFQ systems could give fishermen the flexibility to target more favorable harvesting conditions and avoid areas where bycatch of certain species is more likely.

5.2.4 Golden Crab

5.2.4.1 Description of fishing practices, vessels and gear

The description below was summarized from observations recorded by Council staff (Gregg Waugh) on a commercial golden crab fishing trip aboard the *Lady Mary*, the fishing vessel belonging to the Nielsen family. Additional information was obtained during the course of presentations by fishermen at the April 1995 Council meeting and the 2008 Golden Crab Advisory Panel meeting.

The golden crab fishery employs baited traps attached with gangions to a 5/8" polypropylene line up to 5 miles long. There are 50 traps per line, or "trawl," set 400 feet apart. Fishermen may fish 4 trawls in a two-week period pulling 100 traps one week and 100 the next (Howard Rau, Golden crab AP). In 2008, vessels in the golden crab fishery averaged 57 feet in length (Golden Crab AP, 2008)

A typical trip to fish for golden crabs begins with the vessel leaving the dock at 3:00 a.m. Bait wells to be placed in the traps are prepared on the way out. The bait consists of available fish heads and racks, chicken parts, pigs' feet, etc. Four and a half hours after leaving dock, the vessel is on site and the crew ready to begin the process of picking up traps and deploying new ones.

The location of the traps is noted using GPS; buoys are not used to mark the location of traps due to strong currents. Trawls are set south to north with the current. Retrieval begins at the south end of the trawl. To begin retrieval of traps, the main line, which may be sitting 1,000 feet below, must be grappled. The success of this operation depends on currents and sea conditions. At different times of the year, when the current is not as swift and is moving in a favorable direction, it is easier to place the grapple on the bottom. The grapple consists of links of large chain and is used to hook the main line towards one end of the string. On the observed trip, the grapple did not appear to have disturbed the bottom. Sometimes, however, the grapple or the trap itself may have mud adhered to it when it is pulled out of the water.

Once the grapple successfully hooks the main line, the line is pulled up and looped over the pulley allowing crew members to pull over to the first trap on the line. Traps are stacked on deck as the string is worked toward the short end of the line. Upon reaching one end of the line, the vessel turns around to work the string toward the other end. It takes approximately two hours to work a string of traps. The determining factor for how long a day of fishing will last is how quickly each trap string can be grappled. Sometimes it is necessary to move traps up or down the slope, keeping the same latitude and moving in a range of 5 to 15 miles east or west in order to avoid hard bottom or follow the crabs. After a soak period, traps may be moved as described depending on the success of the catch. Twenty to 30 lbs of crabs per trap is a desirable catch. On a good season, fishermen may catch 70 to 100 lbs per trap.

Golden crab traps have two entrances, one on the top and one on the bottom. As each trap is brought on deck, the empty bait wells are replaced with full ones. A spike coming up from the bottom of the frame holds the bait well in place. The trap string is deployed off the stern. The end of the string is weighted and its position recorded using GPS.

Towards the stern of the vessel is a spacious ice hold. As the traps are retrieved and brought on deck, golden crabs are removed by hand. The crabs are immediately placed into plastic boxes or coolers and layered with ice. The crabs are somewhat lethargic, but crew members still need to be watchful when handling them. As each crab is removed from the trap, a crew member checks its size (weight) and sex. All females and individuals weighing less than one pound and a quarter are released back into the water.

Only male crabs are harvested because, since the beginning of this fishery, fishermen felt that an integral factor in the sustainable harvest of this resource was not to harvest the females. Besides, females are smaller than males and therefore less marketable.

On the observed trip, three trawls were retrieved (about 100 traps) out of which only 20-25 crabs were discarded. Such a low number of crabs are released upon trap retrieval because the majority of the culling is being accomplished through the escape panels while the traps are still submerged. Thus, escape gaps are very effective in culling out undersized individuals.

On the observed trip, the largest crab caught was approximately 190 millimeters carapace width and weighed about 4 pounds. According to the Nielsens, this crab was one of the largest, if not the largest, they had ever caught. Among the rest of the catch for that trip, were two berried females that were released. One of the trawls was fished longer than the others (about a 10-day soak) and the crabs in those traps were larger than those in traps that were fished a shorter period of time. Once all the bait is consumed (after about 10 days), the escape rate tends to increase.

Detailed trap description

The evolution of golden crab trap design was described by Mr. Nielsen, Sr. in a presentation at the April 1995 Council meeting.

At that time, the golden crab fishery had been prosecuted for about ten years, going full-time commercial in 1992. The first trap that was constructed measured 6 feet long, 4 feet wide and 30 inches high and was very cumbersome. This trap yielded 100 pounds of golden crabs at the start of this fishery. The trap that was displayed during the presentation was the 1995 model, which was deemed to need no further changes to its design.

Golden crab traps are constructed of 3/8" smooth rebar. The latter makes it easier to place the stainless steel hog rings on it to hold the wire in place. The trap is 4 feet long, 30 inches wide and 18 inches high. The body of the trap consists of 1" x 2" mesh and 14 gauge galvanized wire with plastic coating. The corners of the trap are reinforced with zinc to prevent the wire from falling off. The zinc reinforcements are replaced every four or five months as they wear out. At the time this description was compiled (1995), golden crab traps cost about $100 to construct. A golden crab trap weighs approximately 30 lbs.

The trap has two funnels through which the crabs enter the trap. Initially one entrance funnel was placed in the center of the trap. However, fishermen soon realized that traps sometimes landed on the bottom upside down thus preventing the crabs' from entering the trap. The only crabs that would then have access to the bait would be the smaller ones that could enter through the escape gaps. Fishermen then designed the traps with two funnels on opposite sides of the trap that were offset to either side. That way, if the trap landed in such a way as to cover up one of the funnels, it would still be able to fish through the other.

The bait container is placed on a spike that comes up off the frame of the trap. The bait consists of heads and racks of cod, snapper, grouper, dolphin, mackerel or any other available fish. When the traps are retrieved, the empty bait container is removed and a full one is put in place. It was estimated that at least 65 tons of bait were being used in this fishery at the time this description was compiled.

Degradable wire is used to lock the traps. To open the trap, the wire is simply cut. Since the main trap door is shut using degradable wire, ghost fishing is not a concern if the trap becomes lost. In addition, traps are required to have two escape gaps on either side of the trap to allow females and small individuals to escape.

Allowable gear

Traps are the only allowable gear. Rope is the only allowable material for mainlines and buoy line. Maximum trap size is 64 cubic feet in volume in the Northern zone and 48 cubic feet in volume in the Mid and Southern zones. Traps must have at least 2 escape gaps or rings and an escape panel. Traps must be identified with a permit number.

5.2.4.2 Economic description of the fishery

This section and associated tables and figures are from the Golden Crab SAFE document (SAFMC, 1999) which describes economic aspects of the commercial fishery for golden crab in the South Atlantic region. The Golden Crab Fishery Management Plan went into effect beginning on August 27, 1996 and established three golden crab fishing zones. The northern zone is defined as the EEZ north of 28 degrees N. latitude. The Middle Zone is contained within the EEZ between 25 degrees North and 28 degrees North latitude. The Southern zone extends South from 25 degrees North latitude within the South Atlantic Council's EEZ. Federal permits are issued for a specific zone and fishing is allowed only in that zone for which the permit is issued.

In the South Atlantic region 35 vessels were granted permits to operate in this fishery: 27 permits were issued for the southern zone; 6 permits were issued for the middle zone; and 2 permits were granted to vessels for the northern zone. Other management regulations imposed by the golden crab FMP include: dealer and vessel permitting and reporting; limitations on the size of vessels; prescribing allowable gear (including escape gaps and escape panels); and prohibiting possession of female crabs (see the FMP for a complete list of measures).

The Golden Crab Log book data are summarized in Table 5.2.4-1. The number of trap hauls reported for the 434 reported trips were 49,301, and the average number of trap hauls per month was 1,216 in the middle zone and 860 in the Southern zone. There is some evidence that golden crab catch per unit effort (CPUE) measured as pounds per trap haul varies by season with peak CPUE during the period December to May.

Table 5.2.4-1. Number of Trips, and Landings of Golden Crab in the South Atlantic Region.

Time Period	Zone	Number of Trips	Total Landings	Average monthly Catch
November 1995 - April 1998	Middle Zone	330	1,390,000	46,315
February 1997 - March 1998	Southern Zone	104	395,275	28,234

Monthly golden crab landings show a cyclical pattern with the greatest landings between March and July (Figure 1) when the Keys' lobster fishermen enter the fishery. During the period June 1996 to May 1997 the total landings amounted to 897,000 at a total ex-vessel value of $781,000. These landings were down 46% from the previous year's harvest (June 1996 to May 1996).

Of the 35 vessels that were issued permits only about 11 have fished for golden crabs since qualifying. In 1997, Antozzi (1997) reported that only five or six vessels were dedicated to harvesting this species full time. One vessel docked in St. Petersburg, one in Ft. Lauderdale, two in Marathon Key, and one or two in the lower Keys. Seasonally about a dozen vessels fish for golden crab during the closed lobster season, March to July.

An update for 1998 indicated that only 1 vessel was operating in this fishery full-time, and there was no production in the Gulf of Mexico. In addition, the expected boost in landings that occurred in previous summers was not observed during the summer of 1998. This is due to the fact that spiny lobster fishermen who participate in this fishery from March to July chose to pursue other fisheries or did not fish during this season.

An important issue may be ex-vessel prices which are an important determinant of entry and exit behavior in any fishery. For golden crab, ex-vessel price declined from $0.90 and $1.04 per pound in 1995 to $0.83 in 1997. This decline in 1997 is particularly noticeable considering that harvest was at higher levels in 1995 (Figure 5.2.4-1). Dockside prices reported in early 1998 were between 75 and 80 cents per pound. This price decrease is likely due to the increased supply of other large crabs, especially snow crab.

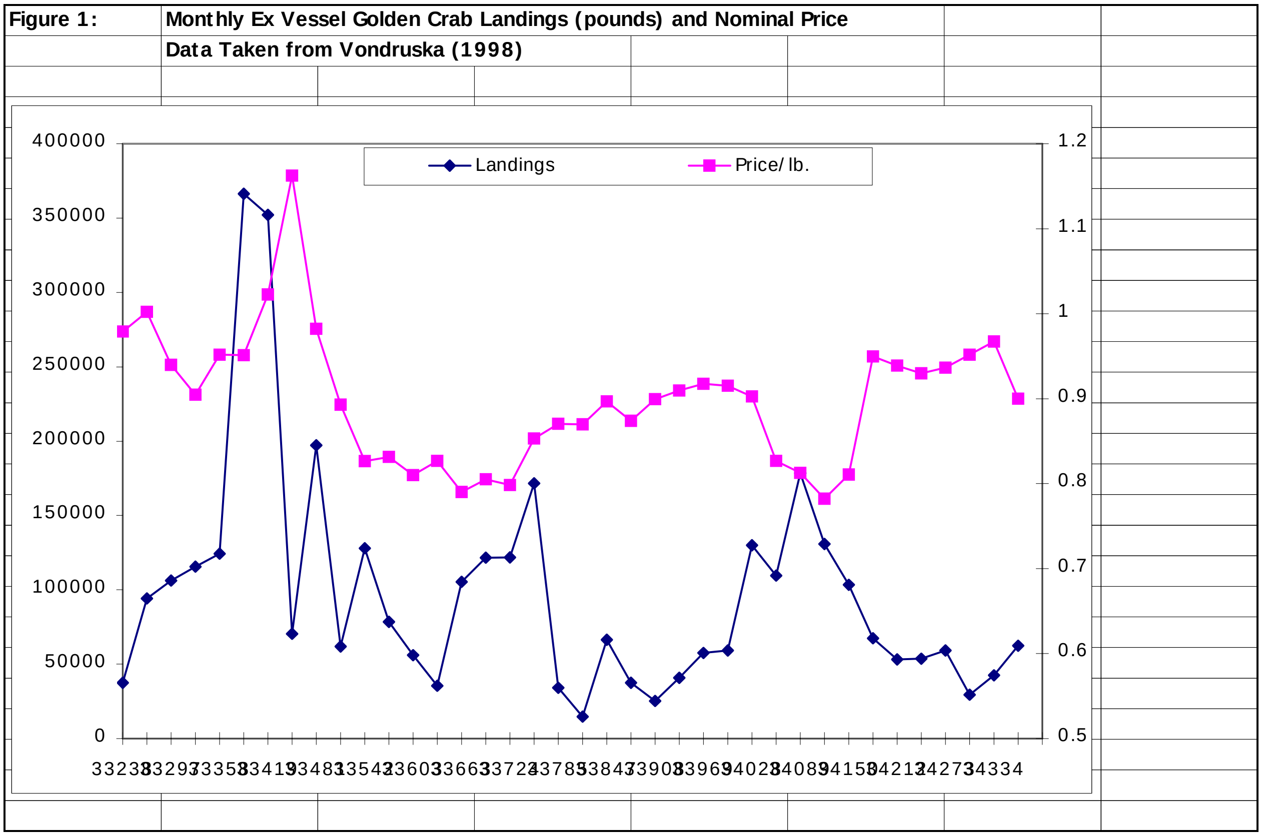


Figure 5.2.4-1. Monthly Ex Vessel Golden Crab Landings (pounds) and Nominal Price Data. Source: Vondruska (1998).

This product is viewed in the marketplace as a substitute for snow crab clusters. Most of the product is processed into clusters, which is not as favored as other large crab species such as snow crabs. The golden crab market is strongly influenced by the wholesale market for snow crabs (Antozzi, 1998). A large proportion of the Alaskan catch of snow crab goes to Japan and the drop in the yen reduced the export demand for this product. The excess supply entered the domestic market and lowered snow crab prices, which may be partly responsible for depressed golden crab prices. The increase in production from Russia and Canada also magnified this problem.

Antozzi (1997) concluded that the market for golden crab is inhibited from expanding due to a supply constraint. He attributes this lack of production to the difficulty and cost of operating in this fishery, which requires a sizable investment in specialized gear including on-board holding facilities that keep crabs alive. This fishery takes place in deep water and this can result in lengthy trips under adverse sea conditions. Some industry members have stated that vessels larger than 50 feet are needed to cope with rough sea conditions offshore and to provide the stability needed for trap deployment and retrieval.

The future outlook for this market will be strongly influenced by the market supply of other large crabs, and the health of export markets. The outlook on this market would improve if this product could be viewed as more than just a substitute for snow crabs.

Steady production and other product forms such as picked meat were suggested as ways to overcome this problem. However, Antozzi (1998) was of the opinion that this fall off in price may not reverse unless the Japanese economy improves.

Economic Analysis (from Golden Crab SAFE 1999)
Five years of data have been added to the golden crab landings and value, through 2003. The overall annual price paid per pound (obtained by dividing the total annual value by the total pounds landed) decreased from 1998 to 2002, from $1.11 to $0.81 (Figure 5.2.4-2). The price then jumped to an all-time high of $1.31 in 2003. In contrast, landings increased from 1998 until 2000, then decreased through 2003 (Figure 5.2.4-2). The average ex-vessel price was 26% higher in 2003 ($1.31/lb) than the five-year average value from 1998 to 2003 ($0.98/lb) (Figure 5.2.4-2). In contrast, landings were at an all-time low of 341,000 lbs. The high value could be related to the relatively low value of Alaskan snow crab compared to previous years, and to the low landings of Alaskan snow crab that began in 2000, which could have resulted in greater demand for golden crab. Alaskan snow crab and golden crab fulfill similar seafood markets (Antozzi 2002). In addition, low landings of golden crab could have lead to more competitive pricing for this species.

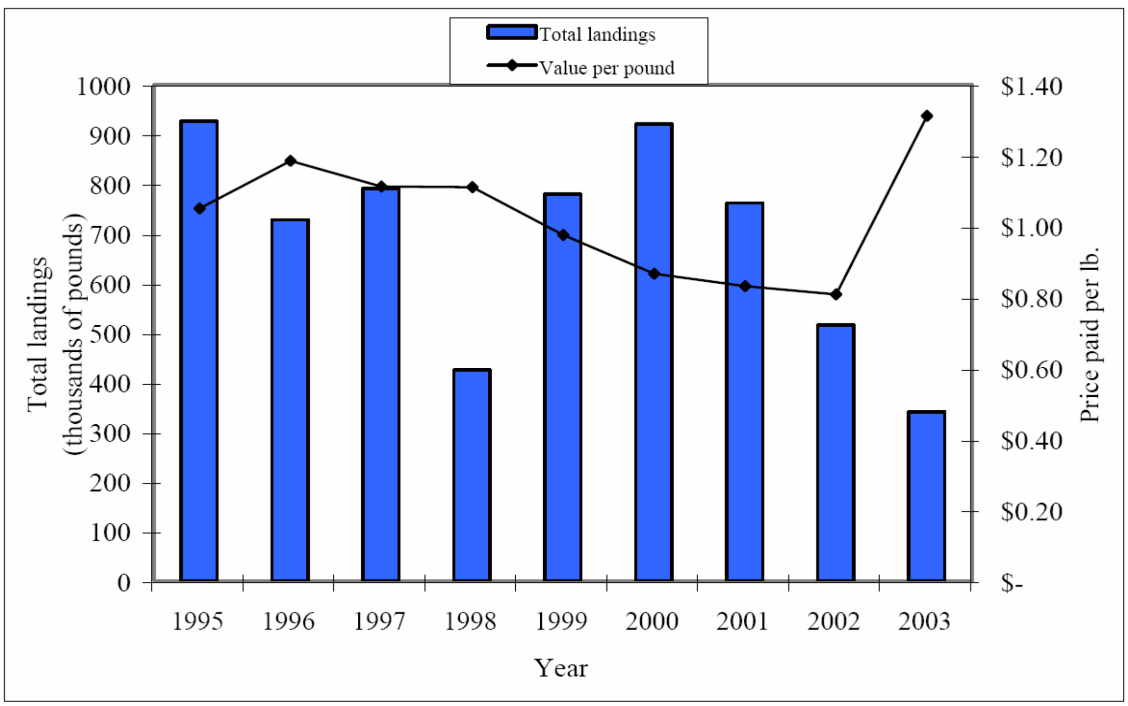


Figure 7: Total annual landings and value of golden crab, 1995 - 2002.

Figure 5.2.4-2. Total annual landings and value of golden crab, 1995-2002.

5.2.4.3 Social and cultural environment

Needs to be developed

5.2.4.4 Bycatch

Bycatch in the golden crab fishery is minimal and consists almost entirely of isopods (Golden Crab AP discussion, January 2008).

5.2.5 Coastal Migratory Pelagics

5.2.5.1 Description of fishing practices, vessels and gear

Commercial fishery

(From CMP Amendment 15)
In the South Atlantic region, runaround gill nets are an important gear for Spanish mackerel, but other kinds of gill nets, cast nets, and handline gear now account for the majority of the landings. Though the effect of the State of Florida's 1995 prohibition on the use of various net gear had more of an impact on the Florida west coast (state waters extend to 9 nautical miles from shore), it did reduce landings on the Florida east coast (state waters extend to 3 nautical miles from shore). Reportedly, Spanish mackerel were concentrated more in state rather than federal waters off the Florida east coast in 2001-2003 than in 1995-2000, and cast nets may be used in state waters. Therefore, cast nets became an increasingly important gear and accounted for 1.88 out of 3.20 million pounds (MP) in 2003, or approximately 59% of total South Atlantic Spanish mackerel harvest. Cast nets were followed by "other" gill nets (0.44 MP), run-around gill nets (0.35 MP) and handlines (0.32 MP).

Various federal and state regulations greatly reduced the use of gill nets for king mackerel, and most are caught with handline gear. Compared with 1966-1988 when gill nets were the predominant gear for the king mackerel fishery in the South Atlantic region, king mackerel are now caught predominantly by various handline gears, which accounted for 2.78 MP out of 2.84 MP for the South Atlantic region in 2003.

Gill nets are not authorized gear for the directed commercial harvest of king mackerel, little tunny, and cobia south of Cape Lookout, North Carolina (34° 37.3'North Latitude). Off North Carolina, the majority of gill-net effort occurs within state waters. During the period between 1999 and 2003, 90% of gill-net trips targeting king mackerel were conducted south of Hatteras within 3 miles from shore using sink gill nets. In federal waters, fishermen also used sink gill nets though a small proportion (0.2%) used runaround gill nets.

The peak fishing months for king mackerel are September through November. For king mackerel, the minimum mesh size averages 5" to 6" (12.7 to15.24 cm). Typically, not more than 15 boats participate in this fishery though the number can fluctuate. Fishermen usually fish 5 or 6 nets (400 yards in length or 365.76 m) working from one net to another throughout the day. They generally fish the gear within a couple of hours, depending on the catch. As mentioned above, this fishery is not allowed below Cape Lookout, North Carolina and is rarely prosecuted above Oregon Inlet, North Carolina.

Between 1999 and 2003, over 100 gill-net trips for Spanish mackerel were conducted per month (May through October) with effort being greatest during October (over 300 trips). Trips occurred mainly south of Hatteras (90%) of which 96% occurred within state waters. Sink gill nets are the primary gill-net gear used on Spanish mackerel trips (over 99%) with a small proportion of runaround gill nets (0.3%) and float gill nets (0.5%). The summer fishery typically involves 10 to 14 boats, and the fall fishery usually includes another 10 to 12 boats with catches generally higher after the first of September. Fishermen usually fish 3.5 inches (8.9 cm) stretched-mesh nets, the minimum mesh size allowed.

Off the east coast of Florida, cast nets have accounted for more of the landings of Spanish mackerel in recent years than gill nets, and the main season occurs in October-March, compared with May-October farther north Spanish mackerel is the primary species targeted by gill nets off the Florida east coast, and the main season for this activity is September through December. Beginning in January, many of the fishermen using gill nets switch to shark fishing or they will participate in the cast net fishery that occurs in state waters. The Spanish mackerel gill-net fishery mainly occurs between Fort Pierce to just north of Cape Canaveral. Less than 30 vessels are active in the fishery with many being outfitted to use either round-around gill nets or stab nets. Vessels fishing for Spanish mackerel in the South Atlantic EEZ off Florida north of the line directly east from the Miami-Dade/Monroe County, Florida boundary (25<20.4' N. lat.) may not have a float line longer than 800 yds. (732 m), set more than one at any one time, or soak for more than 1 hour.

(from PH draft Mackerel Am. 18)

Harvest in the Commercial Fishery

For the king mackerel fishery, commercial landings have been below 3 million pounds since 1989/90. Over that period of time, commercial landings peaked during the 2004/05 fishing season at 2.8 million pounds. In 2005/06, landings reached 2.4 million pounds, a decrease from 2004/05 of about 400,000 pounds (Table 8). The king mackerel fishery experiences commercial landings primarily in North Carolina and Florida. Table 10 provides commercial landings by area for 2001/02 to 2005/06.

For the Spanish mackerel fishery, since 1995/96 the commercial landings have been below 4 million pounds. In 2005/06, commercial landings were approximately 3.6 million pounds, a slight decrease from the 3.7 million pounds landed in 2004/05 (Table 9). Prosecuted predominantly in state waters from Virginia to Florida, the majority of the commercial fishery for Spanish mackerel occurs in Florida and North Carolina. Table 11 provides information on Atlantic migratory group Spanish mackerel commercial landings by major area.

Table 5.2.5-1 shows that North Carolina and Florida take the majority of commercial landings of Atlantic migratory group king mackerel. North Carolina landings have varied widely over the past five years with a low of 592,000 taken in 2003/04. Since then, North Carolina landings have surpassed landings in 2001/02. Central and south Florida landings peaked in 2004/05, as did North Carolina's. However, central and south Florida landings have returned to levels similar to those occurring in 2001/02.

Table 5.2.5-2 shows that landings of Atlantic migratory group Spanish mackerel occur predominately in Florida. Atlantic landings to Florida peaked in 2003/04 and those landings have been maintained. North Carolina landings reached a five year low in 2005/06, almost 200,000 pounds less compared to 2001/02.

Table 5.2.5-1. Atlantic migratory group king mackerel commercial landings by area, thousand of pounds, 2001/02 - 2005/06.

	2001/02	**2002/03**	**2003/04**	**2004/05**	**2005/06**
NY through Flagler County	1,008	854	642	1,193	1,157
North Carolina	930	777	592	1,130	1,087
Volusia County through Miami-Dade County	958	847	1,065	1,593	996
Monroe County	56	44	23	34	34

Note: Season is April through March for 2001/02 through 2004/05 and March through the end of February for 2005/06.
Note: South Carolina and Georgia were not included in this table due to confidentiality issues.

Table 5.2.5-2. Atlantic migratory group Spanish mackerel commercial landings by area, thousands of pounds, 2001/02 - 2005/06.

	2001/02	**2002/03**	**2003/04**	**2004/05**	**2005/06**
NY – GA	873	852	589	547	454
North Carolina	653	699	457	456	445
Florida east Coast	2,163	2,355	3,152	3,130	3,125

Note: Season is April through March for 2001/02 through 2004/05 and March through the end of February for 2005/06.
Note: South Carolina and Georgia were not included in this table due to confidentiality issues.

Recreational fishery

Participation

Table 5.2.5-3 depicts the number of saltwater anglers in the South Atlantic. This includes participants engaged in all fisheries and those anglers who either fished from private/rental boats, from charter boats or by shore/beach bank mode. Overall, recreational fishing participation increased by about 450,000 (9%) from 2001 to 2005. Most saltwater anglers fish on the east coast of Florida and North Carolina. In Florida, in recent years, recreational participation hit a five year low in 2004 before rebounding in 2005 to rival participation in 2001. In Georgia, participation has increased in the past three years from a low of about 150,000 in 2002. North Carolina participation has increased to reach a five year high in 2005. South Carolina has experienced the largest percentage increase in participation by doubling since 2002.

Anglers target a variety of species including South Atlantic group king and Spanish mackerel. It is not possible to extract the estimated number of participants who targeted or caught South Atlantic group king and Spanish mackerel from this dataset. A more specific estimate of recreational activity in the king and Spanish mackerel can be obtained from the harvest data reported in the latter part of this section.

Table 5.2.5-3. Participants in recreational fisheries by state, 2001-2005.

	2001	2002	2003	2004	2005
FL east coast	2,649,299	2,088,671	2,206,209	1,918,226	2,467,522
Georgia	212,215	147,901	267,641	275,691	247,297
North Carolina	2,006,661	1,765,205	2,102,925	2,055,415	2,261,647
South Carolina	481,426	392,301	571,448	661,772	831,328
Total	**5,349,601**	**4,394,078**	**5,148,223**	**4,911,104**	**5,807,794**

Source: MRFSS, NOAA Fisheries (http://www.st.nmfs.gov/st1/recreational/data.html).

Recreational Fishing Effort

Shore, Charter, Private/Rental Trips

Table 5.2.5-4 shows the number of recreational fishing trips made from shore, charter vessel and private or rental vessel over the past five years by state. Trips made by headboats are included in the next sub-section. These trips are not species specific since the data set cannot be divided in that manner.

Table 5.2.5-4. Number of trips by state, 2001-2005.

	2001	2002	2003	2004	2005
Florida east coast	12,464,111	10,303,392	11,443,784	10,587,960	11,964,599
Georgia	806,849	619,085	971,208	929,377	859,360
North Carolina	6,649,546	5,586,122	6,733,464	7,024,677	6,822,954
South Carolina	1,675,601	1,254,295	2,097,813	2,235,629	2,188,359
Total	**21,596,107**	**17,762,894**	**21,246,269**	**20,777,644**	**21,835,272**

Source: MRFSS, NOAA Fisheries (http://www.st.nmfs.gov/st1/recreational/data.html).

The number of fishing trips from shore, charter vessels, and through private or rental trips in the South Atlantic reached a five year high in 2005. Florida experiences the most fishing trips with North Carolina experiencing the second largest amount (about half that of Florida). The number of recreational trips in Florida have declined slightly since 2001. The number of trips in Georgia reached almost 1 million in 2004 before declining slightly in 2005. North Carolina trips reached a five year high in 2004 and ended in 2006 with about the same number of trips that occurred in 2001. South Carolina trips have increased since 2001 by about 30%.

Headboat Trips

Table 5.2.5-5 shows the total number of angler days for the headboat sector in the U.S. South Atlantic. This represents all headboat effort and not only those trips where South Atlantic group king and Spanish mackerel species were caught. These estimates are calculated from a survey where it is not possible to associate catch with a specific angler on the trip. However, it is expected that a significant portion of these trips target mackerel species.

Table 5.2.5-5. Estimated headboat angler days for the U.S. South Atlantic.

Year	Florida	Georgia	North Carolina	South Carolina	Total
2001	138,390	na	31,779	49,263	219,432
2002	125,322	na	27,601	42,467	195,390
2003	122,313	na	22,998	36,556	181,867
2004	149,542	na	27,255	50,461	227,258
2005	145,686	na	31,573	34,036	211,295

Source: The Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab.
Note: "Na" indicates the data is not available due to confidentiality issues.
Note: With regard to data for Florida, only half of the headboat trips taken from the Florida Keys and Tortugas areas were counted in this table in order to give a better approximation of trips taken that might result in harvest of South Atlantic migratory group king or Spanish mackerel.

Table 5.2.5-5 indicates that total headboat angler days have been relatively stable over the past five years. Florida trips have increased slightly since 2001 while North Carolina trips have remained almost exactly the same, although a five year low of 23,000 occurred in 2003. The number of South Carolina angler days has decreased 31% since 2001.

Headboat operators usually offer their passengers options for choosing trip packages of different durations. It appears that the majority of headboat trips are of half a day duration in Florida (78%) and South Carolina (59%). In North Carolina and Georgia the majority of trips are full day trips (Table 5.2.5-6).

Table 5.2.5-6. Average number of headboat trips (1999-2003) by trip length and percent of total trips by trip length.

Average Number of trips 1999-2003					**Percent of total trips**		
State	**Full day**	**¾ day**	**½ day**		**Full day**	**¾ day**	**½ day**
NC	561	17	374		56%	2%	38%
SC	642	110	1,144		33%	6%	59%
GA	152	1	10		93%		6%
FLA	1,972	546	9,038		17%	5%	78%
Total	1,014	123	2,079		23%	5%	72%

Source: The Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab.

Harvest in the Recreational Fishery

<u>Shore, Charter, Private/Rental</u>

King mackerel harvested by the recreational fishery has fluctuated between almost 2.7 and 6.3 million pounds since 1989/90, peaking in 1992/93 at 6.3 million pounds (Table 8). Table 21 shows harvest of king mackerel by state over the past five years. Florida and North Carolina have the highest harvest levels with Florida harvesting over twice as much as North Carolina in 2005. Florida harvest levels peaked in 2003 at over 4 million pounds before declining to 2.8 million pounds in 2005. Georgia's recreational harvest of king mackerel fluctuated a great deal over the past five years with a low of 14,370 in 2002 and a high of 156,374 in 2001. North Carolina recreational harvest of king mackerel has varied over the past five years between about 700,000 and 1.8 million pounds. South Carolina recreational harvest of king mackerel peaked in 2004 at about 240,000 before reaching a five year low in 2005 at about 120,000 pounds.

Table 5.2.5-7. Recreational harvest (lbs) of king mackerel by state, 2001-2005.

	2001	2002	2003	2004	2005
Florida east coast	2,443,614	2,843,643	4,262,627	3,323,463	2,829,734
Georgia	156,374	14,370	130,966	26,616	66,028
North Carolina	1,862,838	733,973	949,700	1,206,758	1,326,781
South Carolina	148,958	132,673	150,792	243,875	120,510

Source: MRFSS, NOAA Fisheries (http://www.st.nmfs.gov/st1/recreational/data.html).

The amount of Spanish mackerel harvested by the recreational fishery increased in recent years after reaching a low in 1998/99 (Table 9 in FEP Vol II). Table 5.2.5-8 shows harvest of Spanish mackerel by state over the past five years. Florida and North Carolina recreationally harvest the majority of Spanish mackerel with the Florida harvest at about three times that of North Carolina. Florida harvest peaked in 2002 at about 1.5 million pounds and reached a five year low in 2004 at about 900,000 pounds. Georgia recreational harvest of Spanish mackerel has fluctuated between about 5,000 pounds and 35,000 pounds over the past five years. North Carolina harvest decreased from 2001 and peaked in 2004 before reaching a five year low in 2005. South Carolina harvest has achieved relatively high levels for the state over the past two years.

Table 5.2.5-8. Recreational harvest (lbs) of Spanish mackerel by state, 2001-2005.

	2001	2002	2003	2004	2005
Florida east coast	1,232,506	1,475,232	1,021,204	905,429	1,088,374
Georgia	23,056	4,795	34,855	11,777	15,820
North Carolina	499,829	475,742	446,052	565,352	358,338
South Carolina	46,945	47,057	29,107	145,784	148,667

Source: MRFSS, NOAA Fisheries (http://www.st.nmfs.gov/st1/recreational/data.html).

<u>Headboats</u>
Harvest by headboats over the past five years is shown in Tables 5.2.5-9, 5.2.5-10. Harvest for the Florida Keys and Tortugas areas was halved in order to better represent potential harvest of South Atlantic migratory group king and Spanish mackerel.

Table 5.2.5-9 shows that total headboat harvest of king mackerel has increased by almost 100,000 pounds since 2001 and more than doubled since 2003 when a five year low occurred. In general, in all states, king mackerel harvests hit a five year low in 2003 when angler days also hit a five year low.

Table 5.2.5-9. Headboat harvest (lbs) of Atlantic migratory group king mackerel, 2001-2005.

	2001	2002	2003	2004	2005
North Carolina	4,081	1,672	1,384	8,711	6,376
South Carolina	23,970	13,026	7,227	13,528	6,014
Georgia	na	na	na	na	Na
Florida	108,703	91,134	81,498	138,935	215,740
Total	**136,754**	**105,831**	**90,109**	**161,175**	**228,129**

Source: The Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab.
Note: "Na" indicates the data is not available due to confidentiality issues.
Note: With regard to data for Florida, only half of the headboat trips taken from the Florida Keys and Tortugas areas were counted in this table in order to give a better approximation of trips taken that might result in harvest of South Atlantic migratory group king or Spanish mackerel.

Table 5.2.5-10. Headboat harvest (lbs) of Atlantic migratory group Spanish mackerel, 2001-2005.

	2001	2002	2003	2004	2005
North Carolina	81	8	51	186	65
South Carolina	9,007	3,670	1,417	10,897	8,512
Georgia	na	na	na	na	na
Florida	2,120	1,825	1,409	4,703	3,157
Total	**11,209**	**5,503**	**2,877**	**15,786**	**11,735**

Source: The Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab.
Note: "Na" indicates the data is not available due to confidentiality issues.
Note: With regard to data for Florida, only half of the headboat trips taken from the Florida Keys and Tortugas areas were counted in this table in order to give a better approximation of trips taken that might result in harvest of South Atlantic migratory group king or Spanish mackerel.

Total harvest of Spanish mackerel by headboats reached a five year low in 2003 but then recovered to 2001 levels in 2005. Harvest levels varied widely over the past five years for all three states shown (Table 5.2.5-10).

Characteristics of the Charter and Headboat Sectors

There is no specific economic information on the for-hire sector that currently operates in the South Atlantic snapper grouper fishery. Holland et al. (1999) conducted a study of the charterboat sector in 1998 and provided information on charterboats and headboats engaged in all fisheries (Table 5.2.5-11).

Table 5.2.5-11. Charterboats and headboats operating in the South Atlantic during 1998.

State	Number of Headboats	Number of Charter Boats
North Carolina	18	207
South Carolina	18	174
Georgia	2	56
Florida-Atlantic Coast	42	413
Florida –Keys	16	230
Total	**96**	**1,080**

Source: Holland et al. (1999).

Holland et al. (1999) surmised that charterboats in Florida tend to be less specific in terms of species targeting behavior when compared to charterboats in the other South Atlantic states. In their study 47.7% of all captains in Atlantic Florida said they don't have specific targets but spend their time trolling or bottomfishing for any species. The most popular species for the Florida Atlantic vessels that had specific targets were king mackerel, dolphin, billfish, wahoo, and amberjack.

Allowable gear

Authorized commercial gears for Atlantic migratory group king mackerel north of Cape Lookout Light (34° 37.3' North Latitude), North Carolina are all gears, except drift gill nets and long gill nets. South of Cape Lookout, authorized gear includes automatic reel, bandit gear, handline, and rod and reel. A minimum size of 4.75-inch stretched mesh is required for run-around gill nets. No more than 400,000 pounds may be harvested by purse seines.

Authorized commercial gear for Spanish mackerel is automatic reel, bandit gear, handline, rod & reel, cast net, run around gill net and stab net. Minimum size of 3.5" stretch mesh required for all run around gill nets.

Other commercial coastal migratory pelagics may be harvested with longline, handline, rod and reel and bandit gear.

Coastal migratory pelagics maybe caught recreationally using bandit gear, rod and reel, handline and spear.

5.2.5.2 Economic description of the fishery

Commercial fishery

Ex-vessel Prices

Annual real ex-vessel prices (2004 dollars) for Atlantic migratory group king and Spanish mackerel, during the fishing years 1981/82 through 2005/06 are shown in Table 5.2.5-12 Figure 5.2.5-1 for the Atlantic coastal states (Maine through Florida east coast). In general, prices for both species have increased since 1981/82, by 25% for Atlantic migratory group king mackerel and by about 45% for Atlantic migratory group Spanish mackerel. King mackerel prices peaked several times in the 1990s and early 2000s at about $2.03/pound and Spanish mackerel peaked at $0.82 in the late 1990s. In general, prices for Atlantic migratory group king mackerel are somewhat lower that prices received for most of the 1990s and early part of this decade while prices for Spanish mackerel have remained relatively steady over this period of time.

Ex-vessel prices of king mackerel, the U.S. market, and estimated imports of king mackerel and possible substitute species have been described and analyzed using econometric models (Easeley et al. 1993; Vondruska and Antozzi 1999; Vondruska 1999). The model results indicate that demand for king mackerel is relatively price elastic for the U.S. market as a whole. That is, compared with any given percentage change in market supply, the expected percentage change in ex-vessel price is much smaller, holding other factors constant.

The models also indicate statistically significant shifts in ex-vessel prices of king mackerel during the year because of variations in landings. Landings of king mackerel exhibit extreme seasonal variation in some major harvest areas, more so for the Gulf group than the Atlantic group, and this affects the annual average ex-vessel price.

Table 5.2.5-12. Ex-vessel prices for Atlantic migratory group king and Spanish mackerel (2004 dollars).

Year	Atlantic king mackerel ex-vessel prices	Atlantic Spanish mackerel ex-vessel prices
1981/82	$1.42	$0.52
1982/83	$1.51	$0.48
1983/84	$1.41	$0.42
1984/85	$1.51	$0.41
1985/86	$1.66	$0.45
1986/87	$1.62	$0.50
1987/88	$1.71	$0.57
1988/89	$1.66	$0.53
1989/90	$1.75	$0.53
1990/91	$1.72	$0.51
1991/92	$1.76	$0.54
1992/93	$2.03	$0.57
1993/94	$1.92	$0.55
1994/95	$1.91	$0.59
1995/96	$1.95	$0.78
1996/97	$1.81	$0.64
1997/98	$1.76	$0.71
1998/99	$2.03	$0.69
1999/00	$1.94	$0.82
2000/01	$2.04	$0.75
2001/02	$2.03	$0.75
2002/03	$1.98	$0.73
2003/04	$1.64	$0.67
2004/05	$1.68	$0.77
2005/06	$1.78	$0.73

Note: Season is April through March for 2001/02 through 2004/05 and March through the end of February for 2005/06.

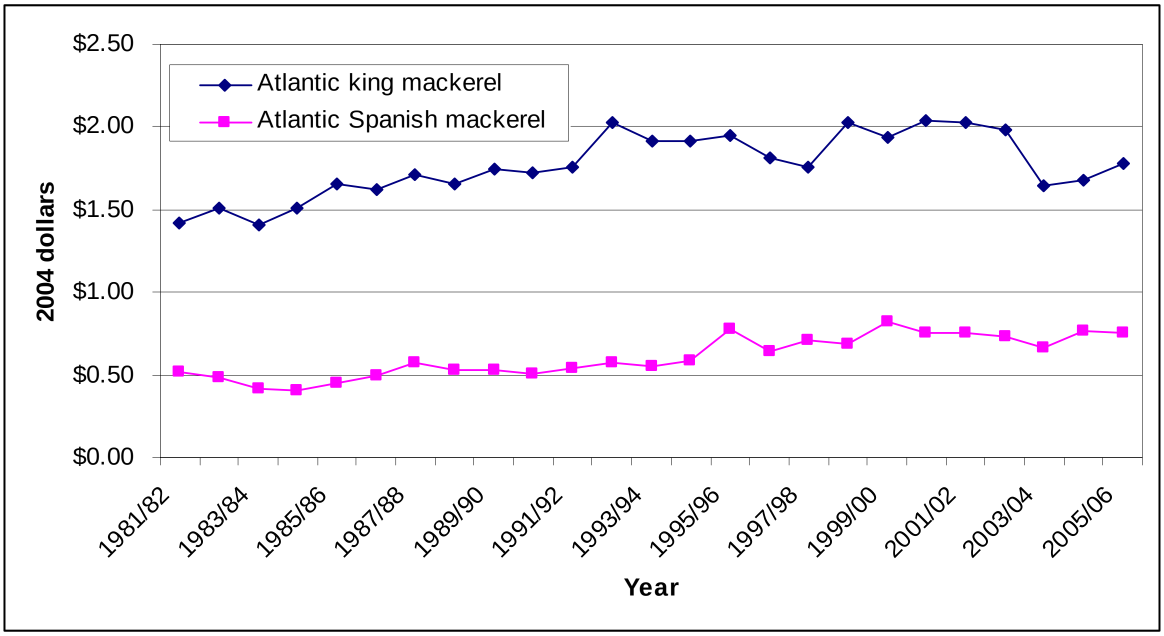


Figure 5.2.5-1. Ex-vessel prices for Atlantic migratory groups of king and Spanish mackerel, 1981-2006.

Logbook indicators of commercial fishing activity

Since 1998, fishermen have completed and submitted FMP-mandated logbooks for commercial fishing trips for king and Spanish mackerel. The data base management systems for fisherman-supplied logbooks and southeast coastal state-collected commercial landings are administered by the NOAA Fisheries Southeast Fisheries Science Center, Miami. Table 5.2.5-13 and Table 5.2.5-14 provide average values for various categories for the Atlantic migratory group king and Spanish mackerel fisheries over the past five years. The reader should note that while all federally permitted vessels are required to fill out and send in logbooks, there are vessels in state waters that fish for Atlantic migratory group Spanish mackerel that are not required to fill out logbooks.

Information from vessels fishing in state waters and not required to fill our logbooks for fishing in these areas, has not been incorporated into the data shown below. Therefore, the number of vessels is likely an underestimate of the number of vessels actually fishing for Atlantic migratory group Spanish mackerel. However, the below information is correct for the number of vessels turning in logbooks and these vessels serve as a representation of the entire fleet.

Over the past five years total commercial pounds landed (Table 8 in FEP Volume II), pounds landed per vessel annually, and pounds landed per trip (Table 5.2.5-13) have increased while the number of vessels declined. At the same time, real ex-vessel value remained unchanged due to the decrease in ex-vessel prices from $2.03 in 2001/2002 to $1.78 in 2005/06 (Table 5.2.5-12). Ex-vessel value of Atlantic migratory group king mackerel increased in the percentage of value it contributed to all species caught in the year. The total number of trips and days away from port on fishing trips for king mackerel declined from 2001 to 2005. It appears that while the fleet has decreased in size, those remaining have increased landings but not value due to market changes. Given increasing fuel prices over the past several years, the average vessel likely experienced decreased net income since 2001.

Table 5.2.5-13. Atlantic migratory group king mackerel mean statistics, 2001/02 - 2005/06 (2004 dollars).

	2001	2002	2003	2004	2005
Vessels	750	718	715	695	661
Pounds landed (king mackerel)	2,287	2,043	2,727	3,147	2,571
Pounds landed per trip (king mackerel)	167	163	203	247	232
Real ex-vessel value (king mackerel), 2004 $	$4,288	$3,882	$4,269	$4,982	$4,249
Real ex-vessel value (% all species caught in yr), 2004 $	33.2%	31.5%	33.3%	39.3%	37.7%
Real ex-vessel value per trip (king mackerel), 2004 $	$313	$311	$317	$391	$384
Real ex-vessel value per trip (% all species), same trips, 2004 $	77%	76%	80%	81%	77%
Trips (king mackerel)	13.7	12.5	13.5	12.7	11.08
Crew size per king mackerel trip	1.5	1.5	1.4	1.5	1.6
Days away from port (king mackerel)	19.7	17.7	17.5	16.2	15.6
Days away from port (trips all species)	47.7	48.5	47.6	42	39.8

Note: Not all vessels providing logbooks provided data for every category included in the table.
Source: NMFS Southeast Coastal Fisheries Logbook, 2005/06. As of May 26, 2006. ALS data accessed August 9, 2006.

Over the past five years total commercial pounds landed (Table 9 in FEP volume II), pounds landed per vessel annually, and pounds landed per trip (Table 5.2.5-14) for Atlantic migratory group Spanish mackerel increased while the number of vessels declined. Annual and per trip real ex-vessel value increased while ex-vessel prices remained at the same level ($0.75) (Table 5.2.5-12). Ex-vessel value of Atlantic migratory group Spanish mackerel increased slightly in the percentage of value it contributed to all species caught in the year. The total number of trips increased slightly and days away from port on fishing trips for Spanish mackerel increased slightly from 2001 to 2005. However, total days away from port fishing for all species declined from 44 to 39 from 2001 to 2005. While the fleet decreased in size, those remaining have increased landings and real ex-vessel value has increased somewhat. Increasing fuel prices over the past several years may have negated any revenue increases.

Table 5.2.5-14. Atlantic migratory group Spanish mackerel mean statistics, 2001/02 - 2005/06 (2004 dollars).

	2001	2002	2003	2004	2005
Vessels	348	371	323	310	312
Pounds landed (Spanish mackerel)	4,608	5,019	5,903	5,300	5,391
Pounds landed per trip (Spanish mackerel)	495	498	592	536	545
Real ex-vessel value (Spanish mackerel), 2004 $	$3,323	$3,521	$3,714	$4,012	$3,813
Real ex-vessel value (% all species caught in yr), 2004 $	22.4%	22.7%	22.6%	22.7%	24%
Real ex-vessel value per trip (Spanish mackerel), 2004 $	$357	$349	$372	$405	$386
Real ex-vessel value per trip (% all species), same trips, 2004 $	65%	64%	71%	72%	71%
Trips (Spanish mackerel)	9.3	10.1	10	9.9	9.9
Crew size per trip	1.5	1.5	1.5	1.5	1.5
Days away from port (mackerel)	9.7	10.4	10.3	10.3	10.2
Days away from port (all species)	44	44	47	39	39

Note: Not all vessels providing logbooks provided data for every category included in the table.
Source: NMFS Southeast Coastal Fisheries Logbook, 2005/06. As of May 26, 2006. ALS data accessed August 9, 2006.

Tables 5.2.5-15 and Table 5.2.5-16 provide various statistics regarding landings, revenue, vessel specifications, trips, and crew size for the Atlantic migratory group king and Spanish mackerel fisheries. The 661 vessels that submitted logbooks with Atlantic migratory group king mackerel landings in 2005/06 were, on average, 31 feet in length, had 350 horsepower, spent 15 days away from port each year fishing for king mackerel, and used 1.5 crew members per trip for Atlantic migratory group king mackerel. Although this information does not encompass the entire population of vessels fishing for Atlantic migratory group king mackerel, this data set can provide some indication of characteristics of the fleet.

A large portion of the vessels fishing for Atlantic migratory group king mackerel obtain a significant portion of total ex-vessel revenue from the species as a percentage of all species caught in the year. The data shows that the median vessel obtains 27% of real ex-vessel value from king mackerel as a percentage of all species caught in the year. The 75th – 90th percentile range received about 70% - 100% of real ex-vessel value from king mackerel as a percentage of all species caught in that year. However, for the 75th - 90th percentile this amounts to only about $4,300 – $12,400 ex-vessel value. On a per trip basis, the 75th – 90th percentile range makes about $475 - $1000 ex-vessel per trip from landings of king mackerel. This encompasses 100% of ex-vessel value from all species for those trips.

The 312 vessels that submitted logbooks with Atlantic migratory group Spanish mackerel landings in 2005/06 were, on average, 30 feet in length, had 295 horsepower, spent 10 days away from port each year fishing for Spanish mackerel, and used 1.5 crew members per trip for Atlantic migratory group Spanish mackerel.

A portion of the vessels fishing for Atlantic migratory group Spanish mackerel obtain a significant portion of total ex-vessel revenue from the species as a percentage of all species caught in the year. The data shows that while the median vessel obtains only 7% of real ex-vessel value from Spanish mackerel as a percentage of all species caught in the year, the 75th – 90th percentile range receives about 38% - 87% of real ex-vessel value from Spanish mackerel as a percentage of all species caught in that year. However, for the 75th -90th percentile this amounts to only about $4,300 – $12,400 ex-vessel value. On a per trip basis, the 75th – 90th percentile range makes about $550 - $970 ex-vessel per trip from landings of Spanish mackerel and this encompasses 100% of ex-vessel value from all species for those trips. Clearly, fishermen fishing for Atlantic migratory group king and Spanish mackerel participate in a portfolio of other fisheries and/or supplement their income by other means (second job).

Table 5.2.5-15. Atlantic migratory group king mackerel statistics by vessel, 2005/06 (2004 dollars). The table features data contained in 661 logbooks.

	Mean	**25th percentile**	**50th percentile**	**75th percentile**	**90th percentile**	**99th percentile**
Length (ft)	31	26	30	35	42	53
Horsepower	350	220	300	425	590	900
Depth fished for king mackerel (ft)	94	70	85	100	135	230
Pounds landed (king mackerel)	2571	116	643	2,521	7,136	28,465
Pounds landed per trip (king mackerel)	232	38	110	276	595	1,151
Real ex-vessel value (king mackerel)	$4,249	$193	$1,010	$4,311	$12,379	$45,254
Real ex-vessel value (% all species caught in yr)	37.7%	2%	27%	69%	100%	100%
Real ex-vessel value per trip (king mackerel)	$384	$67	$194	$474	$993	$2,392
Real ex-vessel value (% of all species caught on trip)	77	66	98	100	100	100
Real ex-vessel value per trip (% all species), same trips	77%	66%	98%	100%	100%	100%
Trips (king mackerel)	11.08	2	6	15	29	58
Crew size per king mackerel trip	1.57	1	1	2	3	4
Days away from port (king mackerel)	15.6	3	8	22	42	90
Days away from port (trips all species)	39.8	9	25	57	97	170

Note: Not all 661 vessels providing logbooks provided data for every category included in the table.

Source: NMFS Southeast Coastal Fisheries Logbook, 2005/06. As of May 26, 2006. ALS data accessed August 9, 2006.

Table 5.2.5-16. Atlantic migratory group Spanish mackerel statistics by vessel, 2005/06 (2004 dollars). The table features data contained in 312 logbooks.

	Mean	25th percentile	50th percentile	75th percentile	90th percentile	99th percentile
Length (ft)	30	25	28	34	40	51
Horsepower	295	200	250	375	454	840
Depth fished for Spanish mackerel (ft)	42.5	20	30	60	80	150
Pounds landed (Spanish mackerel)	5,391	37	487	4,579	16,836	60,674
Pounds landed per trip (Spanish mackerel)	545	37	259	800	1,488	3,271
Real ex-vessel value (Spanish mackerel)	$3,813	$40	$432	$3,120	$12,412	$34,366
Real ex-vessel value (% all species caught in yr)	24%	1%	7%	38%	87%	100%
Real ex-vessel value per trip (Spanish mackerel)	$386	$35	$212	$551	$972	$2,237
Real ex-vessel value per trip (% all species), same trips	71%	38%	95%	100%	100%	100%
Trips (Spanish mackerel)	9.89	2	4	13	25	67
Trips (all species)	36.2	13	27	54	80	120
Crew size per trip	1.5	1	1	2	2	3
Days away from port (mackerel)	10.2	2	5	13	25	67
Days away from port (all species)	39.1	13	29	57	87	157

Note: Not all 312 vessels providing logbooks provided data for every category included in the table.
Source: NMFS Southeast Coastal Fisheries Logbook, 2005/06. As of May 26, 2006. ALS data accessed August 9, 2006.

Recreational fishery

The statistics presented in Section 5.2.5.1 (Recreational Fishery) document marine recreational fishing participation, recreational effort, and harvest of South Atlantic migratory group king and Spanish mackerel. Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above their costs of fishing. The monetary value of this satisfaction is referred to as compensating variation (same as non-market benefit). The magnitude of this non-market benefit derived from the recreational experience is dependent on several quality determinants which include fish size, catch success rate, the number of fish kept, and aesthetics. These quality variables are important not only in their determination of the value of a recreational fishing trip but also in their influence on total demand for recreational fishing trips. For example, as the population of fish increases it is expected that angler success rate would increase and the marginal value of the fishing trip to the angler would increase, provided all other conditions remain the same.

Recent estimates of the economic value of a day of saltwater recreational fishing are available for the South Atlantic from different sources. These estimates are not specific to king or Spanish mackerel but shed some light on the magnitude of an angler's willingness to pay for this recreational experience. The mean value of access per marine recreational fishing trip was estimated at $109.31 for the South Atlantic (Haab et al. 2001). Such values can be considered good estimates of the opportunity cost of time for saltwater recreational fishing.

The valuation estimates previously discussed should not be confused with angler expenditures or economic activity generated as a result of these expenditures. Angler expenditures benefit a number of sectors that provide goods and services for saltwater sport fishing. A study conducted by NOAA Fisheries (Gentner et al. 2001) provides estimates of saltwater recreational fishing trip expenditures (Table 5.2.5-17). The average expenditure per trip varies depending on the state, type of trip, duration, travel distance, and other factors. As expected, trip expenditures for non-residents are higher than for in-state residents. Compared to in-state residents, non-residents travel longer distances and incur expenses for food and lodging. Some in-state residents will incur higher trip expenses if they reside far away from the coast. These estimates do not include expenditures on recreational fishing in Monroe County or expenditures made on headboat angler trips.

Financial Operations of the Charter and Headboat Sectors

Holland et al. (1999) defined charterboats as boats for-hire carrying 6 or less passengers that charge a fee to rent the entire boat. Data from their study conducted in 1998 indicated that this trip fee reportedly ranged from $292 to $2,000. The actual cost to the passenger depended on state, trip length, and the variety of services offered by the charter operation. In the South Atlantic, depending on the state, the average fee for a half day trip ranged from $296 to $360, for a full day trip the range was $575 to $710, and for an overnight trip the range in average fee was $1,000 to $2,000. Most (>90%) Florida charter operators offered half day and full day trips and about 15% of the fleet offered overnight trips. In comparison, in the other South Atlantic states about 3% of the total charter trips were overnight trips.

Table 5.2.5-17. Summary of expenditures on saltwater trips estimated from a 1999 MRFSS add-on survey (Source: Gentner et al. 2001).

	North Carolina		South Carolina		Georgia		Florida	
Item	**Resident**	**Non Resident**	**Resident**	**Non Resident**	**Resident**	**Non Resident**	**Resident**	**Non Resident**
Shore mode trip expenses	$63.61	$75.53	$54.12	$104.27	$31.78	$115.13	$36.90	$141.30
Private/rental boat trip expenses	$71.28	$92.15	$35.91	$67.07	$161.34	$77.51	$66.59	$94.15

Charter mode trip expenses	$201.66	$110.71	$139.72	$220.97	$152.45	$155.90	$96.11	$196.16
Charter fee-average-per day	$133.76	$70.59	$114.26	$109.97	$73.68	$80.99	$71.37	$100.79

Headboats tend to be larger, diesel powered and generally can carry a maximum of around 60 passengers. The average vessel length of the headboats whose owners responded to the survey was around 62 feet. In Florida, the average headboat fees was $29 for a half day trip and $45 for a full day trip. For North and South Carolina, the average base fee was $34 per person for a half day trip and $61 per person for a full day trip. Most of these headboat trips operated in Federal waters in the South Atlantic (Holland et al. 1999).

The demand for charter and headboat trips will depend on the fee charged and the quality of the fishing experience. As noted previously, variables such as catch success rates, bag (keep) limits, and aesthetics are determinants of the quality of the experience to the angler. Profits within the for-hire sector will depend on trip demand, the fee charged, and cost of the fishing operation. It is expected that the cost of fishing will bear some inverse relationship to the population size of the species as it is expected that costs of searching for fish will decrease as the population size increases.

On the east cost of Florida, the average charter vessel length and horsepower was 39 feet and 617 hp respectively. The average vessel length in North Carolina was comparable to Florida. Also, for the other states it appears that charter vessels tended to be smaller than vessels in Florida and North Carolina. Electronics such as global positioning systems (GPS) and fish finders are common on most charter vessels in the South Atlantic. Capital investment in charter vessels averaged $109,301 in Florida, $79,868 for North Carolina, $38,150 for South Carolina, and $51,554 for Georgia (Holland et al. 1999). Charterboat owners incur expenses for inputs such as fuel, ice, and tackle in order to offer the services required by their passengers. Most expenses incurred in 1997 by charter vessel owners were on crew wages and salaries and fuel (Holland et al. 1999). The average annual charterboat business expenditures incurred was $68,816 for Florida vessels, $46,888 for North Carolina vessels, $23,235 for South Carolina vessels, and $41,688 for vessels in Georgia in 1997. The average capital investment for headboats in the South Atlantic was around $220,000 in 1997. Total annual business expenditures averaged $135,737 for headboats in Florida and $105,045 for headboats in other states in the South Atlantic.

The 1999 study on the for-hire sector in the Southeastern United States presented two sets of revenue estimates for the charter and headboat sectors in the South Atlantic (Holland et al. 1999). The first set of average gross revenue per vessel estimates were those reported by survey respondents as follows: $51,000 for charterboats on the Atlantic coast of Florida; $60,135 for charterboats in North Carolina; $26,304 for charterboats in South Carolina; $56,551 for charterboats in Georgia; $140,714 for headboats in Florida; and $123,000 for headboats in the other South Atlantic states (Holland et al. 1999). These authors concluded that survey respondents were reluctant to report gross income, and it is possible that these are underestimates of the true income received by these business entities. As a result, a second set of estimates on the for-hire sector was calculated by multiplying the average trip fee by the average number of trips per year for each vessel category. Using this method the average per vessel gross revenue was estimated at $69,268 for charterboats and $299,551 for headboats operating on the Atlantic coast of Florida (Holland et al. 1999). The calculated vessel gross revenue estimate for the charter sector was 22% higher than the reported charter gross revenue per vessel on the east coast of Florida (Holland et al., 1999). The calculated vessel gross revenue figure for the headboat sector was 113% higher than the reported headboat gross revenue per vessel on the east coast of Florida (Holland et al. 1999). The second set of gross revenue estimates were only calculated for vessels in Florida. To obtain revised estimates for average gross vessel income for the other South Atlantic states, the reported per vessel gross income was multiplied by the percent increase calculated for Florida by sector. The revised estimates of average gross revenue per vessel for the other states are as follows: $73,365 ($60,135 x 1.22) for charterboats in North Carolina, $32,091 ($26,304 x 1.22) for charterboats in South Carolina; $68,992 ($56,551 x 1.22) for charterboats in Georgia; and $261,990 ($123,000 x 2.13) for headboats in the other South Atlantic states.

It must be noted that the study's authors were concerned that while the reported gross revenue figures are underestimates of true vessel income, these calculated values could overestimate gross income per vessel from for-hire activity (Holland et al. 1999). Some of these vessels are also used in commercial fishing activities and that income is not reflected in these estimates.

Permit Ownership

Amendment 15 established an indefinite limited access program for the king mackerel fishery in the exclusive economic zone under the jurisdiction of the Gulf of Mexico, South Atlantic and Mid-Atlantic Fishery Management Councils. Permits may be transferred. Tables 5.2.5-18 and 5.2.5-19 provide the number of king mackerel and Spanish mackerel permits by area, respectively. While all vessels with permits for king and Spanish mackerel are included in the table, only a portion of these fish for Atlantic migratory group king and Spanish mackerel. For our purposes, it is assumed that vessels located on the east coast of the U.S. and Florida fish for Atlantic migratory group king and Spanish mackerel. It is assumed that Florida west coast and non-coastal numbers are split evenly between fishing for Atlantic migratory group king and Spanish mackerel and Gulf migratory king and Spanish mackerel. While these assumptions are rather simplifying and perhaps not entirely realistic, they allow us to discuss the data included in the tables below in an approximate way.

In total, there are about 1,119 commercial vessels, 243 charter vessels, and 5 headboats with federal permits for king mackerel that likely fish for Atlantic migratory group king mackerel. The majority of the commercial permits are registered to vessels homeported on the east coast of Florida and Monroe County. While a large portion of the commercial and charter boats with federal king mackerel permits are registered to vessels homeported in Florida, a significant portion (21% and 40%) are homeported in North Carolina. Most of the headboat permits are registered to vessels homeported in Florida.

Table 5.2.5-18. Boats with federal permits for commercial fishing for king mackerel by region, January 2006.

Home State or Region	Not Specified	Commercial	Charter	Headboat	All
Northeast (Maine-Virginia)	-	64	4	-	68
North Carolina	6	238	98	1	343
South Carolina	-	38	7	-	45
Georgia	1	10	2	-	13
Florida east coast	4	433	57	2	496
Florida west coast	4	469	126	3	602
Florida non-coastal	2	204	23	1	230
Alabama	-	25	3	-	28
Mississippi	-	10	-	-	10
Louisiana	-	78	3	-	81
Texas	1	25	7	-	33
Other states	1	13	1	-	15
TOTAL BOATS	19	1,607	331	7	1,964
FLORIDA					
Northeast (Nassau-Flagler)	-	26	9	-	35
Southeast (Volusia-Dade)	4	407	48	2	461
Monroe County	4	242	36	-	282
West (Collier-Wakulla)	-	112	24	-	136
Northwest (Franklin-Escambia)	-	115	66	3	184
Non-coastal	2	204	23	1	230
TOTAL BOATS	10	1,106	206	6	1,328

In total, there are about 956 (69%) commercial vessels, 177 (70%) charter vessels, and 8 (80%) headboats with federal permits for king mackerel that likely fish for Atlantic migratory group Spanish mackerel. The majority of the commercial permits are registered to vessels homeported on the east coast of Florida and Monroe County. About 14% of commercial permits and 29% of the charter permits are homeported in North Carolina. Most of the headboat permits are registered to vessels homeported in North Carolina and points north.

Table 5.2.5-19. Boats with federal permits for commercial fishing for Spanish mackerel by region, January 2006.

Home State or Region	Not Specified	Commercial	Charter	Headboat	All
Northeast (Maine-Virginia)	3	84	7	2	96
North Carolina	5	135	51	4	195
South Carolina	-	10	3	-	13
Georgia	2	3	1	-	6
Florida east coast	7	385	45	1	438
Florida west coast	13	475	123	1	612
Florida non-coastal	5	203	16	1	225
Alabama	-	11	-	-	11
Mississippi	-	7	2	-	9
Louisiana	1	64	1	-	66
Texas	-	6	3	1	10
Other states	2	8	-	-	10

TOTAL BOATS	38	1,391	252	10	1,691
FLORIDA					
Northeast (Nassau-Flagler)	-	19	5	-	24
Southeast (Volusia-Dade)	7	366	40	1	414
Monroe County	5	262	42	1	310
West (Collier-Wakulla)	8	140	31	-	179
Northwest (Franklin-Escambia)	-	73	50	-	123
Non-coastal	5	203	16	1	225
TOTAL BOATS	25	1,063	184	3	1,275

5.2.5.3 Social and cultural environment

Most fishermen who participate in the mackerel fishery also participate in other fisheries. Even if mackerel fishing only accounts for a portion of the income earned by a fisherman, it is an important part and may mean the difference in someone being able to continue to fish, and the necessity to seek other types of employment. If the mackerel fishery were to experience further reductions in the catch, there could be ramifications for fishermen, fish processors, marinas, and other fishing-related businesses that draw part of their income from the mackerel fishery. If there are changes made to the current regulations for the mackerel fishery, it is assumed that the regulations would have the most impact in communities where the most mackerel are landed, the most income from mackerel earned, and the most boats are permitted for mackerel. That is, regulations will likely have the greatest impact on the communities that are most dependent on the mackerel resource. The above mentioned data can act as indicators of mackerel dependence. By comparing all of the data, it is possible to determine which counties/communities may be most impacted by changes in regulations that may affect mackerel-dependent fishermen, fishing-dependent businesses, and communities.

Measures of Fishing Dependence

Jepson et al. (2006) conducted community profiles for the South Atlantic region. These community profiles provide a snapshot of the community and its involvement in fishing using 2001 as a base year. The profiles provide historical background about the community and its involvement in fisheries or fisheries related industries. The profiles provide information on community involvement in commercial and recreational fishing as evidenced through various indicators (federal commercial permits, state commercial licenses, federal charter permits, seafood landings, fish processors and wholesale fish houses, recreational docks/marinas, and recreational fishing tournaments). Demographic information on a community basis is also provided to the extent that the data were gathered in a Federal Census.

Mackerel Fishing Communities

In general, the community profiles do not provide fishery specific information other than the number of federal and state permits associated with each community. Because not all communities profiled are likely relevant to the actions under consideration in this document, profiles that outline homeports for vessels with at least five federal commercial king mackerel, federal commercial Spanish mackerel, and federal charter/headboat permits for coastal pelagics combined, have been included. The last subsection under each state heading summarizes community engagement in that state based on several indicators that data was gathered for. These community profiles have been included in Appendix A of Draft Mackerel Amendment 18.

5.2.5.4 Bycatch

Bycatch data in the commercial CMP fisheries are primarily collected via logbooks, and recreational bycatch is collected by the Marine Recreational Fisheries Statistics Survey (MRFSS). Bycatch from commercial gill nets has recently been collected via the supplementary discard program, which was implemented in August 2001. A stratified, random sample (20% coverage) of commercial permit holders was selected each year and required to record their discards for each trip they made. For the first survey period (8/01-7/02), 15 vessels with gill-net gear were selected to fill out discard report forms. For the second survey period (8/02 to 7/03), 14 vessels with gill-net gear were selected to report. Overall, menhaden, smooth dogfish sharks, and spiny dogfish sharks were the three most frequently discarded species. There were no interactions of sea turtles or marine mammals reported (Poffenberger 2004).

5.2.6 Spiny Lobster

5.2.6.1 Description of fishing practices, vessels and gear

Commercial fishery

Private recreational fishery

Recreational landings are estimated using mail surveys. Recipients of FWC mail surveys are randomly selected from the state's saltwater fishing license database of individuals who purchased a lobster permit that was valid during the survey period. To ensure that this selection process does not over- or under- sample any geographic region, these selections were stratified based upon license sales in each of 10 residence areas defined by postal codes. The number of lobster license holders that have been attempted to survey each season has ranged from 4,000 to 5,000.

Fishing effort during the Special Two-Day Sport Season from the 1992 through the 2003fishing seasons, expressed in terms of person-days has ranged from c. 60,000 to 112,000 person-days. Fishing effort was concentrated in the Florida Keys, where effort has ranged from 39,000 to 79,000 and accounted for 64% or more of the statewide fishing effort estimate each season. Most of the remaining fishing effort occurred along the SE coast of the state, where effort ranged from 16,000 to 36,000 person-days. Fishing effort throughout the remaining areas of the state ranged from 2000 to 10,000 person-days. Annual landings during the Special Season have ranged from 249,000 to 568,000 lbs. The largest proportion of landings occur in the Florida Keys and have ranged from 163,000 to 397,000 lbs, or 60% to 70% of the annual statewide total. Landings along the SE coast during the Special Season ranged from 70,000 to 151,000 lbs, and those throughout the remainder of the state ranged from 5,000 to 58,000 lbs.

To obtain a coarse estimate of lobster fishing effort after the Labor Day holiday, mail surveys from 1993 through 1996 included questions that asked respondents about which month they intended to fish for lobsters after the survey period. Nearly 60% of respondents to the regular season survey had fished for lobsters before Labor Day, but only 37% of respondents to both surveys indicated they intended to do so during the remainder of September, and that percentage progressively decreased during the subsequent months. However, an end-of-season mail survey that was conducted after the conclusion of the 1994 lobster fishing season indicated that lobster fishing effort during those months was even lower than that indicated by respondents of the former surveys. Only 13% of those survey recipients indicated that they actually fished for lobsters after Labor Day, and no more than 10% of those respondents fished for lobster in any single month during the survey period. From that same survey, we estimated that statewide there were only 50,673 (±1SD = 9,163) person-days of lobster fishing during that period and that 148,000 (± SD = 39,000) lbs of lobsters were landed. Because of the small number of surveys from which these estimates were derived (n = 52), regional landings were not estimated. Comparing this estimate to estimates from the Special Two-Day Season and regular season during 1994 indicated that less than 7 % of lobster landings that season occurred after Labor Day.

Allowable gear

Authorized gear includes trap, pot, dip net, bully net, snare and hand harvest.
There is a 5% by catch limit by weight (of all fish lawfully aboard) for incidental harvest of spiny lobster by trawls in the EEZ. No poisons or explosives are allowed. No spear, hooks or piercing devices are allowed. A degradable panel is required on non-wooden traps. Traps may not be tended at night. Buoy and trap identification is required.

5.2.6.2 Economic description of the fishery

Section needs to be developed

Commercial fishery

Private recreational fishery

5.2.6.3 Social and cultural environment

Section needs to be developed

5.2.6.4 Bycatch

Section needs to be developed

5.2.7 Live Rock Aquaculture and Allowable Octocoral

5.2.7.1 Octocoral Fishery

Description of fishing practices, vessels and gear

History of the Commercial Fishery

The commercial live octocoral fishery probably dates back to the late 1950s or early 1960s when salt water aquariums first started to become popular and the supply of marine specimens began to appear in major cities in the United States. In the early days, filtration systems tended to be crude and the average marine aquarist stocked his aquarium with fish and a few common invertebrates such as crabs, shrimp, and starfish. As the hobby grew and filtration systems improved, more and more aquarists began to stock their aquariums with difficult-to-keep invertebrates such as clams, snails, stony corals, and octocorals. By 1980 the octocoral fishery was becoming well established, and a handful of the more hardy octocoral species collected off the Florida coasts could be found in most large marine aquarium stores throughout the U.S. The demand for Florida octocorals has continued to grow, as has the list of species harvested and successfully kept in the average marine aquarium. Florida-collected octocorals dominate the U.S. market as well as some of the European and Asian markets.

The South Atlantic Council, together with the Gulf of Mexico Council, became the first fishery management councils to describe the octocoral fishery in 1982 in the original Fishery Management Plan for Coral, Coral reefs and Live/Hard Bottom Habitat (SAFMC 1982). Amendment 1 to the Coral FMP was developed in 1990. This plan set an annual harvest limit of 50,000 octocoral colonies from federal waters, allowed for a minimal bycatch of substrate around the holdfast, set allowable gears, and defined the area where harvest is permitted.

Subsequent to this, the Florida Marine Fisheries Commission ruled that octocoral harvest in Florida waters would be unlimited. If the EEZ yearly quota was reached before September 30, then harvest would be closed in Florida until the following October 1.

Over the years there has been occasional interest in collecting octocorals for use in biomedical research. Past work has mostly focused on sampling a wide variety of species and looking for chemical compounds that might be of interest to this type of research. Compounds of interest were eventually synthesized in the lab, eliminating the need to continue harvesting a specific species of octocoral for the extraction. No large-scale octocoral harvests are presently taking place in the South Atlantic EEZ.

Although octocoral harvest in the South Atlantic EEZ is legal in almost all areas from Cape Canaveral south, the overwhelming bulk of the commercial octocoral harvest is located primarily in the Florida Keys. Harvest of octocorals from state waters occurs as far north as Jupiter inlet, but it is also mostly a Florida Keys based fishery. A limited harvest also occurs in the Gulf of Mexico EEZ off Florida’s southwest coast.

Licenses and Permits

Commercial harvest of octocorals in federal waters is restricted to individuals or corporations holding a federal octocoral permit or a valid Florida Saltwater Products license (SPL) with a marine life (ML) endorsement. Federal permits are available through NOAA Southeast Regional Center in St Petersburg, FL, and are not restricted in any way. Saltwater products licenses from Florida’s Fish and Wildlife Commission

(FWC) are unrestricted, but the ML endorsement necessary to land commercial quantities of any organism designated as a “marine life” species, which includes all octocorals, is restricted. The commercial marine life fishery in Florida waters and the adjacent federal waters is managed by a limited entry program administered by the State of Florida’s FWC, and only a limited number of the licenses currently issued are transferable and valid for harvesting octocorals.

The state of Florida also has a Special Activities License (SAL) that can be issued to researchers, public aquariums, and educational institutions that allows the harvest of octocorals in state and federal waters. The permit holder must state in the application how many and what species of octocorals they wish to harvest, and the request is reviewed by FWC staff before being issued. Requests for any substantial amounts of octocoral harvest in federal waters are referred to NOAA Fisheries for review and approval.

Recreational harvest of gorgonia is permitted with a State of Florida saltwater fishing license and is restricted to 6 specimens per day, and the harvest is considered part of the aggregate recreational bag limit of marine life, which is no more than 20 total marine specimens per license holder per day.

Reporting requirements
All octocorals harvested commercially by marine life fishermen must be reported monthly to the Florida Fish and Wildlife Research Institute (FWRI). Landings must be identified as coming from specific zones along the coast, and within each zone it must be specified as coming from state or federal waters. The FWRI has accurate state and federal landing data for octocorals going back as far as about 1990.

Octocorals harvested under a Federal Fisheries Permit must be reported to NOAA Fisheries.

Octocorals harvested by SAL holders must be reported to FWRI.

Octocorals harvested by recreational fishermen are not reported.

Harvest Methods
Almost all commercial harvest of octocorals is done by marine life fishermen for the live aquarium trade, so harvest is by hand and is done in small numbers on any given day. Because it is listed as a marine life species by the state of Florida, fishermen harvesting octocorals using a Florida SPL with ML endorsement must transport and land them in a live and healthy condition.

As many as 50 different species of octocorals are harvested off the coasts of Florida, but only about a dozen species make up the majority of the harvest. Water depth ranges from 5’ to 150’, but most specimens from federal waters are photosynthetic specimens from shallow waters (less than 80’). Sea fans, Gorgonia ventalina, and Gorgonia flabellum as well as all black corals of the genus Antipathes are protected in state and Federal waters and there is no allowable harvest from any state or federal waters.

The aquarium trade has specific size and shape requirements that force marine life fishermen to be very selective in their harvest. Small specimens are passed by for the most part, and few specimens larger than about 20 inches are collected because they are too big for most aquariums and are difficult to ship. The standard shipping box used by Florida shippers has an inside dimension of 15" x 15", so although a 20 inch specimen could fit diagonally in a standard box or could be bent, most wholesale shippers and purchasers prefer specimens less than 15' long. Shape and quality are other factors that fishermen must consider when selecting specimens. The ideal specimen is one that has several lateral branches and no dead spots or odd growths.

The South Atlantic Coral FMP states that harvest by non-powered hand tools is permitted, so although there are many hand tools that could be used, the majority of the harvest is done using either a dive knife, a mason's hammer, or a hammer and wood chisel. The FMP allows for the harvest of a minimal amount of substrata (1" around the base of the octocoral), and most harvesters harvest much less than this amount. Allowing the substrate around the holdfast to be harvested reduces the chance of injuring the specimen and also makes it easier for the final consumer, the aquarist, to attach it to a rock in their aquarium or place it upright in the sand.

Most marine life fishing vessels are les than 25' and are usually trailerable, open fishing boats with outboard motors, and most fishermen either work alone or with just one other person on the boat. Most divers use standard SCUBA gear, but a few use boat mounted surface supplied air systems. Marine life vessels are required to have some sort of aeration system on board to aerate the livestock both on the water and during transport to an onshore holding facility.

Harvest by SAL requires all of the above considerations, but the SAL permit may have additional requirements or exemptions that are issued by the state of Florida on a case-by-case basis.

Recreational harvest is most likely done in the same way that the commercial harvest is done and uses the same types of vessels and gear. Recreational harvesters are not required to aerate their catch, but the catch must be landed live.

The recreational Federal permit is also limited to a daily catch of 6 octocorals. This permit must adhere to the most stringent of Federal or State criteria.

Allowable gear
Hand harvest is the only allowable method. A toxic chemical may not be used or possessed in a coral area in the EEZ. A power-assisted tool may not be used to take prohibited coral, allowable octocoral or live rock. Possession in the EEZ of coral resources harvested with a power assisted tool is prohibited.

Economic description of the fishery

The FWRI collects and maintains fishery landing data for this fishery and has provided the following landing data and ex-vessel value of the catch. However, the total economic value of the catch is many times greater as the product moves from the collector to the final consumer. The traditional chain of possession of the product is collector to wholesaler to pet shop to aquarist, and traditionally the price is at least doubled at each step of the process, so a $4 octocoral reported to the FWRI will sell for at least $16 to the final aquarist, and most likely much more than that. Most of this income comes into Florida from the rest of the United States and from other parts of the world (primarily Europe).

Landing data collected by FWRI for the 2006 calendar year indicated that a total of 39,404 colonies were harvested from the South Atlantic EEZ, for an approximate ex-vessel value of $157, 616 (based on an average landed price of $4 per colony). FWRI probably has a better number than this. Harvest levels have risen and fallen over the last five years, from a low of 29,420 in 2002 to 39,404 in 2006. Harvest in 2004 and 2005 was below the level for 2003, most likely reflecting the disruptive impacts of hurricanes on the ability of the fishermen to get out and harvest. Hurricanes not only disrupt the lives of the fishermen, but they also tend to scour many areas and in many cases the scouring removes all octocorals from that habitat, further disrupting the fishermen's ability to harvest. Re-growth of a completely scoured area to a level that will sustain a harvest varies from two years to four, depending on the habitat type and the targeted species. FWRI data also indicates that there were 26 fishermen reporting landings from the South Atlantic EEZ from 2002 to 2006, and 103 fishermen reporting state landings during that same time period.

Social and cultural environment

Although the area where octocoral harvest is permitted extends from the Florida Keys north to Cape Canaveral, the entire harvest from the South Atlantic EEZ comes from the Keys with most of the harvesters either living in the Keys or in Southeast Florida. Within the Florida Keys, there is no harvest in Key Largo National Marine Sanctuary or in Biscayne National Park, and within the Florida Keys National Marine Sanctuary there are several closed areas where all consumptive harvest is prohibited.

Most fishermen that land octocorals also land other marine life specimens on the same trip, and usually multiple species of octocorals can be harvested on the same dive. Octocoral communities are always associated with hardbottom habitats, and densities vary greatly. Harvest volume is governed by demand and by the amount of holding capacity available on the fishing vessel and at the shore based holding facility.

Bycatch

Because the octocorals are almost exclusively harvested one at a time by divers, there is very little bycatch. On most of shallow water, photosynthetic species, there is no visible bycatch at all on the octocoral itself; on the substrate that surrounds the base there may be an occasional attached macro alga or sponge. Experienced harvesters usually collect octocorals in areas where the target species are abundant and they can quickly and easily remove a specimen without damaging any surrounding benthic communities.

Bycatch is slightly more common on some of the deepwater, non-photosynthetic specimens, very little of which is collected in the federal waters of the Florida Keys (most of the deepwater octocorals are collected off Broward and Palm Beach counties in state waters). Bycatch on these deepwater octocorals usually consists of small brittle stars and basket stars, and the amount and the species composition varies greatly from location to location, from species to species, and from season to season.

All octocorals most likely have communities of tiny, almost microscopic invertebrates living on them that may be specially adapted to live on each of the different species of octocorals. These invertebrates may include different shrimps, amphipods, nudibranchs, and starfish. Some of these organisms are occasionally seen on the specimens in the wild or at the bottom of containers used to transport freshly harvested specimens, but the amount per colony is generally very small. Accurate bycatch species identification and counts can only be done in a laboratory with a dissecting scope, and it is unlikely that this information is available for most of the species harvested by marine life fishermen.

The impact of harvesting octocorals is most likely not discernable. Few fish feed directly on octocorals, octocoral communities are not considered prime habitat for most fish, the selective nature of the harvest has very little impact on the overall community, and because of the rapid growth of octocorals and their short natural lifespan, there is a rapid population replacement cycle in hardbottom habitats.

5.2.7.2 Live Rock Aquaculture

Description of fishing practices, vessels, and gear

The federal liverock aquaculture fishery for the South Atlantic EEZ takes place exclusively in the Florida Keys, mostly due to the narrow continental shelf off Southeast Florida and unsuitable conditions north of there. In the Florida Keys, most of the federal aquaculture sites are in 30 to 50’ of water along the outer reef edge.

Federal live rock aquaculture permits are managed by the NOAA Fisheries Southeast regional office in St Petersburg Florida. Applicants must select a suitable site in federal waters, have the site surveyed and approved by a biologist from the Florida Keys National Marine Sanctuary, provide a geologic description of the seed rock to be used, and complete all the necessary paperwork required by NOAA Fisheries. Permitting from start to finish can be accomplished in less than three months if the applicant is well prepared, but most applications take longer to be approved.

Development of an approved site requires lots of hard work both above the water and below the water. Collecting and depositing suitable rock is tedious and must be done by hand. Upland rocks, generally purchased from limestone quarries in South Florida, must be transported to the site by boat and then lowered to the bottom in baskets and placed within the designated site boundaries. The average rock size is about 5 pounds and is somewhere between the size of a soft ball and a football. High quality rocks are irregular in shape and have numerous holes in them. Low quality rocks lack the irregular shape, have few if any holes, and are a denser type of limestone.

Most aquaculturists employ off-season commercial crawfish boats to transport the rock to the site and lower it to the bottom. A medium to large sized trap boat can haul 10,000 pounds of rock, and if the rock site is close to the dock, they can take two or more trips a day to the site. Most of the big rock deposits and underwater stacking activities take place in the late spring, summer, and fall when the commercial boats are available, the weather is consistently favorable, and the water is warm and clear.

To date, all federal sites have been located in sand, so most individuals have opted to lay a foundation of larger, less desirable rocks on the sand, and then build mounds on top of these foundations. Most work is done with SCUBA gear, but some operations use surface supplied air systems which consist of low pressure, high volume air compressors, filters, pressure tanks, and long hoses that have regulators on the ends.

The time required to "grow" a high quality live rock is about two years, but there is a market for one year old "base" rock, and there are maintenance steps that can be taken to produce high quality rock in under two years. The quality of the seed rock used will also have an impact on how soon it can be harvested and what its market value will be, so hand selected seed rocks will have a higher yield than machine sorted seed rocks.

Vessel types for live rock aquaculture depend on the size of the operation and the type of business. Individuals that are selling more than a thousand pounds a week generally operate 25 to 35' vessels ranging from open, center console skiffs, with outboard motors to traditional, closed cabin vessels with inboard diesel engines. Operations of this size usually have crews of two or three people, and use mechanical lifting devices such as davits and hydraulic hoists. Individuals selling less than a thousand pounds a week tend to operate out of boats less than 25', have a crew of just two people, and pull the rock by hand. These small operators also tend to participate in the marine life fishery, and often mix marine life collecting trips with live rock harvesting stops.

After the rock is harvested, it is usually transported submerged in water to a shore based facility where it is stored prior to being shipped out. Most of the rock is shipped by airfreight out of Miami or Ft. Lauderdale FL, but some is transported by truck to wholesalers in Tampa where it is then flown out of the Tampa area airports. A limited amount of rock is also shipped by FedEx, UPS, DHL, and the United States Postal service, and some is even trucked into the southeast U.S.

Economic description of the fishery

According to data collected by the Florida Wildlife Research Institute (FWRI), 36 different license holders reported a total of 3,136,819 pounds of aquacultured live rock harvested from the South Atlantic EEZ from 2002 to 2006. These license holders were not necessarily all different fishermen and not all of them owned their own aquaculture sites.

The landings data show a clear upward trend until 2005, after which landings drop from over a million pounds in 2004 to roughly 370,000 pounds in 2005 and to just over 13,000 pounds in 2006. This precipitous drop was a direct result of two very active hurricane seasons topped off by a disastrous late season hurricane Wilma in October of 2005. Only one Upper Keys live rock site remained in production following hurricane Wilma. Landings are expected to go back up in 2007, but for many, the risks of trying to grow live rock in the exposed offshore waters of the Florida Keys far outweigh the potential benefits.

The ex vessel price for high quality live rock is around $2.00 a pound, but the price can vary from market to market and season to season. There is a considerable amount of price pressure from cheap imports coming from Haiti and Southeast Asia, which has kept the price at or below the $2.00 per pound value for the last 15 years. Aquacultured live rock is generally denser and less porous than imported wild live rock, which detracts from its value. However, aquacultured live rock also tends to have more living organisms on it, which increases its value. Other positive selling points for the aquacultured rock are that it is domestically produced, may contain live stony corals, and it is not harvested from a natural reef.

Social and cultural environment

Live rock aquaculture is primarily a Florida based fishery with state and federal aquaculture sites on both coasts of Florida. Along the East Coast of Florida in the South Atlantic EEZ, all of the aquaculture sites are in the Florida Keys from about Tavernier to Key West. Most of the permit holders are also marine life fishermen, and the live rock is one of many products that they harvest for the marine ornamental trade. Most live rock producers operate small business with less than 5 employees, and most sell their product out of the state to wholesalers and pet shops, or directly to hobbyists. Prior to the active hurricane seasons of 2004 and 2005, there were several companies based outside of the Keys that were almost exclusively dependent on live rock for their income, but after losing everything to multiple hurricanes, they have moved their operations out of the Keys or have gotten out of the business completely. The surviving live rock operations are ones that do not depend on live rock for much more than 20% of their gross income.

Bycatch

Bycatch associated with live rock harvest is varied and often sold as part of the product. Macro algae, sponges, bryozoans, octocorals, and stony corals that attach to the rock are what add value to the rock and determines what type of rock it can be sold as. Not all of these sessile organisms are desirable, so the rocks are sometimes “cleaned” on the bottom or on the boat so that these undesirable organisms are not taken back to the holding facilities.

Another type of bycatch associate with live rock harvest is the numerous crabs, shrimps, snails, worms, and tiny fish that cling to the rocks or hide in the crevices of the rocks. Often times a quick shake on the bottom loosens up a lot of these small fish and invertebrates, but many remain attached to the rock and are brought to the surface. Once on the boat, most producers sort the rock and place it into holding tanks for transport to shore, so the sorting process also releases some of the attached organisms, which are then dumped back overboard. Whatever remains on the rock at this point is taken to shore and ends up in the shore based holding facilities, and some is actually shipped to the buyer still attached to the rock.

All of the bycatch associated with live rock aquaculture is inherently created by this method of harvest. Although there is bycatch associated with this industry, it is a bycatch that is essentially produced in conjunction with the production live rock. In many ways, offshore live rock aquaculture is a type of polyculture, because many different organisms are raised at the same time on the same site. Live rock aquaculture operations are net producers of marine life because whole communities of fish and invertebrates establish themselves around the live rock site and although the harvest operations disturb these communities, they continue to thrive there from year to year.

5.2.8 Sargassum

5.2.8.1 Description of fishing practices, vessels and gear

Only one company, Aqua-10 Laboratories, has harvested pelagic *Sargassum* offshore of North Carolina from 1976 to 1997; no harvest has occurred since 1997. A total of approximately 448,000 pounds wet weight of pelagic *Sargassum* has been harvested to date. Pelagic *Sargassum* was originally collected with unweighted shrimp trawls or 3’ x 4’ and 4’ x 8’ beam trawls constructed of iron pipe with 1.5 inch and 2 inch mesh bags that were 6’- 8’ deep. The average capacity of the beam trawl is 200 pounds of *Sargassum*. Initially, harvest was conducted during the months of June and September by Aqua-10 contracting with a shrimp, snapper grouper, or longline vessel to harvest pelagic *Sargassum* in conjunction with their regular fishing trip. No harvest occurred from 1991 through 1994. The company reinitiated harvest activities in 1995 and has now purchased a former snapper grouper vessel to conduct directed trips harvesting pelagic *Sargassum* in the South Atlantic EEZ off North Carolina. The company anticipates a growth in demand and projects an increase from an average annual harvest of 1,723 pounds dry weight or 17,230 pounds wet weight, to 50,000 dry weight or 500,000 pounds wet weight annually between 1999 and 2005 to meet demand. However, no harvest has occurred since 1997.

Pelagic *Sargassum* is sun dried, powdered, fermented, and extracted to provide a processed liquid used by Aqua-10 in plant and yield stimulants (soil and foliar), fertilizer concentrate (soil and foliar), poultry feed supplement, and livestock feed supplement.

For a summary of previous harvest activities see, “Commercial harvest of pelagic *Sargassum*: A summary of landings since June 1995 (Settle, 1997)” and a NMFS SEFSC *Sargassum* harvest report - June 13 1996. In addition, reference the thesis prepared by Lawrence Settle (Settle, 1993) titled “Spatial and Temporal Variability in the Distribution and Abundance of Larval and Juvenile Fishes Associated with Pelagic Sargassum”.

William E. Campbell, owner of Aqua-10 Laboratories, provided information on the harvest and processing of pelagic *Sargassum* during the informal review and public hearing process which is contained in the Administrative record. Additional comments were provided during the September 1998 Council meeting in Charleston, S.C. and are included in a supplemental comment package compiled for the December 1998 Council meeting. Mr. Campbell gave written permission for his confidential landings data to be used. In his comments to the Council on December 3, 1998, Mr. Campbell indicated he used 4-inch stretched mesh to harvest *Sargassum*.

Allowable gear

Harvest and possession of Sargassum is prohibited south of the latitude line representing the North Carolina/South Carolina border (34º North latitude). All harvest is prohibited within 100 miles of shore between the 34º North latitude line and the line representing the North Carolina/Virginia border. Harvest is limited to the months of November through June. Official observers are required on any harvesting trip. An annual quota of 5,000 pounds landed wet weight. Nets used to harvest Sargassum be constructed of 4" stretch mesh or larger fitted to a frame no larger than 4 x 6 feet.

5.2.8.4 Bycatch

5.2.9 Dolphin and Wahoo

5.2.9.1 Description of fishing practices, vessels and gear

The fishery for dolphin and wahoo is prosecuted along the Atlantic coast predominately south of Virginia into the Caribbean Sea and the Gulf of Mexico. The fishery is seasonal with catches from the Atlantic occurring mainly between April and September, catches from the Caribbean primarily occurring January through June, and catches in the Gulf of Mexico mainly occurring between May and October (Table 5.2.9-1).

Table 5.2.9-1. Summary of locations and approximate seasonality of commercial and/or sport fisheries for dolphin (*Coryphaena hippurus*) within the western central Atlantic (Oxenford, 1997). References are found in Oxenford (1997).

Area	Location	Approximate seasonality	Selected References
Southeastern USA	North Carolina South Carolina Georgia East Florida	April-Sept	Ellis 1957 Iversen 1962 Beardsley 1967 Rose & Hassler 1969 Hassler & Hogarth 1977 Gentle 1977 Brusher & Palko 1985 Oxenford & Hunte 1986 Palko *et al.* 1989
Southern USA (Gulf of Mexico)	West Florida Alabama Mississippi	May-Oct	Baughman 1941 Springer & Pirson 1958 Fable 1981

	Louisiana Texas		Bentivoglio 1988 Palko *et al.* 1989
Central America (Caribbean coast)	Mexico	?	FAO 1996
Northern Caribbean	Bahamas Hispaniola Puerto Rico US Virgin Islands	Jan-June	Erdman 1956 Olsen & Wood 1982 Appeldoorn & Meyers 1993 Perez & Sadovy 1991 Perez *et al.* 1992 Rivera Betancourt 1994
Eastern Caribbean	Guadeloupe Martinique Dominica St. Lucia Barbados St. Vincent Grenada Tobago	Dec-June	Mahon *et al.* 1981 Sacchi *et al.* 1981 Murray 1985 Oxenford & Hunte 1986 Hunte 1987 Mahon *et al.* 1990 Mahon 1993 FAO 1996 Mohammed 1996
Southern Caribbean	Curacao	Dec-July	Zaneveld 1961
South America	Northeast Brazil	?	Monteiro *et al.* 1996
Atlantic	Bermuda	March-Dec	Oxenford & Hunte 1986

Dolphin support economically important fisheries from North Carolina through the Gulf of Mexico, and within the Caribbean Sea, including the northeast coast of Brazil (SAFMC, 1998a).

Commercial fishery

Dolphin

In the Atlantic, commercial fisheries for dolphin consist primarily of longline and hook and line (which includes hand line, troll, rod and reel and electric reel). The hook and line portion of the commercial fishery is conducted similarly to the recreational hook and line segment, which is described under the recreational fisheries section. The longline component of the fishery consists of longliners that primarily target highly migratory species but may also catch dolphin and longliners that target dolphin directly.

The commercial longline fishery for dolphin in the Atlantic consists of approximately 3 or 4 longline vessels that direct effort on dolphin on a regular basis off the coasts of North and South Carolina (NMFS, 1995 & 1996) and longliners who catch dolphin and wahoo but primarily target highly migratory species, mainly swordfish and shark. In the mid to late 1990s, there was an increase in longline landings of dolphin in the South Atlantic with the participation of swordfish and shark longliners who have been adapting their gear to simultaneously target dolphin. They also focus more effort on dolphin after shark and swordfish quotas have been met. This increased participation by these other longliners may alter the makeup of this fishery as those vessels that participated in the directed fishery for dolphin withdraw for a variety of reasons. According to reports by

NMFS (1995 & 1996), there may be as many as 20 longline vessels that currently participate in this fishery.

The directed fishery begins the last part of April and continues for about 3 weeks initially off the coast of South Carolina then north to Morehead City, North Carolina where dolphin become more scattered and difficult to catch near the middle of July. Most fishing occurs on either side of the Gulf Stream where eddies spin-off with early concentrations on the western side (NMFS, 1995 & 1996).

Vessels in the directed longline fishery make sets during the daytime using gear that is from 2 to 6 miles in length. The mainline is often 700 pound monofilament with leaders of 400 pound monofilament. There are ordinarily a total of 75 to 80 hooks per mile with a maximum of 480 hooks total. The standard No. 5 circle hooks that are used for dolphin are smaller than those normally used for conventional longline fishing. Leaders of around 18 inches are also shorter than normal with one hook per leader. No drop lines are used in this fishery and haul back is immediate. Fish are located using hook and line gear along weed lines or temperature breaks. Gear may be set in a circular pattern to facilitate haulback and as many as six sets may be made daily. Trips may average 2 days in length (NMFS, 1995 & 1996).

Longline vessels in the shark and swordfish fisheries target dolphin simultaneously by attaching small leaders to their float buoys. There is usually only one leader per buoy with approximately 100-150 such rigs employed at one time. These dolphin rigs are retrieved at the same time as the main longline which is often set overnight (NMFS, 1995 & 1996).

The commercial dolphin fishery in New England has fluctuated with average landings for 1984-97 of 10,701 pounds (Table 5.2.9-2). Average landings over 1994-97 were up slightly to 13,570 pounds then back down to 9,403 over 1997-2000 (Tables 5.2.9-2, 5.2.9-4). In the Mid-Atlantic, landings averaged 70,761 pounds for 1984-97, increased to 131,933 over 1994-97, and then decreased to 82,342 pounds over 1997-2000 (Table 5.2.9-2). South Atlantic landings averaged 920,870 pounds over 1984-97, increased to 1,428,484 over 1994-97, and then decreased to 1,018,863 pounds over 1997-2000 (Table 5.2.9-2).

Table 5.2.9-2. Recreational and commercial landings of dolphin (pounds) from the South Atlantic, Mid-Atlantic, and New England for 1984-2000 (Source: Goodyear (1999) and data provided by NMFS in 2000 & 2002). NOTE: Table in landscape format. Update before inserting.

Commercial landings of dolphin by region by gear are shown in Tables 5.2.9-4, 5.2.9-5, 5.2.9-6 and Figures 5.2.9-1 through 5.2.9-3. As mentioned earlier, longlines in the South Atlantic increased over 1994-97 (average = 429,754) but landings by hook and line were roughly double the longline landings at 992,147 pounds (Table 5.2.9-6).

South Atlantic commercial landings are shown by state in Table 5.2.9-3. Average landings were highest in Florida followed by North Carolina, South Carolina, and Georgia. For the most recent time period (1997-99) average landings were 706,730 pounds in Florida, 196,545 pounds in North Carolina, 136,235 pounds South Carolina, and 8,059 pounds in Georgia.

Table 5.2.9-3. Recreational and commercial landings of dolphin (pounds) North Carolina, Florida, South Carolina and Georgia for 1984-1999 (Source: Goodyear (1999) and data provided by NMFS in 2000 & 2002). NOTE: Table in landscape format. Update before inserting.

Table 5.2.9-4. Commercial landings of dolphin (pounds) in New England by gear type for 1984-2000 (Source: Goodyear, 1999, NMFS, 2000 & NMFS, 2002).

Year	Hook & Line*	Long Line	Other/Unknown	Combined gear
1984	NA	NA	NA	400
1985	NA	NA	NA	4,800
1986	0	0	0	200
1987	1,100	0	0	1,100
1988	NA	NA	NA	17,800
1989	NA	NA	NA	15,300
1990	NA	NA	NA	14,233
1991	NA	NA	NA	9,816
1992	NA	NA	NA	8,361
1993	NA	NA	NA	23,524
1994	8,771	5,012	1,010	14,793
1995	257	15,852	464	16,573
1996	103	9,198	346	9,647
1997	1,736	12,257	1,925	13,265
1998	NA	NA	NA	11,813
1999	NA	NA	NA	5,990
2000	NA	NA	NA	6,545
Average 94-97	2,717	10,580	936	13,570
Average 97-2000	NA	NA	NA	9,403

*Includes hand line, troll, rod & reel, and electric reel.

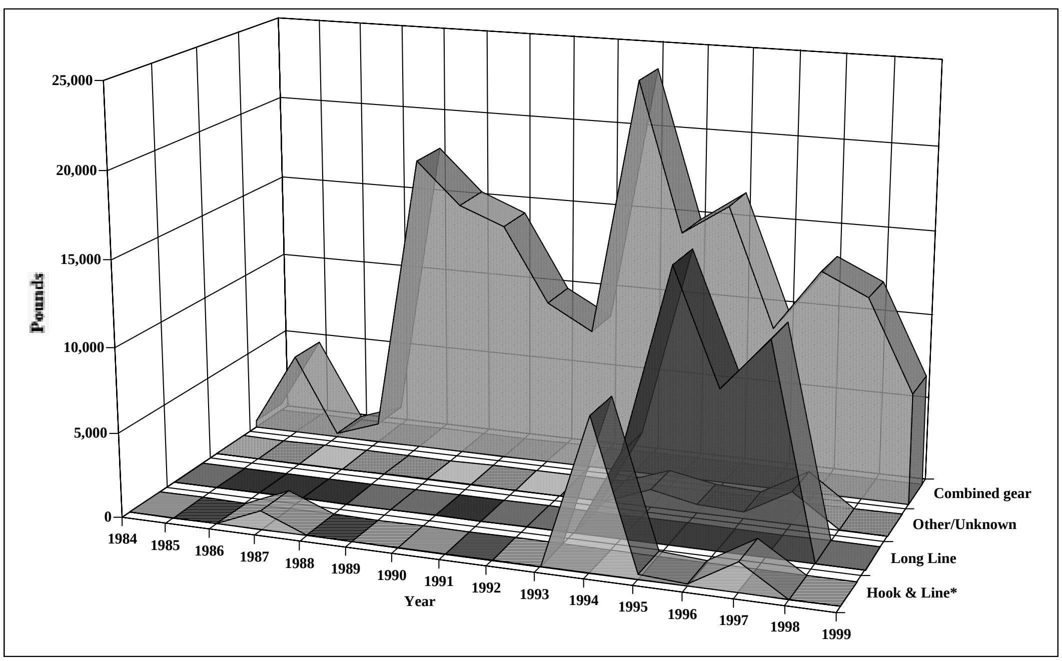


Figure 5.2.9-1. Commercial landings of dolphin (pounds) in New England by gear type for 1984-1999 (Source: Goodyear, 1999 & NMFS, 2000).

Table 5.2.9-5. Commercial landings of dolphin (pounds) in the Mid-Atlantic in pounds by gear type for 1984-2000 (Source: Goodyear, 1999, NMFS, 2000 & NMFS, 2002).

	Hook & Line*	Long Line	Other/Unknown	Combined gear
1984	NA	NA	NA	1,700
1985	NA	NA	NA	5,000
1986	NA	NA	NA	4,200
1987	NA	NA	NA	13,400
1988	NA	NA	NA	26,600
1989	NA	NA	NA	81,700
1990	NA	NA	NA	69,106
1991	NA	NA	NA	90,722
1992	NA	NA	NA	72,946
1993	NA	NA	NA	97,553
1994	2,526	120,245	874	123,646
1995	1,080	231,006	6,368	238,438
1996	248	58,844	248	59,341
1997	671	125,604	1,291	106,305
1998	NA	NA	NA	87,545
1999	1,853	96,599	1,053	99,505
2000	1,592	32,518	1,903	36,013
Avg. 94-97	1,131	133,925	2,195	131,933
Avg. 97-2000	NA	NA	NA	82,342

*Includes hand line, troll, rod & reel and electric reel.

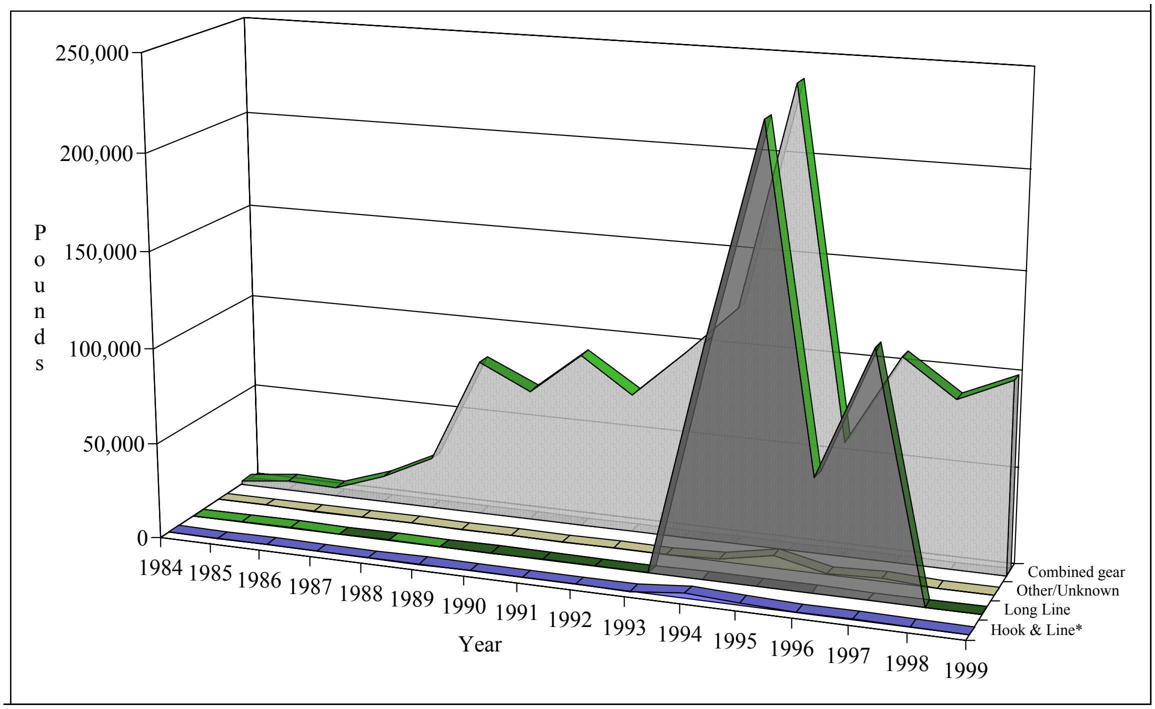


Figure 5.2.9-2. Commercial landings of dolphin (pounds) in the Mid-Atlantic by gear type for 1984-1999 (Source: Goodyear, 1999 & NMFS, 2000).

Table 5.2.9-6. Commercial landings of dolphin (pounds) in the South Atlantic by gear type for 1984-2000 (Source: Goodyear, 1999, NMFS, 2000 & NMFS, 2002).

Year	Hook & Line*	Long Line	Other	Combined gear
1984	NA	NA	NA	426,960
1985	NA	NA	NA	316,102
1986	NA	NA	NA	532,078
1987	NA	NA	NA	483,681
1988	NA	NA	NA	481,207
1989	NA	NA	NA	995,556
1990	NA	NA	NA	961,088
1991	NA	NA	NA	1,529,261
1992	NA	NA	NA	605,072
1993	NA	NA	NA	847,245
1994	848,562	254,240	11,312	1,114,114
1995	1,316,434	650,246	10,096	1,976,776
1996	864,054	275,883	7,757	1,147,694
1997	939,538	538,648	10,274	1,475,350
1998	NA	NA	NA	727,282
1999	647,293	238,903	58,399	944,595
2000	520,590	294,376	113,257	928,223
Average 94-97	992,147	429,754	9,860	1,428,484
Average 97-2000	NA	NA	NA	1,018,863

*Includes hand line, troll, rod & reel, and electric reel.

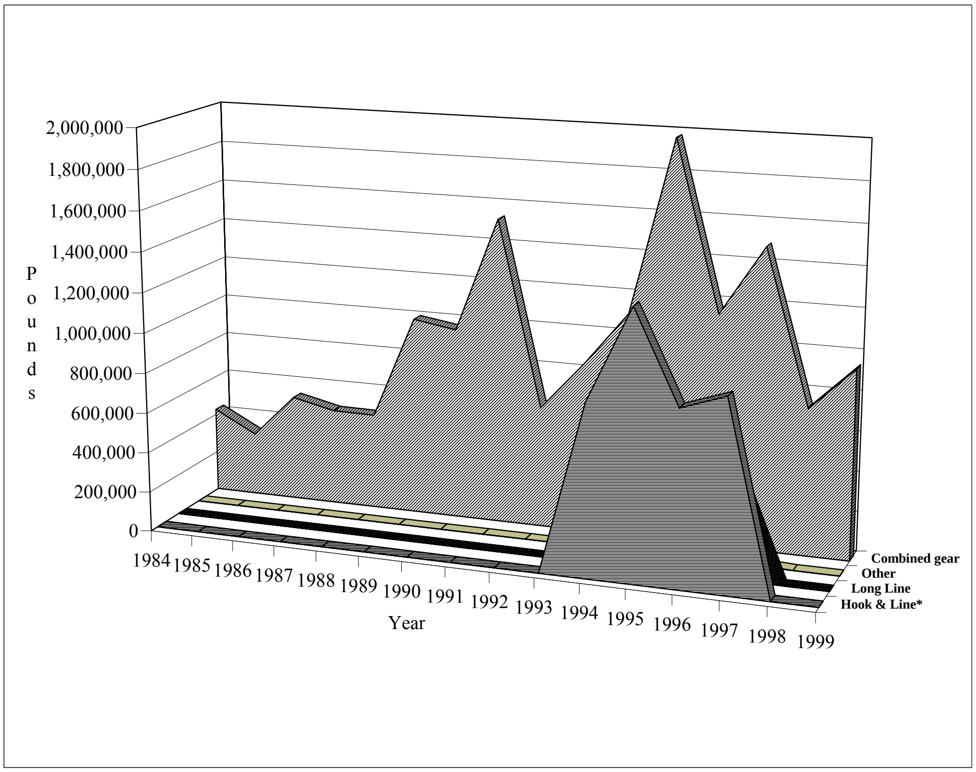


Figure 5.2.9-3. Commercial landings of dolphin (pounds) in the South Atlantic by gear type for 1984-1999 (Source: Goodyear, 1999, NMFS, 2000 & NMFS, 2002).

Mid-Atlantic commercial landings are shown by state in Table 5.2.9-7.

Table 5.2.9-7. Commercial landings of dolphin (pounds) in the Mid-Atlantic by state for 1984-1999 (Source: NMFS and Goodyear, 1999 & NMFS, 2000).

	Maryland	New Jersey	New York	Virginia
1984	600	200	400	500
1985	100	1,700	2,800	400
1986	500	1,200	2,200	300
1987	1,000	3,000	7,400	2,000
1988	1,900	6,200	16,000	2,500
1989	3,700	44,300	25,200	8,500
1990	6,809	30,884	28,645	2,478
1991	6,433	45,023	32,247	7,019
1992	4,204	38,717	25,732	4,293
1993	6,230	40,269	47,920	3,134
1994	10,363	68,542	37,436	7,304
1995	24,824	143,126	68,012	2,493
1996	4,727	34,282	13,321	7,012
1997	3,299	72,620	29,812	574
1998	14,958	40,412	30,972	1,043
1999	7,319	57,937	33,589	1,043

Wahoo

The commercial fishery for wahoo appears to be incidental to fishing for dolphin or other pelagic species. In New England landings while being sporadic, peaked at 16,720 pounds in 1994 and dropped off to 110 and 163 pounds for 1995 and 1996 respectively (Table 5.2.9-8). Landings for 1997 through 1999 have been 75 pounds or less. In the Mid-Atlantic, annual commercial landings from 1984 through 1997 averaged 1,840 pounds. Landings increased to an average of 3,890 pounds in 1994 through 1997 and declined slightly to 3,104 pounds for 1997-2000 (Table 5.2.9-8). In the South Atlantic annual commercial landings ranged from 25,137 pounds in 1984 to 102,277 pounds in 1995 (Table 5.2.9-8). Average landings were 85,264 pounds in 1994-97 and declined slightly to 80,486 pounds in 1997-2000.

Table 5.2.9-8. Recreational and commercial landings of wahoo (pounds) in the South Atlantic, Mid-Atlantic and New England for 1984-2000 (Source: Goodyear (1999) and data provided by NMFS in 2000 & 2002). NOTE: Table in landscape format. Update before inserting.

Recreational fishery

Dolphin

The recreational dolphin fishery in New England has been sporadic with the average landings from 1984-97 at 19,524 pounds (Table 5.2.9-8). The dolphin fishery in the Mid-Atlantic had average landings of 477,655 pounds for the 1984-97 period (Table 5.2.9-8). Recreational landings of dolphin in the South Atlantic have increased over time but have shown wide fluctuation in catches from year to year; landings for the South Atlantic peaked at just over 12 million pounds in 1995; average landings for 1984-1997 were 7,493,268 pounds (Table 5.2.9-8)

Comparing more recent average landings (1997-2000) to the 1994-97 average landings (Table 5.2.9-8). indicates that average recreational landings have increased in the South Atlantic by about 76,000 pounds, decreased in the Mid-Atlantic by about 106,000 pounds, and decreased in New England from 22,747 pounds to 3,020 pounds. Total recreational landings peaked at 13,092,212 pounds in 1995. Total recreational 2000 landings are preliminary but exceed the 1999 landings by about 2.4 million pounds. Average total recreational catch in both the 1994-97 and 1997-2000 periods was 10.3 million pounds.
South Atlantic recreational landings are shown in more detail in Table 9; data only provided through 1997. Florida and North Carolina account for the bulk of landings. Average landings in Florida for 1994-97 were 6,398,917 pounds and declined to 4,731,124 pounds for 1997-99. The trend was reversed in North Carolina with average landings increasing from 3,403,370 pounds to 4,243,769 pounds for the same time periods. Average landings increased in both South Carolina and Georgia for these same time periods (Table 5.2.9-9).

Recreational landings by region and mode within the Atlantic are shown in Tables 5.2.9-11 and 5.2.9-12. data only provided through 1997. Private/rental accounted for more landings than charter in the Mid-Atlantic and South Atlantic, whereas, charter accounted for more landings in New England. Recreational landings by state in the Mid-Atlantic are shown in Table 5.2.9-13. Landings have been variable and spread amongst the States of Maryland, New Jersey, New York, and Virginia. Over the 1997-99 time period, Virginia and Maryland accounted for the majority of landings. Landings from the recreational sector by state and mode within the Atlantic are presented in Table 5.2.9-14 through 5.2.9-25. These tables provide more detail by State but follow the general trends described above.

The overall trend by mode within the South Atlantic is shown in Figures 5.2.9-4, 5.2.9-5; data only provided through 1997. In North Carolina (Table 5.2.10-24) charter landings exceed private/rental whereas in Florida (Table 5.2.9-26) the private/rental catch greatly exceeds the charter catch. South Carolina’s charter fleet has accounted for more of the recent landings (Table 5.2.9-24), but private/rental had much higher catches in the mid 1980s. The trend in Georgia (Table 5.2.9-25) is similar to South Carolina except that there were no landings recorded from the private/rental mode for 1995-1997.

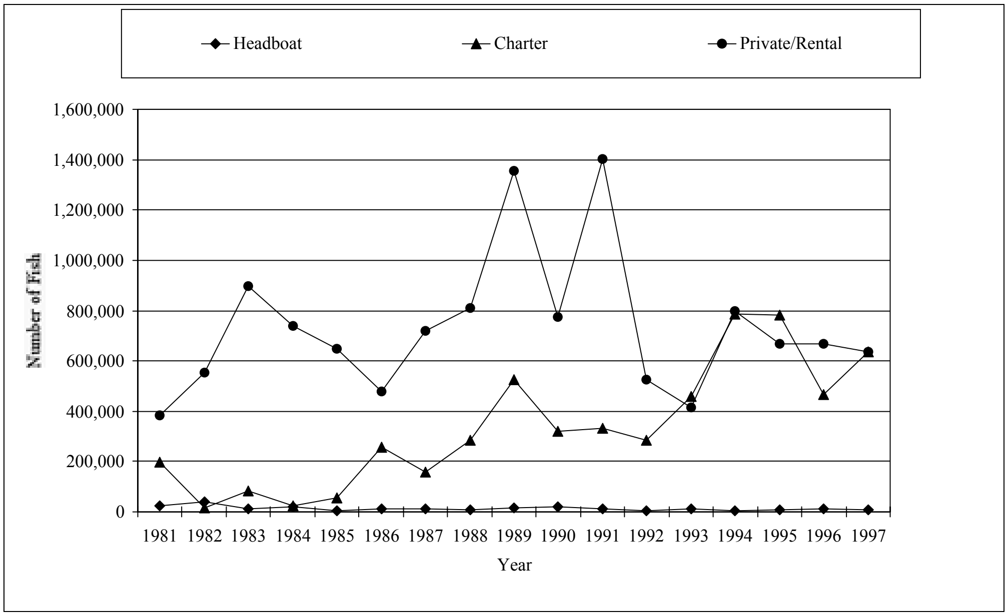


Figure 5.2.9-4. Recreational landings of dolphin in the South Atlantic in numbers by mode for 1981-1997 (Data Source: Goodyear, 1999).

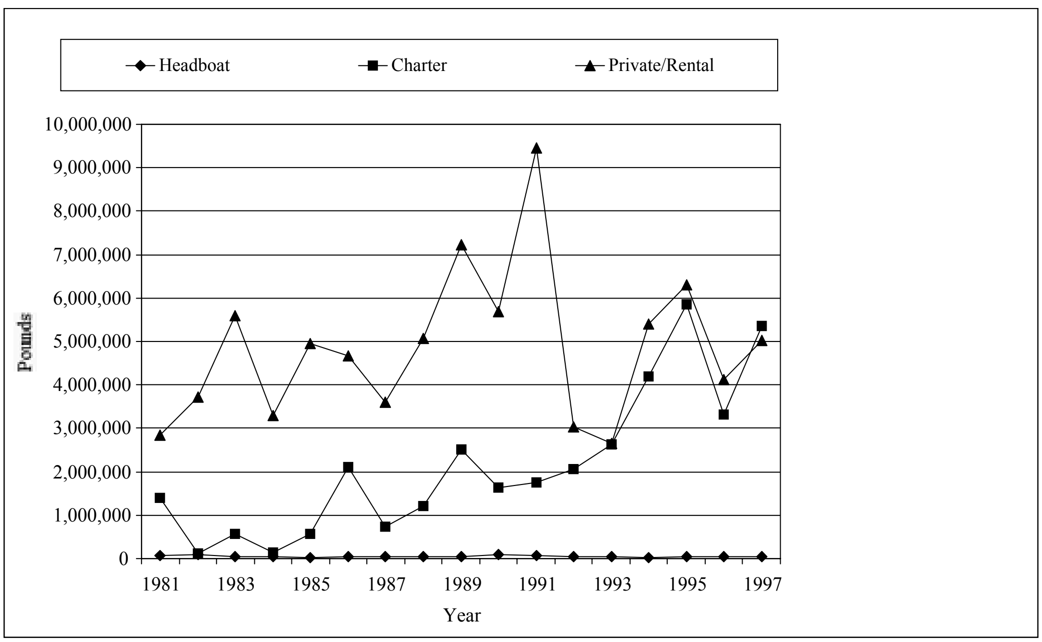


Figure 5.2.9-5. Recreational landings of dolphin (pounds) in the South Atlantic by mode for 1981-1997 (Data Source: Goodyear, 1999).

Table 5.2.9-9. Recreational and commercial landings of dolphin (pounds) from the South Atlantic, Mid-Atlantic, and New England for 1984-2000 (Source: Goodyear (1999) and data provided by NMFS in 2000 & 2002). See note above

Table 5.2.9-10. Recreational and commercial landings of dolphin (pounds) North Carolina, Florida, South Carolina and Georgia for 1984-1999 (Source: Goodyear (1999) and data provided by NMFS in 2000 & 2002). See note above.

Table 5.2.9-11. Recreational landings of dolphin (pounds) in New England by mode for 1981-1997 (Source: Goodyear, 1999).

	Headboat		Charter		Private/Rental		Total	
Year	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
1981	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-
1987	-	-	-	-	-	-	-	-
1988	-	-	81	359	259	1,142	340	1,501
1989	-	-	1,339	6,811	-	-	1,339	6,811
1990	-	-	81	600	1,275	9,500	1,356	10,101
1991	-	-	156	721	1,833	8,487	1,989	9,208
1992	-	-	111	837	-	-	111	837
1993	-	-	8,709	53,739	7,098	100,146	15,807	153,885
1994	-	-	305	1,772	781	4,540	1,086	6,312
1995	-	-	8,146	71,546	-	-	8,146	71,546
1996	-	-	-	-	614	4,644	614	4,644
1997	-	-	829	8,486	-	-	829	8,486

Table 5.2.9-12. Recreational landings of dolphin (pounds) in Mid-Atlantic by mode for 1981-1997 (Source: Goodyear, 1999).

	Headboat		Charter		Private/Rental		Total	
Year	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
81	-	-	-	-	-	-	-	-
82	-	-	-	-	1,586	1,049	1,586	1,049
83	-	-	2,302	26,904	1,632	23,686	3,935	50,590
84	-	-	-	-	-	-	-	-
85	-	-	12,577	12,697	15,193	66,208	27,770	78,904
86	-	-	2,597	10,521	25,712	182,606	28,309	193,127
87	-	-	2,273	12,765	11,908	60,012	14,181	72,777
88	-	-	3,756	21,928	22,996	144,540	26,752	166,468
89	-	-	30,446	146,264	111,425	660,018	141,871	806,282
90	-	-	11,552	91,693	78,106	257,531	89,658	349,224
91	-	-	20,892	158,678	94,273	396,218	115,166	554,896
92	-	-	35,216	179,332	110,545	512,877	145,761	692,209
93	-	-	150,675	1,358,188	89,742	425,080	240,417	1,783,267
94	-	-	49,296	274,976	30,903	118,475	80,199	393,450
95	-	-	34,248	385,176	36,668	439,964	70,916	825,140
96	-	-	33,705	205,033	56,560	358,452	90,265	563,485
97	-	-	24,456	66,338	19,117	141,602	43,573	207,940

Table 5.2.9-13. Recreational landings of dolphin (pounds) in the South Atlantic by mode for 1981-1997 (Source: Goodyear, 1999).

Year	Headboat		Charter		Private/Rental		Total	
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
1981	23,056	76,103	197,342	1,392,254	381,410	2,848,551	601,808	4,316,908
1982	39,846	94,722	16,058	110,511	554,631	3,709,001	610,535	3,914,231
1983	10,551	42,136	84,558	568,519	896,783	5,583,383	991,892	6,194,038
1984	17,882	52,727	22,786	135,913	739,500	3,287,178	780,168	3,475,817
1985	5,319	33,587	56,571	580,496	646,186	4,955,658	708,076	5,569,740
1986	11,665	50,324	256,814	2,111,430	476,957	4,673,013	745,436	6,834,766
1987	12,900	49,034	156,330	739,834	717,309	3,607,051	886,539	4,395,920
1988	8,233	35,930	283,695	1,198,525	808,105	5,079,359	1,106,705	6,334,041
1989	13,961	54,751	525,336	2,519,018	1,355,989	7,238,291	1,900,598	9,830,209
1990	17,872	103,072	318,895	1,634,846	773,890	5,680,409	1,113,462	7,430,291
1991	9,949	75,748	330,434	1,752,745	1,403,623	9,443,396	1,744,006	11,271,890
1992	5,450	38,984	285,355	2,068,521	523,503	3,031,715	826,447	5,192,498
1993	10,199	50,742	459,379	2,631,453	413,859	2,664,395	909,841	5,414,984
1994	5,527	24,521	785,113	4,196,392	797,637	5,414,156	1,589,271	9,643,594
1995	6,775	52,000	781,432	5,848,770	667,007	6,291,777	1,456,784	12,194,620
1996	11,893	46,959	468,129	3,315,770	669,066	4,117,283	1,149,088	7,480,014
1997	7,473	39,295	634,597	5,360,610	634,760	5,019,254	1,276,830	10,419,160

Table 5.2.9-14. Recreational landings of dolphin (pounds) in the Mid-Atlantic by state for 1984-1999 (Source: Data provided by NMFS in 2000).

	Delaware	Maryland	New Jersey	New York	Virginia
1984	-	-	-	-	-
1985	-	11,854	18,486	5,964	42,601
1986	-	19,672	23,396	14,243	133,816
1987	-	8,159	-	32,583	32,035
1988	-	152,607	9,490	-	4,371
1989	21,124	125,378	147,952	437,883	73,946
1990	30,423	71,640	74,205	146,813	26,143
1991	28,734	135,346	210,650	34,435	145,731
1992	10,186	158,773	43,928	63,695	415,628
1993	821	1,087,649	77,522	209,476	407,799
1994	29,838	-	24,932	193,659	145,022
1995	90,578	82,547	150,565	37,878	463,572
1996	1,057	224,301	315,071	-	23,057
1997	1,409	54,936	10,619	9,371	131,606
1998	8,347	128,297	50,732	37,851	204,062
1999	-	100,215	9,217	35,853	149,190

Table 5.2.9-15. Recreational landings of dolphin (pounds) in Massachusetts by mode for 1981-1997 (Source: Goodyear, 1999).
No landings except for 1393 pounds in 1997. Update.

Table 5.2.9-16. Recreational landings of dolphin (pounds) in Rhode Island by mode for 1981-1997 (Source: Goodyear, 1999). Update.

Table 5.2.9-17. Recreational landings of dolphin (pounds) in Connecticut by mode for 1981-1997 (Source: Goodyear, 1999). Update.

Table 5.2.9-18. Recreational landings of dolphin (pounds) in New York by mode for 1981-1997 (Source: Goodyear, 1999). Update.

Table 5.2.9-19. Recreational landings of dolphin (pounds) in New Jersey by Mode for 1981-1997 (Source: Goodyear, 1999). Update.

Table 5.2.9-20. Recreational landings of dolphin (pounds) in Delaware by mode for 1981-1997 (Source: Goodyear, 1999). Update.

Table 5.2.9-21. Recreational landings of dolphin (pounds) in Maryland by mode for 1981-1997 (Source: Goodyear, 1999). Update.

Table 5.2.9-22. Recreational landings of dolphin (pounds) in Virginia by mode for 1981-1997 (Source: Goodyear, 1999). Update

Table 5.2.9-23. Recreational landings of dolphin (pounds) in North Carolina by mode for 1981-1997 (Source: Goodyear, 1999). Update

Table 5.2.9-24. Recreational landings of dolphin (pounds) in South Carolina by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-25. Recreational landings of dolphin (pounds) in Georgia by mode for 1981-1997 (Source: Goodyear, 1999). Update

Table 5.2.9-26. Recreational landings of dolphin (pounds) on the Florida East Coast by mode for 1981-1997 (Source: Goodyear, 1999). Update

Wahoo

Wahoo are primarily caught using the same fishing methods as dolphin, i.e., trolling. The recreational fishery for wahoo mainly operates off North Carolina and the east coast of Florida. Annual recreational landings in the South Atlantic ranged from a low of 282,967 pounds in 1990 to a high of 2,470,098 pounds in 1986; landings in 1999 were 1,172,886 pounds and 991,559 in 2000 (Table 5.2.9-27). Average South Atlantic landings for the period 1994-1997 were 866,327 pounds and increased to 992,224 for 1997-2000 (Table 5.2.9-26). In the Mid-Atlantic, for the period 1994-1997, average landings were 16,239 pounds and increased to 76,433 pounds in the 1997-2000 period (Table 5.2.9-27). In New England there were only landings in 1993 (5,738 pounds) and 1998 (5,355 pounds) (Table 5.2.9-27).

Recreational landings by state and mode are shown in Tables 5.2.9-28 through 5.2.9-36. The charterboat sector in North Carolina landed the largest quantity of wahoo for the period 1994-1997, with an average annual landings of 363,386 pounds during this period (Table 5.2.9-33). Total recreational landings from North Carolina averaged 502,523 pounds for the same time period. The private/rental sector on Florida's East Coast accounted for the next highest average landings of 204,098 pounds during the period 1994-1997 (Table 5.2.9-36), then the private/rental fleet in North Carolina at 138,906 pounds (Table 5.2.9-33), and the charter fleet on the east coast of Florida averaging 132,349 pounds (Table 5.2.9-36) for the same period. Average annual recreational landings of wahoo for the period 1994-1997 for recreational fishermen in South Carolina were 24,844 pounds (Table 5.2.9-34).

Comparing more recent average landings (1997-2000) to the 1984-97 average landings indicates that recreational landings have increased in the South Atlantic by about 200,000 pounds. More recent average landings are also up in the Mid-Atlantic and in New England.

Table 5.2.9-27. Recreational and commercial landings of wahoo (pounds) in the South Atlantic, Mid-Atlantic and New England for 1984-2000 (Source: Goodyear (1999) and data provided by NMFS in 2000 & 2002).

Table 5.2.9-28. Recreational landings of wahoo (pounds) in Rhode Island by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-29. Recreational landings of wahoo (pounds) in New York by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-30. Recreational landings of wahoo (pounds) in Delaware by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-31. Recreational landings of wahoo (pounds) in Maryland by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-32. Recreational landings of wahoo (pounds) in Virginia by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-33. Recreational landings of wahoo (pounds) in North Carolina by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-34. Recreational landings of wahoo (pounds) in South Carolina by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-35. Recreational landings of wahoo (pounds) in Georgia by mode for 1981-1997 (Source: Goodyear, 1999).

Table 5.2.9-36. Recreational landings of wahoo (pounds) on the Florida East Coast by mode for 1981-1997 (Source: Goodyear, 1999).

For-hire recreational fishery

Needs to be developed

Dolphin

Wahoo

Allowable gear

Allowable gear in the Atlantic EEZ: Pelagic longline*, hook and line gear including manual, electric, or hydraulic rod and reels, bandit gear, handline and spearfishing gear (including powerheads).

*Surface and pelagic longline gear for dolphin and wahoo is prohibited within any "time area closure" in the Atlantic EEZ which is closed to the use of pelagic gear for highly migratory pelagic species (HMS).

5.2.9.2 Economic description of the fishery

Commercial fishery

Prior to the 1970s, most dolphin landings occurred in Florida; however, by the mid-70s there were significant landings in other areas within the South Atlantic region. During the late 1970s, landings increased in the northeast from Maine to Virginia (Thompson, 1999). Commercial landings of dolphin increased from 7% of total harvest in 1985 to about 19% by 1996 (Table 5.2.9-37). In 1995, commercial landings in the Atlantic exceeded 2.2 million pounds. This sector's landings exceeded one million pounds in 1989, and doubled in 1995. During the period 1997 to 1999 the proportion of commercial landings have dropped to around 11% of the total harvested in the Atlantic (Table 40).
Dolphin are caught off North and South Carolina mainly from May through July. Off Florida's east coast the main season occurs between April and June (Thompson, 1999).

Table 5.2.9-37. Proportion of total recreational and commercial dolphin landings by region. Data derived from Table 5.2.9-2.

	South Atlantic		Mid-Atlantic		New England	
Year						
	Recreational	Commercial*	Recreational	Commercial	Recreational	Commercial
1984	89.01%	10.93%	0.00%	0.04%	0.00%	0.01%
1985	93.22%	5.29%	1.32%	0.08%	0.00%	0.08%
1986	90.35%	7.03%	2.55%	0.06%	0.00%	0.00%
1987	88.50%	9.74%	1.47%	0.27%	0.00%	0.02%
1988	90.13%	6.85%	2.37%	0.38%	0.02%	0.25%
1989	83.76%	8.48%	6.87%	0.70%	0.06%	0.13%
1990	84.11%	10.88%	3.95%	0.78%	0.11%	0.16%
1991	83.71%	11.36%	4.12%	0.67%	0.07%	0.07%
1992	79.01%	9.21%	10.53%	1.11%	0.01%	0.13%
1993	65.08%	10.18%	21.43%	1.17%	1.85%	0.28%
1994	84.63%	10.36%	3.66%	1.15%	0.06%	0.14%
1995	79.58%	12.90%	5.38%	1.56%	0.47%	0.11%
1996	80.64%	12.45%	6.11%	0.64%	0.05%	0.10%
1997	85.20%	12.06%	1.70%	0.87%	0.07%	0.11%
1998	85.26%	8.54%	5.04%	1.03%	0.00%	0.14%
1999	87.94%	8.45%	2.63%	0.89%	0.03%	0.05%
2000	88.16%	6.85%	4.67%	0.27%	0.00%	0.05%
Avg. 84-97	83.33%	10.24%	5.31%	0.79%	0.22%	0.12%
Avg. 90-97	80.81%	11.40%	6.34%	1.01%	0.31%	0.13%
Avg. 94-97	82.38%	12.02%	4.19%	1.11%	0.19%	0.11%
Avg. 97-99	86.17%	9.86%	2.92%	0.92%	0.04%	0.10%

During the period 1994 to 1997, longline and hook and line gears (includes hand line, troll line, rod & reel, and electric reel) accounted for anywhere between 87-90% of the total commercial harvest (Tables 37 to 39). When data from all areas are combined, the longline catch accounted for 37% of the overall dolphin harvest in 1997 (Tables 37 to 39), and the hook and line category accounted for 50% of the total dolphin landings in that year (Tables 37 to 39). The hook and line category not only includes harvest by commercial gear but also bag limit caught fish that are sold by the recreational sector. Based on information from fishermen, the bulk of this recreational sale can be attributed to the for-hire sector.

Price Fluctuations in the Dolphin Fishery

Dolphin prices are similar to that of king mackerel. Price trend in the entire U.S. commercial dolphin fishery is depicted in Table 5.2.9-37. Even though landings increased significantly during the early and mid 1980s, real prices continued to increase. This trend continued until 1989 when landings doubled from the previous year and prices declined. In the 1990s price reached an all time high in 1994 despite the increase in landings during this period. Rhodes (1998) speculated that this phenomenon was the result of unmet demand for other seafood products that could be substituted with dolphin products such as mahi-mahi steaks. This increasing price trend did not continue when landings reached 2.6 million pounds in 1995. Prices declined in 1995 reaching a seven year low in 1997. Rhodes (1998) also analyzed monthly price data and surmised that in the South Atlantic region, prices are at their lowest in the first half of the year, usually May to June.

It is difficult to determine what factors are responsible for the decrease in price in the years following 1995. Part of this effect may be due to increased landings that peaked in 1995 at 2.57 million pounds. Also, imports may have played a role in this price decline, however import data on dolphin are only available from 1997. Furthermore, The Fisheries Statistics & Economics Division of the National Marine Fisheries Service (NMFS) report only imports of frozen dolphin fillets. A total of 15.75 million pounds of frozen dolphin fillets were imported at a value of $20.23 million dollars in 1997. In 1998 imports were 16.72 million pounds at a value of $23.95 million dollars. However, these figures may be underestimates of dolphin imports. Information from seafood distributors indicate that fresh, de-headed, and gutted dolphin, as well as other product forms, are also imported by U.S. buyers (Rhodes, 1998). Given the lack of historical and complete import data it is difficult to speculate on the influence of imports on domestic prices. A survey of U.S. buyers to collect data on all dolphin product forms imported into the U.S. by country of origin, time of year, and port of entry will provide some of the necessary information for market analysis.

Price Fluctuations in the Wahoo Fishery

In the United States fisheries for wahoo exist off North and South Carolina, primarily from April to September and off Florida's East Coast. The National Marine Fisheries Service first recorded landings of wahoo in the commercial catch in 1974 when they amounted to 1,000 pounds caught primarily off Florida. Landings during the period 1987 to 1993 (Table 5.2.9-39) ranged between 160,000 to 370,000 pounds (Vondruska, 1999).

Recently Louisiana has landed the most. In fact in 1997 more than 50% of total wahoo commercial landings came from Louisiana (Vondruska, 1999). Price per pound was less than $1.00 until 1985 (Table 5.2.9-39). During the period from 1985 to 1994 real price fluctuated but remained below $1.23 per pound. From 1995 to 1997 the price per pound increased above $1.30 per pound.

Table 5.2.9-38. Ex-vessel dolphin landings (thousand pounds), value (thousand dollars) and real price (1990 dollars) (Data Source: Vondruska, 1999).

Year	Landings	Real Value	Real Price (1990 dollars)
1979	111	88	0.79
1980	173	133	0.77
1981	132	116	0.88
1982	307	280	0.91
1983	321	298	0.93
1984	444	449	1.01
1985	422	504	1.19
1986	687	801	1.17
1987	648	879	1.36
1988	780	1,031	1.32
1989	1,561	1,766	1.13
1990	1,848	1,949	1.05
1991	2,430	2,771	1.14
1992	1,136	1,250	1.10
1993	1,242	1,505	1.21
1994	1,417	1,971	1.39
1995	2,570	3,214	1.25
1996	1,646	2,158	1.31
1997	1,995	2,086	1.05

Table 5.2.9-39. Ex-vessel wahoo landings (thousand pounds) and real price (1990 dollars) (Data Source: Vondruska, 1999).

Year	Landings (1,000 pounds)	Real Price (1990 dollars)
1979	15	0.87
1980	23	0.83
1981	26	0.81
1982	30	0.83
1983	34	0.97
1984	30	1.00
1985	39	1.13
1986	52	1.23
1987	160	1.19
1988	312	1.12
1989	300	0.97
1990	203	1.21
1991	252	1.10
1992	365	1.05
1993	335	1.12
1994	249	1.15
1995	264	1.35

1996	231	1.31
1997	256	1.34

Recreational fishery

The preceding section provides a detailed account of the historical recreational catch of dolphin in the Atlantic by mode of fishing. In summary, the total 1999 recreational harvest accounted for 91% (10,127,970 pounds total recreational harvest and 1,050,090 pounds commercial harvest) of the total U.S. harvest in 1999 (Table 5.2.9-2). Most of this recreational activity occurs in the summer months, and charter boat and private boat modes (Tables 5.2.9-4, 5.2.9-5) take the majority of the recreational catch of this species.

The size distribution of the catch from the recreational sector differs depending on the mode of fishing (Goodyear, 1999). Headboats harvest smaller fish compared to the other two modes. Just over 55% of the headboat catch are fish below 22 inches (550 mm) fork length. For the most part, the size distribution of fish harvested by private/rental boats and party/charter boats are fairly similar for both groups (Goodyear, 1999). Both size of fish caught and catch success rates are important determinants of the quality of the recreational experience, and thus the value of these recreational trips.

Information on the value of the dolphin recreational fishery in the Atlantic is not yet available. Apart from the economic value (consumer surplus) anglers derive from the resource, they generate significant economic impact through expenditures for recreational fishing which are important to coastal communities in the Atlantic. Data on economic impact of recreational fishing for dolphin are not available.

Like dolphin, the recreational landings of wahoo account for a larger proportion of the total harvest in the Gulf and Atlantic. In 1999 the total commercial harvest amounted to 99,159 pounds, compared to 1.41 million pounds harvested by recreational anglers (Table 5.2.9-27). Information on the value of the wahoo recreational fishery and data on economic impact of recreational fishing for wahoo are not available.

The charterboat sector in the South Atlantic and the Gulf of Mexico depend on dolphin as one of the main attractions for their clientele. Available data indicates that this species is less important to the headboat sector (Holland et al., 1999). Of all charterboat owners surveyed as part of a study to document the characteristics and economics of the for-hire sector in the State of Florida, 26% target dolphin. This species was much more important to the charter fleet operating in the Florida Keys and Florida's Atlantic Coast. Results from this study also revealed that 53% of charterboats in North Carolina and 60% of charterboats in South Carolina target dolphin (Holland et. al., 1999).

In their study Holland et al. (1999) measured capital investment, average annual expenses, and average revenue in the for-hire sector. A summary of this data is contained in Table 5.2.9-40. On average it appears that investment in equipment is much higher in Florida compared to the rest of the South Atlantic.

In terms of fixed costs, it is unclear as to whether these expenditures were apportioned to charters and other revenue earning activities for the vessel. Some charterboats are full-time operations while others may only operate charters on a seasonal basis and could be commercial harvesters for part of the fishing year. For part-time operations the total annual fixed costs can be attributed to several activities including commercial fishing.

Table 5.2.9-40. Summary of Capital Investment, Average Annual Expenses, and Average Annual Revenue on Charterboats. Data on Florida includes information for the entire State of Florida (Source: Holland et. al., 1999).

Item	**Florida**	**North Carolina**	**South Carolina**	**Georgia**	**Average for NC, SC, GA**
Average Capital Investment:					
Hull and Superstructure	$90,989				$39,445
Engine	$40,518				$14,586
Electronics	$5,568				$5,900
Other Equipment and Tackle	$5,878				$4,463
Average Annual Expenditures					
Wages and Salaries	$25,810				$17,298
Fuel and Oil	$8,224				$7,575
Engine	$6,334				$2,738
Maintenance and Repair	$5,720				$4,991
Docking Fees	$4,604				
Hull and Superstructure	$3,020				
Insurance	$2,970				
Other Equipment and Tackle	$2,404				
Advertising	$2,041				
Average Total Exp.	**$68,574**	**$46,888**	**$23,235**	**$41,688**	
Average Annual Revenue	**$68,816**	**$60,135**	**$26,304**	**$56,851**	

Crew wages may be underestimates in that they do not reflect the "tips" left by customers. Out of state anglers typically give the fish they catch to the crew members on these charter vessels in lieu of a tip. Crew members, and sometimes vessel owners, sell these fish. The frequency of this practice varies by state within the South Atlantic region and may be more common in Georgia and the Florida Keys. Income derived from bag limit caught fish is not reflected in these revenue estimates or crew salaries. As a result it could be misleading to use this information to determine profitability of the charterboat fleet in each state under current operating procedures. However, these data provide a first step in describing the economic characteristics of this sector.

5.2.9.3 Social and cultural environment

There are little data available that are directly applicable to dolphin and wahoo recreational and commercial fishing communities in the U.S. Atlantic. The data that are available are only partial for some communities and then, in many cases, only some sectors in those communities (commercial, charter, and/or recreational). Until complete and comparative social research is carried out in these regions, the following overview must be considered the best available data on the social characteristics of these fishing communities.

However, the community profiles that are included below should be viewed as representative of fishing communities throughout the various geographic regions of the dolphin wahoo fishery. All of the communities profiled count dolphin and wahoo as a fishery that is exploited at least for a portion of the year and at least among one or more user groups.This lack of complete data should not be seen as necessarily detrimental to the analysis of possible social impacts accruing from this proposed fishery management plan. Rather, the data that are available allows for reasonable predictions of social outcomes due to management measures. What social impacts that occur in one community can then be reasonably expected to occur in other communities that are either somewhat larger or smaller, older or less historical, and with somewhat different demographic, cultural, and economic mixes. This is stated as an acceptable procedure in the CFR Sec.1502.22 when one must proceed with less than complete data.

In order to better understand how a fishing community is defined according to the MSFCMA, the following discussion has been included. **The following section has been drawn directly from the SAFE Report (SAFMC, 1999), Section 3.2 (references are included in the SAFE Report; Table and Figure numbering is from the SAFE Report).**

"With the addition of National Standard 8, FMPs must now identify and consider the impacts upon fishing communities to assure their sustainable participation and minimize adverse economic impacts [MSFCMA section 301 (a) (8)].

The proposed guidelines for this new standard state: "... fishing communities are considered geographic areas encompassing a specific locale where residents are dependent on fishery resources or are engaged in the harvesting or processing of those resources. The geographic area is not necessarily limited to the boundaries of a particular city or town. No minimum size for a community is specified, and the degree to which the community is 'substantially engaged in' or 'substantially dependent on' the fishery resources must be defined within the context of the geographical area of the FMP. Those residents in the area engaged in the fisheries include not only those actively working in the harvesting or processing sectors, but also "fishery-support services or industries," such as boat yards, ice suppliers, or tackle shops, and other fishery-dependent industries, such as ecotourism, marine education, and recreational diving." [Federal Register Volume 62, Number 149 (August 4, 1997)]

"The term 'sustained participation' does not mandate maintenance of any particular level or distribution of participation in one or more fisheries or fishing activities. Changes are inevitable in fisheries, whether they relate to species targeted, gear utilized, or the mix of seasonal fisheries during the year. This standard implies the maintenance of continued access to fishery resources in general by the community. As a result, national standard 8 does not ensure that fishermen would be able to continue to use a particular gear type, to target a particular species, or to fish during a particular time of the year." [Federal Register Volume 62, Number 149 (August 4, 1997)]

"The term 'fishing community' means a community that is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities. A fishing community is a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries-dependent services and industries (for example, boatyards, ice suppliers, tackle shops)." [Federal Register Volume 62, Number 149 (August 4, 1997)]

In order to determine a community's "substantial dependence" or "sustained participation" on fishing, those communities must first be identified. Presently, the NMFS has not identified fishing communities, nor their dependence upon fishing in the South Atlantic. Moreover, there are no ongoing data collection programs to gather the necessary information that would allow for the identification of fishing communities in the South Atlantic or other regions. Also, there are no future plans to implement any such data collection program that would determine dependence upon fishing in order to provide the Councils with important information necessary for social and economic impact analysis of fishing communities. This leaves the councils with existing data collected through other agencies, not always specific to fisheries management, i.e., census data, regional economic census, and previous research on specific fisheries. Although this data can be useful, it is often not specific enough to identify or provide a clear representation of a community and its dependence upon fishing. One reason for this difficulty is that fishermen in a specific fishery often do not reside within one particular municipality that can easily be identified as a fishing community or one that is substantially dependent upon fishing. Also, that information is often not provided at the municipality level, but more often at the county level.

Commercial fishermen may have a domicile (home) in one community and dock their boat in another. They may sell their fish in either place or an entirely different location. Recreational fishermen often do not live on the coast, but drive from inland counties and may launch their boats or fish from several different sites. For these reasons, identifying a "fishing community" becomes problematic in that such a community does not fit the normal geographic boundaries or fall within the metes and bounds that would surround a normal incorporated municipality.

The impacts of fisheries management may be minimal in a single community, but, when taken overall may be substantial to an entire county or several county area. Those same *measures may have a small impact on a large metropolitan area, but, to a neighborhood where most fishing families live or most fishing activity originates it could be substantial. Therefore, a "fishing community" may encompass a single municipality, a county, several counties or one neighborhood within a major metropolitan area depending upon a variety of demographic, social, economic and ecological factors that one must consider."*

North Carolina

The following two community profiles describe an example each of a recreational community and a commercial community.

<u>Recreational Fishing</u>

The following section is from McCay and Cieri (2000) and focuses primarily on the recreational harvest of dolphin and wahoo.

Field Observations and Interviews, Dare County, North Carolina
Summer 1998, July 1999

Hatteras

Hatteras and Its Fishery

(Note: This part is based on field research done by Doug Wilson in 1998 for the Highly Migratory Species social impact assessment, Wilson and McCay 1998).

Hatteras Village is a rural community at the southern end of Hatteras Island on North Carolina's Outer Banks, part of Hatteras Township (pop. 2,675 in 1990). Hatteras Island is the "classic example" of a dynamic barrier island, which is bordered by the Atlantic on the east and Pamlico Sound on the west. Noted for it's vast marine resources, the area is also an important point of departure for marine vessels, and has historically been considered a strategic location on the coast of North America during war.

Geographic isolation adds to the local character of Hatteras. Respondents said that it is a place where people feel safe. Some people leave their houses unlocked. It feels safer because it is an isolated island community. A ferry leaves Hatteras to go to neighboring Ocracoke Island. Usage of the ferry is very heavy in the summer when you can bet get cars backed up for a half a mile. The village is quite and insular and "made up of a lot of people who came here to get away from something."

In the 18th century, Hatteras established itself as a seaport community, where activities included whaling and exporting/ importing. However, due to the dynamics of the barrier island geography, Hatteras Inlet was closed in 1764, only to be opened up again during a large storm in 1846. Since World War II the economy of the Hatteras community has depended on charter and commercial fishing as the major sources of local income; tourism also serves as an important economic activity.

Seasonal variation in the local economy of Hatteras is due to the presence of three "seasons". In the spring, revenue begins to pick up during weekend and holiday tourism;

it is during this period of time (April to May) that approximately 30 boats from the commercial fleet become active in charter fishing. The second season, approximately June through August, begins when schools let out for the year and family vacations are frequent. The third "season" is the fall, when fishing, surfing and windsurfing are the dominant activities.

In Hatteras, 57% of employees are private for profit wage and salary workers. Tourism and recreation are major industries in Hatteras in terms of employment. Commercial fishing is also a major occupation on Hatteras Island, where there are approximately 500 to 600 part and full time commercial fishermen; recreational fishing is a source of seasonal employment. According to the 1990 Census, twenty-one percent of employed persons work for the local (8%), state (7%) or federal (6%) government; these public sector jobs include ferry workers. Self-employed workers make up 16% of the employed work force.

When combined, managerial, professional, technician, and administrative jobs account for nearly half of the occupations reported in the 1990 Census. Farming, forestry and fishing jobs are held by 6% of those employed in Hatteras.

Fishing Related Businesses
In Hatteras there are five seafood wholesalers and one retail market; there are three marinas. Businesses in surrounding communities such as Manteo and Buxton also add to the marine economy. Hatteras Village is almost totally dependent on fishing. While non-fishing tourists, especially windsurfers, are attracted to beaches elsewhere on the island, Hatteras Village's own beaches are less appealing. Tourists come to Hatteras because they want to fish. Our oldest respondent (in 1998) told us that when he was growing up the only thing to do was fish. He remembers one morning, fifty years ago, counting some 260 boats going out of the harbor. They were gillneting for trout and croakers and "caught a lot more fish than is being caught now." The recreational and charter fishing industry's history is just as proud. The wall of one charter boat office is covered with captioned pictures displaying the history of the Albatross Fleet. In 1937, the four sons of a commercial fisherman went into the charter business. Their first sailfish was caught in 1940. Tarpon and dolphin began in 1940. They hired a publicist to spread the word about big game fishing in Hatteras. They caught their first marlin in 1951. In 1952, the first blue marlin was caught by a lady. In 1962, The Albatross III caught a world record, 810 lb blue marlin. The headline on a yellowing copy of a 1958 New York City newspaper article proclaims the shocking news of an "Angler Deliberately Releasing a Blue Marlin!" (Hurley 1958). The angler was Jack Cleveland of Greenwich CT fishing on the Albatross.

Marinas and Charters
As we did for Point Pleasant/Brielle, New Jersey, we offer some detail on the sports-fishing component of Hatteras, which is otherwise not treated in this study. It is based on field research done in 1998 by Douglas Wilson (Wilson and McCay 1998).
A charter boat captain related in 1998 that newcomers are amazed at how good the fishing is. Ditton et al. (1998) did a survey of both private and charter boat anglers in

Hatteras in the winter of 1997. Their results support the captain's assertion. They found that of 644 anglers, 46 percent agreed with the statement "I caught more fish than I expected on this trip" and 42 percent agreed that they "could not imaging a better fishing trip." The winter season is bluefin tuna. In early spring they get puppy drum on the beach, and offshore yellowfin tuna, dolphin, wahoo and marlin. Sailfish come in June. In the summer with the warm water they get "all fish": flounder, cobia, speckled trout, drum, wahoo, marlin and sailfish. In the fall are flounders, king mackerel and rockfish. The marinas are 100 percent fishing related. Over the course of the year most people come to fish with their boats, both trailer boats and over water boats. A marina owner estimates that half of the parties are all men and about half families. The families go to the beach, the shops, and amusements such as go cart tracks. The winter bluefin tuna fishing brings a greater percentage of the trips to the charter fleet In their census of fishing trips during the bulk of the 1997 winter season, Ditton et al. (1998) found only 27 percent of bluefin tuna fishing trips were in private boats and the rest in charter boats. Ditton et al. (1998) found 51 charter boats in Hatteras in January.

Make up charters, where marinas organize the parties, are becoming more and more common. A captain estimated that his marina did 140 make up charters in the past year. The majority of the charter customers are after a good experience with offshore fishing. One captain, who has been chartering for many years, believes that the motivations of the charter customers are changing. He describes the current group as people who want to get way from city jobs and have fun with something really different. A lot of them are outdoorsmen in other areas. The fishing puts them in touch with wild creatures. The "game hogs," meaning those primarily interested in getting a lot of "meat," have dwindled. He sees the customers as will to accept limits when they are imposed. Often they are more willing to accept limits than people who have fished all their lives. Meat, however, is still an important motivation for all anglers except for billfish anglers. In fact, another captain, who does about a quarter of his business on billfish, sees the growing catch and release ethic as having reduced angler interest in marlins.

Captains say it is very hard to find a year round mate. The college students who work in the summer can make more money when they graduate. It's a good lifestyle for a college student, but to find someone year round they have to like to fish. These are more skilled fishers and they want their own boats. One captain said that "of the boats that are fishing year round, you can bet that the mates that they have are looking for a boat to fish in the future." He estimates that about one in five mates are married and supporting a family. Changes in fishing affect charter bookings almost instantly. Within a couple of weeks after a fish species is gone the marinas will start to get cancellations. Charter customers show little loyalty to North Carolina as a place to fish. Ditton et al. (1998) found that less than a majority of charter boat anglers (44 percent) opposed restricting NC fishing to benefit other parts of the coast, while a majority of the private anglers (57 percent) opposed the measure. They also found that anglers from NC were more likely to oppose the measure.

Because Hatteras attracts top sport fishers from around the world, the issues of minimum sizes and trophy fish take on special significance. One captain, by his account and that of *others, attracts people who come specifically to fish for world records. They are interested in setting records by catching smaller bluefin tuna on fly rods. In 1997 fishing for fish between 27" and 73" was closed on March 2nd. Between, March 5th to March 18th, he had four different groups of people coming to fish for bluefin tuna for world records; and they all canceled because they could not keep a world record fish even if they caught it. Few anglers want to release bluefin tuna. Ditton et al. (1998) found that 60 percent opposed catch and release only for bluefin tuna. Keeping trophy fish "means a lot to someone who has paid a thousand dollars to go out fishing" the marina owner said. The "charter business is not native sons any more" said one respondent. A captain estimated that where the village had 15 charter boats ten years ago there are now 40. These are the charter boats that stay here all year round. Transient charters come for the "cream of the crop," particularly the bluefin season. Ditton et al. (1998) found 51 charter boats in the village during the 1997 bluefin season. There is tension between the local charter boats and the transient charters because of increased competition for both fish and customers. One new charter boat is a state-of-the-art luxury boat with fish finding electronics, a stereo, a microwave and air conditioning. The locals argue that he could get $1500 a day but instead charges but a little more than the going rate. He has announced that he intends to take business from people. However, they say that the charter fleet has not reached a saturation point and that the customers are still happy. The charter captains say they generally work well together. There is also tension with private recreational fishers who following the charter boats to see where they fish. Another long-time, local fisherman is running two party boats. He is finding more and more ways to make the party boat a family excursion. He does pirate trips and other special off shore trips. He also does birding trips.*

Tournaments

The Hatteras Village Civic Association holds three tournaments a year. Tournaments attract people for the prize money and the social events that surround them. The biggest in the area is the Big Rock tournament the first week in June. The present tournament is three days and many boats fish out of Hatteras. One marina manager, interviewed just after a tournament in May, reported that the tournament attracted 9 boats. This was an increase of a third over the year round boats. Also in May is a tournament at another marina and one at a private club. Tournaments are in May because it is otherwise a slow month. There is also a king mackerel tournament in the fall.

Recreational billfishing in Hatteras is described by respondents as totally catch and release. The only exception, and it is an important one, is large tournaments. There are seven such tournaments in North Carolina that are too large and if these tournaments were not allowed to kill fish it would have a negative impact on all businesses related to recreational fishing. The biggest tournament directly affecting Hatteras is the Big Rock in Morehead City. Many boats in this tournament fish out of Hatteras. The blue marlins being killed in tournaments are 110 inches. Respondents disagree about the affect of a 113 inch size limit on these tournaments, but 113" inches is tending toward a rare event. It would make it possible that tournaments would not catch any fish. The tournament at the private club in Hatteras is a total release tournament and has been for five years. However, it is for a trophy only. The organizer says that they lost a few people when they *shifted to total release, but they picked up even more. In his estimation, more people don't want to kill than do. The scales at the club are rusted out, they couldn't weigh fish in any case…*

Fishing Association and Small-Boat Mixed-Fishery Concerns
The only active commercial fishing organization is the Hatteras-Ocracoke Auxiliary of the North Carolina Fishermen's Association, which has been organized since 1992. In the current Hatteras fleet there are 35 or so small gill net boats dependent on a very diverse fishery. What disturbs them the most is the possibility of limited entry systems. They fish five or six species a year but do not always fish the same ones every year. What scares them is that they will not be fishing sometime when landings are counted for some system based on current participation.

Field Observations and Interviews, Hatteras, NC, July 1999
Commercial fishing in Hatteras is said to be much like that of Ocracoke in terms of the size and number of boats (30' to 45'). They mostly trawl for shrimp in the summer and "drop net in the ocean for trout" in the winter. A distinction of Hatteras is that its crabbers are said to be more conservative than those on the west banks of North Carolina: Hatteras crabbers have little more than 300 pots apiece whereas on the western banks crabbers do not run less than 1,000 pots apiece. According to one of our informants, the more diversified nature of fishing in the Hatteras area accounts for the difference: "Our diversity allows us to fish fewer pots."

There are three major sites for fishing boats in Hatteras: two marinas and the docks off Altoona Lane. The docks on Altoona Lane are said to service 20 to 25 crabbers and fishermen, using small boats, up to 35', as well as a couple of larger boats, including a 47' boat used for dogfish by a local fisherman who was fishing up off Massachusetts during our visit. One of the managers of a seafood house here said of the fishermen "They're doing everything they can do to make it. They'll probably be left standing because they do so many different things while inland they only do one or two things." He also said it has been hard to get people to work on the boats or in his fish house because of various regulations.

One of the businesses we interviewed has been in place since 1982. It has experienced a major decline in business from 1994 to 1999, an almost 50% decline. The owner blames this on regulations, in a subtle process: "They take one thing away, then another and another, and finally it all makes a big impact." He says that he's "a believer in the cycle of fish. However, the fishery managers disagree". Still, he insists, "Our fish are coming back now like in '80 and '81. Things like the weather patterns make a big difference in whether there are fish around or not."

He said that he used to go to fisheries meetings all the time but doesn't anymore because "they already have their minds made up." And he has taken to giving money to politicians rather than to fishermen's associations. He feels that the sportsfishermen have more money, and that's why they are winning out. He did say that a state senator from North Carolina has been a champion of the commercial fishermen.

As far as the local community is concerned, he said that it has turned against commercial fishermen in the last 5 or 6 years, primarily because of the ascendancy of tourism. "I'm fighting to stay here, to keep the business viable, what with the mortgage, taxes, all those things." While there obviously have been efforts to preserve wetlands within Hatteras, especially in outlying areas and near the Altoona Lane docks, some large, expensive houses and condominiums have been built on or next to wetland parcels. As he puts it, "There are 20 slips here, and they're probably worth $1,200,000." He sees that pressure is coming to change this area into a residential and/or tourist area. "I don't blame the community. It's changing, but we don't want to change with them," he said.

Another dock in Hatteras is owned by a company based in Wanchese, NC. It is a very small dock, and the dock manager is the major fisherman. He dogfishes in the winter. He leases his boat because, he says, it's too risky to buy it, especially "since we're losin' it" with regards to management of the dogfish fishery. The gillnets they use for dogfish are very expensive. He believes they could have doubled their dogfish catch if they regeared, but won't regear because of the pending regulation. They would have regeared a year ago, but they told them the regulation was coming last year, preventing them from buying new gear then. He said if they had known it wasn't coming until later this year, they would have regeared then, but now it's too late to make it profitable. "They can't put you right out of business, but they'll chisel away at you 'till you can't help but get out of it." "They try to preserve species in the same waters, even when they aren't compatible, even when they eat each other".

This man gillnets for dogfish in the winter. He has 1,300 yards of 4 inch mesh net for croaker. He only sets the small nets twice. He said most fishers in this area do both large and small mesh netting. In the winter they small mesh for croaker and grey trout, but these species are so plentiful then that the fish houses won't buy from the small time fishers. He said that they aren't getting any trout this year anyway; "trout this year are almost non-existent."

He says that the way that the inlet has been changing has greatly reduced their ability to catch fish in the inlet. The deep water channel has shifted parallel to the shore, making it unlikely that fish would travel past the sand bars, into the channel. They usually set the pound nets just off the edge of the deep water channel, and a few stop nets in the channel. They have seen fewer fish since the shift.

The weather had been too windy for the past four weeks. The currents are too strong for the bottom fish. No one had packed here for the past two weeks. There is generally a lull this time of the year(July). "But the longhaulers will pick up soon." The fishermen's hangout, or where they gather when there are more around, tends to be Oden's dock or Sonny's Restaurant

<u>Commercial Fishing</u>
The following description has been excerpted from the Ecopolicy Center's report that describes communities that exploit the HMS fisheries (1998).

Wanchese Community Profile

Wanchese is located on the southern part of Roanoke Island, located in the northern Outer Banks. This small fishing village is said to have "changed as little as those who have lived here for generations" (Cutchin, 1997). Although ultimately unsuccessful, the first American colony was Roanoke Island; today, a local theater group's re-enactment of this historical event is a popular tourist attraction (CNCSS, 1993). The village actually received its name from a Native American leader named Wanchese who greeted these first English settlers in 1584; Wanchese was officially named when the federal postal system was established in 1886 (Cutchin, 1997).

Throughout the nineteenth century, the commercial fishing industry expanded, due in part to the involvement of the first postmaster (CNCSS, 1993). This postmaster owned or financed most of the commercial fishing boats in Wanchese; he also established a system of credit for the fishermen at his store, which was paid off when they brought in their catches. During that time, almost all of the residents of Wanchese were commercial fishermen. Today the village still revolves around fishing, but has expanded to include processing plants. Though traditionally a commercial fishing community, recent growth in tourism and recreational fishing has sparked competition between the new and the old for a restricted resource.

Wanchese's first fish house was begun in 1936 by the grandfather of the current generation that still runs two fish houses in the community, one of which related this history. His son fished the first trawler in Wanchese in the 1950s. He took a little 65' wooden boat and converted it into a fishing trawler. The grandfather stayed and helped packing boats but he was a gillnetter at heart and would rather be catching fish. In those days they were fishing more in Pamlico and Abermarle Sounds than in the ocean. They beached fished for sea mollusks, trout, croakers, spots, striped bass, and bluefish. In the Sounds they fished croakers, butterfish, Spanish mackerel, spots, and pigfishes. With the trawler they began flounder fishing in the winter. Then they would go offshore and catch some sea bass later in the year. They bought another similar boat and then a WWI converted subchaser. The subchaser was the first boat to try scalloping. The owner of a third fish house built the first flynet in 1971.

Demographic Profile

Population

The 1990 Census population for Wanchese to be 1,374 residents; however, this count is not entirely accurate since the Census includes Nags Head and Roanoke Island with Wanchese (CNCSS, 1993). This population consisted of 51% men and 49% women. Population estimates since 1990 were not readily available for Wanchese.

The relative absence of seasonal change in population for Wanchese departs from the normal pattern of seasonal variation found in the surrounding communities. Since commercial fishing is central to the economy of Wanchese, it does not see the shifts in population that occur due to tourism in the summer months (CNCSS, 1993).

Racial and Ethnic Composition

In 1990, the population of Wanchese primarily consisted of White residents (98%), although a little over 1% of its residents were American Indian. The ethnic composition of Wanchese is primarily European ancestry; nearly 29% of the residents of Wanchese claim United States ancestry.

Age Structure

Forty-six percent of the population of Wanchese are between the ages of 15 and 44 years old. The even age structure is shown by the nearly equal percentage of young and old - 26% below 15 years and 27% above 45 years.

Marriage

In Wanchese, 18% of the population over 15 has never been married. Nearly 69% of the population is currently married. Less than 5% are widowed; approximately 8% are divorced.

Household Composition

According to the 1990 Census, there are 503 households in Wanchese which have an average of 2.69 persons per house. Nearly 63% of these are married couple family households. Of the family households without married couples, three percent are family households with male householders and eleven percent are family households with female householders. The remaining 24% of households are non-family households. Table 5.2.9-41 *gives additional household information for Wanchese.*

Table 5.2.9-41. *HOUSEHOLD COMPOSITION, WANCHESE, NC (Source: U.S. Bureau of the Census).*

Total Number of Households	*503*
Average Number of Persons per Household	*2.69*
Percent of Married-couple Family Households	*62.6*
Percent with own children under	*18 36.0*
Percent of Male Householder Family Households	*2.6*
Percent with own children under	*18 2.6*
Percent of Female Householder Family Households	*10.9*
Percent with own children under	*18 6.0*
Percent of Non-family Households	*23.9*
Percent of Householders Sixty-five or older	*14.3*

There are 583 housing units in Wanchese, of which 88% are occupied. Of the vacant housing units, 14% are vacant due to seasonal usage. Table 5.2.9-42 *shows additional housing information from the 1990 Census.*

Table 5.2.9-42. *HOUSING INFORMATION WANCHESE, NC (Source: U.S. Bureau of the Census).*

Total Housing Units	*583*
Owner-occupied Units	*384*
Median Value	*$75,200*
Renter-occupied Units	*129*
Median Contract Rent	*$320*
Vacant Housing Units	*70*

Housing Units Vacant for Seasonal Use	*10*

Educational Trends
In Wanchese, sixty-seven percent of the population 25 and over are high school graduates, according to the 1990 Census. Educational attainment for Wanchese residents is shown in Table 5.2.9-43.

The only educational facility located in Wanchese is the private Wanchese Christian Academy, founded by the Wanchese Assembly of God members in the 1970s (CNCSS, 1993). Public schooling is found at the Dare County schools in Manteo; this school system has elementary, middle and high school facilities. The College of Albemarle has a satellite campus in Manteo; secondary education offered by the college at this site includes a boat-building course (CNCSS, 1993).

Table 5.2.9-43. *EDUCATIONAL ATTAINMENT (PERSONS 25 YEARS AND OLDER) WANCHESE, NC (Source: U.S. Bureau of the Census).*

	# of Persons 25 years and older	*% of Population*
Less than 9th grade	*85*	*10.8*
9th to 12th grade, no diploma	*172*	*21.8*
High school graduate (includes equivalency)	*259*	*32.9*
Some college, no degree	*170*	*21.6*
Associate degree	*40*	*5.1*
Bachelor's degree	*32*	*4.1*
Graduate or professional degree	*29*	*3.7*

Fishing Associations
Fishing related associations include the Oregon Inlet Users Association and the North Carolina Fisheries Association. The former is involved with supporting the plans for jetties at Oregon Inlet; they are responsible for organizing both the Wanchese Seafood Festival and the Blessing of the Fleet. The latter is a trade organization of seafood dealers and commercial fishermen from the state; two members of the 18 member Board of Directors are from Wanchese (CNCSS, 1993).

Economic Characteristics
Income The 1989 per capita income for Wanchese was $10,830. This is below the state per capita income ($12,885) and the per capita income for Hatteras ($12,796). Employment Trends Of the 984 Wanchese residents 16 years old and over, 85% participate in the civilian labor force. The unemployment rate is 10.0% of the civilian labor force; of this unemployment rate, 2% consists of male unemployment and 8% is female unemployment. Of the employed work force in Wanchese, approximately 57% are men and 43% are women. The number of working women has been on the rise, due in part to the increase in opportunities for women outside the home created by tourist businesses in the beach communities surrounding Wanchese (CNCSS, 1993).

According to the 1990 Census, 61% of the working population in Wanchese is employed in private for profit jobs. Jobs in the private sector are largely related to the area's commercial fisheries (CNCSS, 1993). Most of these workers are self-employed; the Census figures show that nearly 19% are self-employed workers. Government jobs are considered desirable due to the security and consistency in contrast with the fishing industry (CNCSS,1993); figures from the 1990 Census show that nearly 17% of the workers are employed with the local, state or federal government.

Employment by Industry Nearly 20% of the employed persons over 16 in Wanchese are working in the agriculture, forestry and fisheries industries; this is the highest rating industrial sector for employment. These industries are followed by retail trade (19%) and professional and related services (16%) in terms of employment of Wanchese residents. Farming, forestry and fishing occupations are held by nearly 19% of the Wanchese employed population. Other prevalent occupations are technician and administrators (25%) and managers and professional (17%). Table 5.2.9-44 *shows the role of industry as an employer in Wanchese. Unlike the surrounding communities, Wanchese has very little seasonal variation in employment resulting from tourism; what seasonal fluctuations do exist are caused by the availability of the fisheries resources and are countered by the flexibility and opportunistic nature of the Wanchese fishermen (CNCSS, 1993). This flexibility is now being threatened; this is addressed below. However, the tourism industries in the surrounding communities do provide seasonal employment opportunities to residents of Wanchese.*

Table 5.2.9-44. *EMPLOYMENT BY INDUSTRY (EMPLOYED PERSONS 16 YEARS AND OVER) WANCHESE, NC Source: U.S. Bureau of the Census*

Sector	*# Employed*	*% Employed*
Agriculture, forestry, and fisheries	*137*	*19.7*
Mining	*0*	*0*
Construction	*35*	*5.0*
Manufacturing, nondurable goods	*9*	*1.3*
Manufacturing, durable goods	*57*	*8.2*
Transportation	*17*	*2.4*
Communications and other public utilities	*9*	*1.3*
Wholesale trade	*46*	*6.6*
Retail trade	*133*	*19.1*
Finance, insurance, and real estate	*23*	*3.3*
Business and repair services	*25*	*3.6*
Personal services	*27*	*3.9*
Entertainment and recreation services	*20*	*2.9*
Professional and related services	*112*	*16.1*
Public administration	*46*	*6.6*
Total	*696*	*100*

Fishing Related Businesses

There are approximately 117 small businesses in Wanchese, 44 of which are commercial or charter fishing businesses (CNCSS, 1993). Some of the more prominent local businesses are described below. Support industries, such as boat builders and seafood packers, are also of great importance to the commercial fisheries.

There are three major fish houses in Wanchese. One, which specializes in scallop and flounder, has fourteen boats which include trawlers, scallop boats and smaller boats for gill netting as well as two scallop boats in Alaska (CNCSS, 1993). They have three packaging and processing houses, a fish-packing house and a processing and freezing operation; These are located in North Carolina, Virginia and Massachusetts. Seafood is distributed locally and nationally by truck and internationally by air freight. The second, which specializes in hooked fish, is an important seafood distributer; this company is the most affected by this FMP. While only operating one boat, this company buys regularly from 35 local and over 70 non-local boats. The third, which specializes in bulk fish, packs the fish from its own two vessels; transportation of their product is set up through an agreement with the Wanchese Fish Company (CNCSS, 1993).

The Wanchese Seafood Industrial Park was constructed in 1980 by the state; it is operated by the North Carolina Department of Commerce. According to the brochure put out by North Carolina Power in 1995, the park has, among other features, "30 acres of leasable land," "a 15-acre deep water harbor," and "1,500 feet of commercial-style concrete docks." There are currently seven seafood related businesses located at the park (CNCSS, 1993).

Part of the Wanchese Seafood Industrial Park project were plans for inlet stabilization. Originally, the seafood park that now takes up half of the newly expanded Wanchese harbor was voted down by the people in the community. The reason they finally put it in was because of the issue of a jetty for Oregon Inlet, which is the most direct route for Wanchese boats to get to open ocean. The state argued that if they were going to spend a hundred million dollars on a jetty the federal government should dredge the harbor, as part of the agreement of the Mateo (Shallowbag) Bay Project (CNCSS, 1993). At that time, the harbor was half as wide as it is now. They dredged it out and piled the spill in the area which is now occupied by the park. They put a cement dock in as well. The state essentially came back to the Wanchese community and said if you want a jetty at Oregon Inlet, you have to have the seafood park first. At first they revolted and then acquiesced because of the importance of the Inlet. They had been trying to get the jetty since the 1950s. Ironically, they still haven't gotten it jetted. The industrial park is also the scene of the annual blessing of the fleet, which is put on by the Oregon Inlet Users Association.

Wanchese as a Multispecies Fishery

A central fact about fishing in Wanchese is the large number of commercially important species that they catch. Many respondents emphasized how they have to be versatile to survive, particularly because they face quick changes in water temperatures. They suggest that Wanchese is much more of a mixed fishery than in the north where people can fish the same species year round. Among the highly migratory species they fish for swordfish, shark, and tuna. Yellowfin tuna is particularly important but they also catch bigeye and bluefin tuna. Because of the weather, summer is the time that they tunas and swordfish are accessible to the medium sized boats that can both gillnet and longline, and late summer is a slow time for everything else. A captain of one of these medium size boats, however, said that he would prefer to stick with shark fishing year round because *of the danger of going for tuna and swordfish farther off shore. They gillnet for dogfish, bluefish, Spanish mackerel, trout, and croakers. The latter two are important in the winter and the Spanish mackerel is important in the spring and fall. They bottom fish for bass and grouper. There are a number of gillnet boats that switch over to charter fishing in the summer. Large trawl boats fish for squid in the summer and a smorgasbord of weakfish, croaker, and flounder in the winter. Squid requires them to travel north. There are now less than fifteen of these trawl boats that stay at Wanchese. The biggest shark months are April to June but their quota is in January and July. Medium sized boats go north to fish for shark. Large longliners fish for swordfish, tuna and dolphin.*

Market considerations are crucial in deciding what to fish. Traditionally, when January comes the larger longliners go shark fishing until the season would close and then try to fish for tuna or swordfish. They use many of these fish to service the restaurants in the local area with a fresh product and they are able to market it better because they pack it fish themselves rather than buying it. Because of this market they would stay fishing for swordfish and mainly tuna until the fall. If the shark season were open at that time, they would want to shark fish September and October. The season, however, is in January and July. Shark trip limits have also made shark fishing less economical for larger boats. Many steam north to fish shark off New York.

The combination of this shifting multispecies fishery and management leads to a complaint voiced by nearly every Wanchese fisher and fish dealer. Wanchese fishers are used to jumping from species to species, but management causes everyone to jumps at the same time. As one respondent put it "this may be good for a specific species at a specific time but it is not good for the whole system." The price of the fish dives when fishers have to shift their effort all to the same species. Some marginal fishers get driven out when these shifts happen. A respondent associated this observation with the fact that there used to be 7-8 Black fishers, and now there are only two. This effect is especially felt when the fishing is good. Another respondent, a fish dealer, said "We had a tremendous amount of fish this winter, one of the busiest winters in a long time. The price of fish was cheaper all winter because everyone was fishing on the same thing. [My] personal trawlers scalloped and floundered. When floundering closed, we had to flynet, fishing for the same fish as gill netters in small boats. We caught a lot, but got nothing for it. I have 350,000 lbs of croakers left, that were caught in March, frozen."

The multispecies nature of the fishery led one respondent to suggest that the loss of the shark quota did not have a major impact in Wanchese because of the number of alternatives. The switch from longlines to gillnets takes a substantial investment at first, but it is then just a day or two to change the gear. Others disagreed, arguing that this initial investment is a hefty one if you are going to do it right. A net reel costs $3000 and will last three or four years. Nets often need to be replaced every year. One gillnet captain spent $6000 on nets last year. A longline tackle supplier explained that shifting between longline gear can also be expensive. Tuna longline gear can be shifted to shark longline gear fairly cheaply, they need different hooks, leads and buoys. This is not true the other way round because shark fishing tends to damage the mainline.

The major fish houses tend to specialize, one of them in hook fisheries. This house reports that shark (including dogfish) is now 40 percent where it was 25 percent in the recent past. Tuna is now 40 percent where it was 50 percent. Swordfish is now 10 percent where it was 15 percent. The remainders are bluefin tuna and dolphin. This house packs between seventy and one hundred different boats through the course of a year. They pack about thirty-five or forty on a full time basis when they are in this area. They develop an ongoing relationship with these boats. When they are in this area, they will come to that dock and their fish is unloaded even if it is not the species that the house does most of its business in. They also provide dockage fee of charge.

The fish house owner reported that he is paying between $3.25 and $4.25 for a pound of swordfish that this time of year should be getting $6.00. He attributes the main cause of dropping prices to an increase in imports. The dollar is strong, and the domestic market is the key one for swordfish. The European market is growing but the Japanese eat very little swordfish. Swordfish is caught in Brazil, Argentina, and Africa. The owner says "Just in the last month there has been hundreds of pounds of fish being produced in Africa. We are on a limit, the season was closed 93 the first of April. You would think that the supply of fish would be way down, therefore the price would be way up, but the price is $2-3/lb less than it was ten years ago." The houses have tried to make up for lost business and low prices by expanding overseas themselves and bringing the fish to Wanchese. They try to fly and truck the fish in but it has not worked well. The swordfish boycott is also having a strong effect because the restaurants and retail markets that are complying with the boycott are the upper end market. High quality is the American fleet's key market advantage over the imports.

The closeness of the kinship and other historical networks in the community allows for flexible cooperation that matches the flexibility of the fishery. For example, one fish house provides freight for all the houses on a flexible, contingency basis. Another house has two tractor trailers and if that house has less than 10,000 lbs one day they take their freight on the first house's trucks. Another uses this service when he has under 5,000 lbs, because he has one small truck. The house that provides the freight service used to have seven trucks, however, now they have four.

Issues of Crew and Ownership

Hiring and managing crew is getting increasingly difficult. This is especially true for the larger boats that need people who can stay out longer. There is a lot of turnover in fishing crews, particularly when boats have to shift fisheries and the revenue drops. It used to be that job alternatives, carpentry and building for the tourist industry are common examples, did not pay as well as fishing. This is often no longer the case. Including the captain, gillnet boats take two or three people, smaller longliners take three people, the larger longliners try to have four but sometimes fish with three. Many respondents reported seeing a trend where those people who are available for this work were transients or people who cannot find employment elsewhere. There have been problems with alcohol, drugs dependability and crew creating trouble in the general community. Several respondents reported that they had or knew of boats that were not fishing specifically because they could not find crew to hire. Wanchese is a conservative, *rural community where major fishing business decisions have hinged on interpretations of how the Sabbath should best be honored. Some boat owners are very disturbed at the prospect of dealing with drunkenness, drugs and theft in crew. This goes beyond simply management headaches, people in Wanchese want, as they have in the past, to give jobs to people who are going to contribute to stable community that reflects their values. One boat owner said "this is what makes me want to quit. I can handle dealing with regulations, I can't deal with the crew. You have to deal with people you wouldn't want to associate with. The good people are just giving it up and trying to find shore jobs." Successful fishers from prominent fishing families are discouraging their children from going into fishing.*

Many captains and boat owners are searching for alternatives. Fishing is an industry that allows people to make a good living based on skills and knowledge that do not come from formal education. As one respondent put it, "a guy who's making $1000 a week fishing with no education is not going to get a job on land for $1000 a week." Selling boats is difficult. There are few buyers. Searching for buyers and listing the boat for sale makes it even more difficult to find and keep crew. People are leaving fishing for carpentry and building for the tourist industry. Many go into running charter boats. Bluefin tuna management has also had an impact. It is very difficult for a Wanchese fisher to legally land and sell bluefin tuna because of the ratios that attach to the incidental permit. This has led to widespread discards (see also the Panama City profile). "There's more put back dead than are brought to the dock - that's a crime against nature" a fish dealer said.

Other Comments Offered by Respondents
On the shark rebuilding schedule, one shark fisher commented that he would like to see ITQS or some other form of limited entry place on the shark industry before there is any future increase in the quota. Otherwise he fears a doubling of the fleet to match any doubling of the quota. If limited entry were in place then he could see a benefit of stopping all fishing for two years to rebuild the stock quickly.

Another fisher was very concerned about the effect of management politics, particularly the increased tension between the commercial and recreational communities, on the community and the people in it. "It's getting worse because of the propaganda... I've never wanted to admit it until now, I won't be fishing in a couple years. One, if you really care about what you are doing, it consumes you. Even though you have groups and organizations, everybody don't represent everybody's interests. You can't be at every meeting. When you look at the schedules of the meetings, you've got to do one or the other. This is a community and it is dividing us and it will get worse."

The Charter Boat Industry in North Carolina
There are now some data describing the charter and headboat industry in North Carolina. The estimated number of charter boats in North Carolina in 1999 was 207 (Table 5.2.9-45**)**. The study (Holland et. al., 1999) used a sample size of 19.3%, or 40 boats. The following tables describe the number of boats by sector and port, ages of operators and educational attainment.

Table 5.2.9-45. North Carolina charter and headboats (Source: Holland et. al., 1999).

City	Number of Charter Boats *	Number of Headboats
Atlantic Beach	26	2
Carolina Beach	15	2
Hatteras	38	0
Manteo	12	0
Moorhead City	19	2
Ocracoke	11	0
Raleigh	5	0
Swansboro	6	3
Wanchese	6	0
Oregon Inlet	27	0
Pirates Cove	11	0
Other	32	5

NOTE: Only location with three or more charter boats are listed with residuals aggregated into the "Other" category.

The mean age for charter boat operators in North Carolina is 50.3 years (Table 5.2.9-46) and the mean number of years of education was 13.51 (Table 5.2.9-47).

Table 5.2.9-46. North Carolina charter and headboats: age of operators (Source: Holland et. al., 1999).

	N	%
30 or younger	0	0.0
31-40	3	8.6
41-50	18	51.4
51-60	11	31.4
61 and older	3	8.6
Total	35	100

Table 5.2.9-47. North Carolina charter and headboats: years of education (Source: Holland et. al., 1999).

	N	%
11 or less	2	5.7
12	19	54.3
13-15	6	17.1
16	4	11.4
17 or more	4	11.4
Total	35	100
Mean		13.51

The sample of North Carolina charter boat operators showed no one divorced, 7.5 percent single, and 92.5 were currently married. The great majority of operators shared a household with 2-3 other persons (87.6%). Table 5.2.9-48 shows the percentage of household income derived from the charter business.

Table 5.2.9-48. North Carolina charter and headboats: household income from charter boat business (Source: Holland et. al., 1999).

Percent	N	% of Sample
0-9%	7	17.9
10-29%	9	23.1
30-49%	1	2.6
50-69%	6	15.4
70-99%	2	5.1
100%	14	35.9
Total	39	100
Mean		61%

North Carolina's charter boat operators have an average of 19.6 years in the business, with 58 % having been in the business for 16 years or more. Furthermore, 72% of the North Carolina operators run their business fulltime.

The Charter Boat Industry in South Carolina
There are currently no new fishing community profiles available for South Carolina. Older descriptions of the various fisheries (commercial, recreational) in the state are contained in Appendix G. However, additional and up-to-date information has been collected on charter and headboat operations in the state. These are summarized below from Holland, et al. (1999).

There are an estimated 174 charter boats operating in South Carolina, with Hilton Head, Charleston, Murrells Inlet, Mt. Pleasant, and Little River as the cities of having the most number of boats.

Demographics -- The majority of charter boat operators in South Carolina are between the ages of 40 and 60, with the mean age being 50 years. The majority have at least 12 years of formal education, with the mean being 15.3 years. 53% are married, and 33 % divorced. According to Holland, et al. (1999) "Household size generally corresponded with marital status…in…South Carolina…half of the households consisted of one individual, likely reflecting the proportion of divorced operators in the sample."

Almost 40 percent of the operators in South Carolina derive 50% or more of their household income from chartering. South Carolina charter boat operators have less experience in the business than their counterparts in North Carolina or Georgia, with only 14.3% operating their business for 16 years or more. 35.7% have been in the business five or less years, and 30.6% have been in the business six to fifteen years. Furthermore, more South Carolina operators claim to operate part-time (58.6%) than fulltime (41.4%).

The Charter Boat Industry in Georgia
Like South Carolina, there are currently no new fishing community profiles available for Georgia. Older descriptions of the various fisheries (commercial, recreational) in the state are contained in Appendix G. However, additional and up-to-date information has

been collected on charter and headboat operations in the state. These are summarized below from Holland, et al. (1999).

There are an estimated 56 charter boats operating in Georgia, with Brunswick, St. Simons Island and Savannah as the cities of having the most number of boats. This relatively low number of boats is due to the geographically smaller coastline of Georgia compared with the other South Atlantic states.

Demographics -- The majority of charter boat operators in Georgia are between the ages of 41 and 50, with the mean age being 47 years. The majority has at least 12 years of formal education, and 38.5% have at least 16 years. The mean is 14 years. 86.7% are married, and 13% are divorced.

Almost 41.3 percent of the operators in South Carolina derive 50% or more of their household income from chartering. Georgia's charter boat operators have a good deal of experience in the business, with 83.3% operating their business for 16 years or more. Furthermore, 68% of the operators claim to operate fulltime (Holland et al., 1999).

Headboat Operators in North Carolina, South Carolina and Georgia
There are fewer overall headboat operators in the South Atlantic region than charter boat operators. Their average age is almost 39 years, the majority (60%) has a high school education, and all of those surveyed were married. All but one headboat operator worked fulltime, and all derived the majority of their income from this business.

Charter Boat Operators in the Florida Atlantic, Keys and Gulf Areas
Florida has the most charter boat operators of all the states in the study by Holland et al. (1999). The estimated populations are as follows: Florida Atlantic – 413 boats; Florida Keys – 230 boats; and Florida Gulf – 615 boats. Table 5.2.9-49 shows a breakdown of charter and headboats in Florida.

The mean age (46 years) for charter boat operators in Florida was comparable to the mean ages in the other states reviewed. More than half (66.5%) of all operators were older than 41 years.

Educational levels are fairly high, with 95% having graduated from high school, and 34% having some college education. 16% of respondents were divorced, 63.4% were married, and 21.5% were single. For all the regions of Florida, 61% indicated that 100 percent of their income comes from chartering.

Table 5.2.9-49. Number of Florida charter and headboats by region and city (Source: Holland et. al., 1999).

Region and City	**Charter Boats N**	**Head Boats N**
Atlantic Coast		
Cape Canaveral	15	2
Daytona Beach	11	1
Fernandina Beach	11	0

Ft. Lauderdale	55	2
Ft. Pierce	11	1
Jacksonville + J. Bch	11	1
Jupiter	11	3
Key Biscayne	11	0
Melbourne + M. Bch	17	0
Miami	55	5
Miami Beach	16	3
New Smyrna + N. S. Bch	13	0
Pompano Bch	22	3
St. Augustine	18	3
Stuart	18	3
Vero + Vero Beach	16	0
Palm Bch + W Palm Bch	14	1
Other	87	14
Florida Keys		
Islamorada	36	5
Key Largo	15	2
Key West	105	4
Marathon	44	4
Other	30	1
Peninsula Gulf		
Boca Grande	14	0
Clearwater	25	7
Ft.Meyers + Ft. Meyers Bch + Lee County	51	8
Madeira Beach	12	0
Marco Island	19	1
Naples	76	1
Palmetto	16	0
Sarasota	42	2
St. Petersburg + St. P. Bch +Tampa	32	2
Other	145	14
Panhandle Gulf		
Destin	73	8
Panama City + Panama City Bch	48	7
Pensacola	36	1
Other	26	2

*Only locations with ten or more charter boats are listed, residuals aggregated in "Other."

Overview of Mixed Commercial and Recreational Fishing Communities

Florida East Coast

As in most of coastal Florida today, most fishing communities are now mixed, in that there are both recreational and commercial fisheries present. The case of Islamorada is an example of this mixed type of community. The following case has been excerpted from the Ecopolicy Center's report on communities in the HMS fisheries (1998).

Islamorada Community Profile
Islamorada calls itself the Sportfishing Capital of the World. The name was adopted in the 1950s by this small community because of the simultaneous proximity to the Florida Bay, the Everglades, bonefish flats, coral mountains and the Gulf Stream. One respondent claimed that "at one time or another they get just about every fish in the hemisphere." The history of fishing here dates back to the Large Key Fishing Club and Zane Grey. Presidents Bush, Truman, and Wilson, athletes, such as Ted Williams, and many movie stars have all fished here. Islamorada is famous for light tackle technique and many different rods have been developed. One respondent said "there would be nothing here if it were not for fishing. There are no beaches. There would be no grocery stores, nothing, not even utility companies."

Population
According to the 1990 Census, the population of Islamorada is 1,293. There are more males (54%) than (46%) females.

Racial and Ethnic Composition
The racial composition is 95% White, 0.9% Black, and 3.8% other races. The highest incidence of a single ethnicity is found in residents with German ancestry, which make up 15%of the population.

Age Structure
Forty-four percent of the population is between the ages of 15 and 44 years. The population of those under 15 and those over 44 are approximately the same, suggesting an even age structure.

Marriage
Fifty-nine percent of people 15 years and older are married, 17% never married, and 17% are divorced.

Household Composition
According to the 1990 Census, Islamorada has 672 households, with an average of 1.86 persons per household. Out of this total, 52% are family households, and 48% are non-family households. Table 5.2.9-50 *shows additional household information for Islamorada from the 1990 Census.*

Table 5.2.9-50. *HOUSEHOLD COMPOSITION, ISLAMORADA, FL (Source: U.S. Bureau of the Census).*

Total Number of Households	*672*
Average Number of Persons per Household	*1.86*
Percent of Married-couple Family Households	*43.8*
Percent with own children under	*18 98*
Percent of Male Householder Family Households	*2.5*
Percent with own children under	*18 0*
Percent of Female Householder Family	*5.4*

Households	
Percent with own children under	*18 3.3*
Percent of Non-family Households	*48.4*
Percent of Householders Sixty-five or older	*24.3*

In Islamorada there are 966 housing units. Of the 646 occupied housing units, approximately 60% are owner-occupied and 40% are renter-occupied. Seventy-two percent of total vacant units are vacant for seasonal, recreational, or occasional use. Table 5.2.9-51 *shows additional information for housing units from the 1990 Census.*

Table 5.2.9-51. *HOUSEHOLD INFORMATION, ISLAMORADA, FL (Source: U.S. Bureau of the Census).*

Total Housing Units	*966*
Owner-occupied Units	*394*
Median Value	*$138,400*
Renter-occupied Units	*252*
Median Contract Rent	*$456*
Vacant Housing Units	*320*
Housing Units Vacant for Seasonal Use	*231*

Education Trends

Twenty-two percent of the 25 years and older population component are high school graduates, with just as many that did not graduate high school. Thirty percent of the population has some college but no college degree. Additional information from the 1990 Census on educational attainment is displayed in Table 5.2.9-52. *The Florida Keys Chamber of Commerce assert that the educational facilities in the Upper Keys are known for their high standards. There is one elementary schools and one high school in Islamorada.*

Table 5.2.9-52. *Educational attainment (persons 25 years and older), Islamorada, FL (Source: U.S. Bureau of the Census).*

	Number of Persons 25 Years and Over	*% of Population*
Less than 9th grade	*104*	*9.6*
9th to 12th grade, no diploma	*137*	*12.6*
High school graduate (includes equivalency)	*222*	*20.4*
Some college, no degree	*322*	*29.6*
Associate degree	*53*	*4.9*
Bachelor's degree	*134*	*12.3*
Graduate or professional degree	*115*	*10.6*

Economic Characteristics

Most of the county's growth since 1950 has been in the unincorporated area. Many people that moved into the region were retirees. By 1980, more people of Hispanic origin moved into the area and commuted throughout the region for jobs. In mid 1970's local *effort began to establish a tourist economy. By the 1980's, the tourist economy attracted a service oriented labor force (White, B. 1995).*

Employment

Of the residents 16 years and older, approximately 73% participate in the civilian labor force. The unemployment rate for Islamorada is 1.2% of the civilian labor force; this is significantly lower than the state unemployment rate (5.8%). The predominant occupations by employment are technical and administrative occupations (31%) and managerial and professional occupations (26%).

Employment by Industry

The five most dominant industries in terms of employment for Islamorada are retail trade (39.4%), personal services (12.5%), professional and related services (8.0%), transportation (7.2%), and agriculture, forestry and fisheries (6.8%). Table 5.2.9-53 *gives additional information from the 1990 Census about employment of Islamorada residents by industry.*

Table 5.2.9-53. *Employment by industry (employed persons 16 years and over), Islamorada, FL (Source: U.S. Bureau of the Census).*

Sector	***# Employed***	***% Employed***
Agriculture, forestry and fisheries	*57*	*6.8*
Mining	*0*	*0*
Construction	*32*	*3.8*
Manufacturing, nondurable goods	*15*	*1.8*
Manufacturing, durable goods	*23*	*2.8*
Transportation	*60*	*7.2*
Communications and other public utilities	*26*	*3.1*
Wholesale trade	*24*	*2.9*
Retail trade	*329*	*39.4*
Finance, insurance and real estate	*48*	*5.7*
Business and repair services	*18*	*2.2*
Personal services	*104*	*12.5*
Entertainment and recreation services	*27*	*3.2*
Professional and related services	*67*	*8.0*
Public administration	*5*	*0.6*
Total	*835*	*100*

Fishing Related Business

There are a total of eleven marinas in Islamorada. Powerboat rentals are another tourist business with seven in the area. Other water related tourist businesses are boat tours, cruises, kayak, wave runner and sailboat rentals, ten snorkel and dive shops, eight boat dockage, lifts and repair shops, and four fishing supply shops. There are 26 lodgings in Islamorada, consisting of motels, bed and breakfast, resorts and inns, ranging from budget to luxury (Islamorada Chamber of Commerce). Local activities include fishing tournaments, golf and tennis clubs, bowling, museums and galleries, wild bird center and a theater of the sea where tourists can swim with dolphins, Indian Key and Lignumvitae *historical and botanical tours, and a fossil reef state geological site. Route U.S. 1 is lined with shops, signs, boutiques, cottages, and multi-million dollar resorts. The islands also offer 18 specialty and general shops (Islamorada Chamber of Commerce).*

Recreational Fishing

Recreational activities in the Keys consist of trophy fishing, catch and release, spear fishing, and fishing for food. The traditional past times for the area are reef, shore, and bridge fishing. The recreational fishing industry is increasing. More recently, there has been a growing interest in the guided fishing industry that promotes catch and release. (Bohnsack and Co-worker, 1994).

According to the Florida Bureau of Vessel Titling and Registration, Monroe County has a total of 23,079 registered boats, with 18,731 pleasure and 4,260 commercial boats as of 1996. Respondents reported that fishing for billfish is nearly entirely catch and release. They feel that catch and release, bag and size limits, and other recreational measures are working. Florida's ban on inshore net fishing was also a success, sea trout are plentiful because of the net ban, as are bonefish, pompano, and Spanish mackerel. They are concerned with other commercial fishing activities, particularly drift gill nets and long lining for dolphin. A respondent said "One commercial person can make a living at the expense of thousands of others."

The largest resort in Islamadora began as a fishing marina and sportfishing is a big part of their marketing. Fishing is now just one aspect of the "resort experience" and people come to the resort and discover fishing. While charter captains report that they can see drops in bookings within a month of reports of bad fishing, the resort has never seen droppings in vacancy rates from such reports. The resort has two sets of boats offshore and "back country," the local term for the Florida Bay area. There are 19 "6 pack boats" which are charter vessels and 1 party boat. The resort arranges pickup charters. Boats that go offshore do fish for marlin, but this is not a big fishery nor do people regularly want to catch them. Charter captains report that marlin were never a big catch, they would get 15-20 in a summer in the early 1980s, now they get one. In the winter they fish for sailfish, black fin tuna, and bonito. Dolphin come in May.

Tournaments are an important marketing device and billfish species are used in the ads. He Holiday Isle Sailfish Tournament is a big one that is specifically marketed to tourists. During tournaments occupancy rates are 100 percent. They advertise in sportfishing magazines, direct mail and through local media. The majority of boats in Islamadora tournaments are Florida boats, but there are some out of state participants. Some of the tournaments generate donations to charity. The Holiday Isle Dolphin Tournament, for example, gave $2500 this year to the American Cancer Society. The Tourist Development Council is a Keys-wide para-statal organization that is supported by a bed tax. They have a large marketing budget and they give grants and sponsorship to tournaments. The will also help with marketing expertise. The Council has three sections: the Fishing Umbrella supports tournaments; the District Advisory Council supports general tourist events; and a third section supports cultural events.

A new, very large, tackle shop is an addition to a national chain. They are surpassing a business plan that they felt was ambitious in the first place. This shop employs 57 people. The shop has a number of local suppliers that includes manufacturers of lures and jewelry as well as local distributors of fishing products. They are going to begin a fishing school next year that will employ 6 teachers and teach 24 people at a time for 3-4 days. They will teach fly casting, different types of fish, how to find fish etc. Their customers are 80 percent tourists.

According to a marine extension agent from the Monroe County Cooperative Extension Service, fishing is doing better as a result of regulations. Despite the marine extension agent's sentiment, the charter captains are pessimistic about the future. They feel that the overall fishing picture is not good. For 3 years the dolphin have been slow in July and August, four years ago it was very good. Last year they experienced their first loss of customers in the late summer as a result of depressed dolphin catches. Customers read the fishing press and drops in catch will start to have an affect on charter bookings with about a month lag. They are getting a lot of Europeans who want amberjack and sharks. They used to be able to catch hammerhead but these are now "dinosaurs." They have lost customers to places like Costa Rica because they want to catch marlins. Additionally, good mates are hard to find. There is no "recruitment stock." Young kids do not grow up thinking they will be charter boat captains. The future looks bleak. They fear that the whole Keys could "become like St. Petersburg, all rich retirees and the marinas all private boats."

Commercial Fishing

There are only two small longline boats that dock in Islamadora (see the Pompano Beach profile for a description of this fleet). Monroe County commercial landings data for the Islamadora area show 10,647 lbs of dolphin, 4,136 lbs of shark, 711 lbs of tilefish and no swordfish (Center for Economic and Management Research 1995). The Keys overall have important commercial fisheries. Major fisheries are shellfish such as shrimp, stone crab and lobster, having an annual dockside value of about $45 million in the Keys area. Florida Keys National Marine Sanctuary proposed a "no take" zone policy in the next 10 years, which will put many commercial fishermen out of business (Sheldone 1996). King and Spanish mackerel recovered after 15 years of protection by the state and federal regulatory agencies. Finfish fishery consisting of snapper, grouper, and mackerel do about $9 million annually in dockside value. There are also snapper resources such as yellowtail, gray and mutton snapper. (Gregory 1996).

Comments Raised by Respondents

Another local problem is the taxidermy scam (described in the Pompano Beach profile) that is a concern, but the community strongly frowns on landing sailfish. Some people land them and say that they died because they were tail hooked. When this happens people will grumble, especially if they do it 2-3 times a season. People will always start asking questions.

There is a general concern in Islamorada that it would be devastating to the community if the fish stocks are depleted. There are a lot of concerns with habitat such as the loss of *grass beds, destruction of mangrove shoreline, water quality, algae blooms, and coral reefs dying from ozone depletion and too much sunlight. Flat fishing depends on knowing the tides because of water pollution, since local water conditions deteriorate when dirty water from the Gulf and Florida Bay comes through the Keys. Twenty years ago, one responded related, there was a lot of clear water with grass, now the grass is not seen due to sewage and pollution. They are concerned with runoff from the lower part of the peninsula including phosphates and exhaust. There is also a concern over loss of fish in the area due to the use of certain gear types, and an increasing number of fishermen.*

East Florida - Pompano Beach Community Profile

Pompano Beach is small city directly adjacent to Ft. Lauderdale FL. It is very much a part of the dense urban complex which extends along the coast north of Miami. The Ft. Lauderdale area is known as the "Yachting Capital of the World" and the "Venice of America " because of the vast canal system which extends throughout Broward County and create 165 miles of waterfront in the region. Pompano Beach is also a globally important manufacturing center for commercial longlining equipment.

Population

The 1990 population Pompano Beach was 72,411 and the population estimates for 1993 and 1996 are 74,876, and 74,583 residents, respectively. There are more females (52 %) than males.

Racial and Ethnic Composition

The racial composition of Pompano Beach is approximately 70% White, 29% Black, and less than 1% other races. The highest ethnic group of a single ancestry is Hispanic, which comprises approximately 20% of the population; populations corresponding to all other ethnic groups in the 1990 Census occur at a rate of less than 10% of the population each.

Age Structure

Approximately 40% of the population is between age 15 and 44, according to the 1990 Census. Forty-five percent of the population is over age 44, while only 15% are under age 15; this suggests an aging population.

Marriage

In the 1990 Census, 53% of the population 15 years and older were married. Of those not currently married, 25% were never married, 11% were widowed and 11% divorced.

Household Composition

According to the 1990 Census, Pompano Beach has 31,891 households, with an average of persons per household. There are 58% are family households and 42% are non-family households. Table 5.2.9-54 *gives additional information on households in Pompano Beach.*

Table 5.2.9-54. *Household composition, Pompano Beach, FL (Source: U.S. Bureau of the Census.*

Total Number of Households	*31,891*

Average Number of Persons per Household	*2.17*
Percent of Married-couple Family Households	*44.7*
Percent with own children under 18	*10.9*
Percent of Male Householder Family Households	*3.5*
Percent with own children under 18	*1.2*
Percent of Female Householder Family Households	*9.8*
Percent with own children under 18	*4.6*
Percent of Non-family Households	*42.1*
Percent of Householders Sixty-five or older	*37.7*

According to the 1990 Census, there are 42,719 housing units; approximately 25% are vacant. Of the 32,157 occupied housing units, 63% are owner-occupied and 37% are renter-occupied. Seventy-three percent of the vacant housing units are vacant due to seasonal use. Table 5.2.9-55 *gives additional information regarding housing units.*

Table 5.2.9-55. *Housing structures, Pompano Beach, FL (Source: U.S. Bureau of the Census).*

Total Housing Units	*42,719*
Owner-occupied Units	*20,343*
Median Value	*$99,300*
Renter-occupied Units	*11,814*
Median Contract Rent	*$470*
Vacant Housing Units	*10,562*
Housing Units Vacant for Seasonal Use	*7,635*

Education Trends

According to the 1990 Census, 73.7% of the residents of Pompano Beach 25 years and older are high school graduates. Table 5.2.9-56 *gives additional information on educational attainment.*

Table 5.2.9-56. *Educational attainment (persons 25 years and older), Pompano Beach, FL (Source: U.S. Bureau of the Census).*

	Persons	*% of Population 25 Years and Over*
Less than 9th grade	*5,331*	*9.8*
9th to 12th grade, no diploma	*9,029*	*16.5*
High school graduate (includes equivalency)	*16,759*	*30.7*
Some college, no degree	*10,115*	*18.5*
Associate degree	*3,380*	*6.2*
Bachelor's degree	*6,855*	*12.5*
Graduate or professional degree	*3,191*	*5.8*

Income

The per capita income for Pompano Beach in 1989 was $17,382; this is higher than the state per capita income ($14,698) but lower than the per capita income for Islamorada ($24,651).

Employment

Of the residents 16 years and older, nearly 56% participate in the civilian labor force. The unemployment rate for Pompano Beach is 6.3% of the civilian labor force; this is only slightly higher than the state unemployment rate (5.8%).

Employment by Industry

Of the 15 main industries in Pompano Beach, the five most dominant in terms of employment are: professional and related services (19.8%), retail trade (18.6%), construction (10.4%), finance, insurance, and real estate (9.3%), and business and repair services (6.5%). Agriculture, forestry and fisheries industries employed 3.0% of the population for the 1990 Census. Table 5.2.9-57 *gives additional information on the industries in Pompano according to the 1990 Census.*

Table 5.2.9-57. *Employment by industry (employed persons 16 years and over), Pompano Beach, FL(Source: U..S. Bureau of the Census)*

Sector	*# Employed*	*% Employed*
Agriculture, forestry, and fisheries	*958*	*3.0*
Mining	*28*	*< 0.1*
Construction	*3,303*	*10.4*
Manufacturing, nondurable goods	*796*	*2.5*
Manufacturing, durable goods	*1,921*	*6.0*
Transportation	*1,260*	*4.0*
Communications and other public utilities	*823*	*2.6*
Wholesale trade	*1,729*	*5.4*
Retail trade	*5,936*	*18.6*
Finance, insurance, and real estate	*2,962*	*9.3*
Business and repair services	*2,067*	*6.5*
Personal services	*1,935*	*6.1*
Entertainment and recreation services	*732*	*2.3*
Professional and related services	*6,305*	*19.8*
Public administration	*1,101*	*3.5*
Total	*31,856*	*100*

Recreational Fishing

The week we visited Pompano Beach they were celebrating the "50 th Year of Yachting" in Ft. Lauderdale. A local yacht manufacturer reported that he sells 58' yachts worth 3,000,000 dollars and he estimates that 85% of the boats he sells are used for fishing. "These people" he says "are very serious about fishing." People in the area have been *making boats since the 40s. Recreational fishing is a very important activity in Pompano Beach. According to Florida's Bureau of Vessel Titling and Registry, in 1996-97 Broward County had 44,151 registered boats, with 41,393 pleasure and 2,043 commercial boats. In contrast to many Florida communities, a substantial amount of the recreational industry is supported by local people in addition to tourists. One indicator of this is a large number of small, local fishing tournaments that respondents estimate attract about 75 percent local people and 25 percent tourists. Tournaments generate money for charity, the 1998 Pompano Beach Ladies Tournament raised $33,500 for charity. Many of these tournaments target billfish, but these are sailfish rather than marlin.*

Sailfish are very important for promoting tourism in the Pompano Beach area. Tournaments play an important role in attracting tourists, especially in the otherwise "dead" month of May. Local activities include an Annual Sea Food Festival in April, and a Rodeo tournament. In 1996 the Rodeo has increased to 722 angler entrees with 221 boats. The Rodeo tournament, a popular event among the tourists and locals, is held every year. It started in 1965 to encourage tourists to stay in the area longer. Today the Rodeo is known internationally and the non-profit activity supports marine conservation and educational programs. It has grown since 1966 when there were 79 anglers on 47 boats that entered the tournament. By 1994 there were 667 anglers on 261 boats establishing a tournament industry standard. There were 95 winners that year with more than $60,000 cash given out among them (Hardie 1995).

While most tournaments are non-profit, there have been, and are, several attempts to set up for-profit tournaments is a competitive business. The Salt Water Anglers Association tried for four years to have a local tournament circuit in which a series of tournaments would to a set of grand prizes. It was difficult to get sponsors for a 40 boat tournament. Several respondents indicated that the issue of luck versus skill is crucial to a tournaments success. The problem with the local inshore tournaments is that if the fishery requires skill the same people are always going to win. People want to enter tournaments that are more luck-based.

Catch and release of billfish is actively promoted among recreational fishers by such organizations as the Billfish Foundation and the International Game Fish Association, where it has been policy for 15 years. The Miami Billfish Tournament was the first to decide to go with just catch and release. The idea had been that people would cheat when prizes were as high as $10,000. They went to 100 percent release by doing lie detector tests and observers. Several respondents reported that people have begun to accept catch and release as normal practice even in tournaments.

Commercial Fishing

Pompano Beach has a small longline fleet, remnant of a much larger fleet, that mainly targets tuna and swordfish. There is also some shark fishing farther north along the coast. The boats that dock in Pompano Beach are five small (40-50'), short trip year round longline boats, and six or seven seasonal longline boats. There are some larger boats in nearby Dania. December through April is the most intensive local fishing. The *resident fleet stay and are joined by many boats from the north come down to fish for the winter. From April through the end of June the larger sized boats found in fish in the South Atlantic bight and land most of their catch at Charleston SC. The smaller boats fish year round in the Gulf of Florida. If swordfish is closed fall is mainly used for maintenance. The longline fleet deals with two fish houses in Pompano Beach and one in Dania.*

Commercial fishers in Pompano Beach are proud of the role they have played in the development of the longline industry. They relate that monofilament longline was created and perfected in Pompano Beach. A group of charter boat captains, the "Mosquito Fleet," began experimenting with longlines and various fish attraction devices in the 1970s. Three of these people opened what one respondent claims was the fish house to specialize in pelagic fish. A related company built the first distant water swordfish fleet in the South.

By the early 1980s the fleet was developing and the geographical range of operations was increasing. They sold the smaller boats and the captains were moving into 68' boats that could move north and follow the fish. They moved from short trips to week long trips. By 1983 they were fishing on George's Bank and would be gone for 2-3 weeks. The Pompano Beach longliners began to invest in even larger boats in the mid-80s. This meant, however, that the best captains were gone for longer and longer times. Family problems, divorces and dislocations began to be issues in the fleet.

By the late 1980s, the eight largest boats in the Pompano fleet had been sent to Hawaii. Even with this increased range the fleet was feeling pressure from several sources. The better captains began to get out of the business because they had to travel so much. The mates that took over were less skilled and this increased the amount of time that the home offices had to spend on absentee management. Trade agreements were increasing competition with imported fish. ICCAT restrictions were becoming tighter and, several respondents feel, the US fleet was being restricted more, or at least more effectively, than its foreign competition. With Bahamian independence the fleet lost access to waters near the Bahamas which had been very important for the smaller (~50') longline boats. More recently, the swordfish boycott has depressed prices for the higher quality swordfish that is bread and butter of the smaller boats. A captain told us that they do catch smaller swordfish. The smaller boats catch some swordfish under 30 lb, and a 41 lb size limit would mean throwing back substantial amounts of fish and considerable loss in income. The development of the Pompano Beach area for yachting and recreational fishing has, made dockage and access to the water more expensive. Swordfish closures have reduced income by shifting effort to less valuable species. One fish dealer reports that before the closures his business was 88 percent swordfish and 12 percent tuna, now he does 59 percent swordfish, 12 percent tuna and 29 percent dolphin. Bluefin tuna landings rank third in East Florida ports for 1996 in Pompano Beach, with 835 pounds. There were 5,126 swordfish caught ranking third and 71sharks ranking sixth.

All commercial respondents reported increased difficulty in getting quality crew. The small boats take two crew plus the captain. Owner operators often try to have at least *one crew member that they keep with them. Then they try to find anyone they can for particular trips. Respondents reported that as recently as four years ago crew used to line up for work. Now captains have to shop around and the quality is lower. A fish dealer estimates that about half the captains he deals with are married, with an average age of 35, but some are much older. While about half of them are what the dealer describes as "societies poor souls." They are unskilled, recalcitrant individuals who don't want welfare and don't like authority. They go to sea and then get some money and live in a hotel. The other half , who often come from fishing families, want to be captains. There are also some crew who are captains up north and come down and crew for the winter. There is also the occasional college student on winter break.*

The end result of all of these factors has been a very substantial reduction of the Pompano Beach longline fleet. For example, the company that sent the eight boats to Hawaii, and owned ten other longliners as well, now owns only two boats. They say that they own these boats only because the grandchildren want to stay attached to the commercial fishery. This company has successfully developed other aspects of their business. Pompano Beach's remaining fleet is considered, both by its owners and suppliers as being in major trouble. Respondents blame both regulations and absence of swordfish from the Straits of Florida. There are few alternative fisheries. Snapper, king mackerel, and red crab are all closed, limited entry fisheries. Dolphin, however, is a profitable alternative during the spring swordfish closure.

Fishers, and other businesses related to commercial longlining in Pompano Beach, are increasingly turning their attention overseas. The best captains are still the ones that go the farthest, but now it is often to work on foreign boats in foreign waters. One longline equipment supplier reported that only 15% of his business is domestic. He has seen sales of longline equipment in Chile double three times since the early 1990s. When he first went to Uruguay in 1990 they had one boat, now they have 10, Brazil's 3-4 longline boats are now 30-40. Another supplier began his business specifically because of the opportunity he saw in the export of longline gear. The East Coast of the US is 30% of his business. He does not see Americans investing in new fixed equipment but people are still replacing equipment when they have to. He describes the East Coast US longline fleet as currently the least technically sophisticated of all the fleets he supplies.

There is a Florida Commercial Fishermen's Association that is not involved very much in pelagic fisheries. Some longliners are members of the Blue Water Fishermen's Association.

Additional Comments Offered by Respondents
Several members of the recreational industry expressed concern about a practice of some charter boat captains. When a customer catches a billfish, they ask them if they want to kill it and have it mounted. The idea is that when the customer has already killed the fish he or she is less likely to back out of the deal upon discovering the cost of the mount. When the customer leaves, however, they throw the fish away and the customer gets a fiberglass replica. The contract is written in such a way that this is technically legal and nothing can be done even if the customer finds out.

There is a great deal of tension between the recreational and commercial fishing groups. Both sides acknowledge a problem with over fished stocks but each often blames the other side. Regulatory discards (having to throw saleable fish back dead in order to comply with regulations) are very demoralizing. They are seen by many as an affront to fishing as a way of life.

5.2.9.4 Bycatch

Observer data and vessel logbooks indicate that pelagic longline fishing for Atlantic swordfish and tunas results in catch of non-target finfish species such as bluefin tuna, billfish, and undersized swordfish, and of protected species, including threatened and endangered sea turtles. Also, this fishing gear incidentally hooks marine mammals and sea birds during tuna and swordfish operations. The bycatch of animals that are hooked but not retained due to economic or regulatory factors contributes to overall fishing mortality. Such bycatch mortality may significantly impair rebuilding of overfished finfish stocks or the recovery of protected species. Atlantic blue marlin, white marlin, sailfish, bluefin tuna, and swordfish are overfished. The concurrent closure in this FMP was deemed necessary by NMFS to reduce bycatch and incidental catch of overfished and protected species by pelagic longline fishermen who target highly migratory pelagic species (HMS).

Appendix C of the Final Supplemental Environmental Impact Statement (FSEIS) for HMS Regulatory Amendment 1 contains data on dolphin-wahoo pelagic longline fishery analysis. The data presented on page C-66 and in Table C-4 indicate that pelagic longlines targeting dolphin do in fact result in a bycatch of HMS species.

Implementation of regulations in the SAFMC's 2003 Dolphin Wahoo FMP addressed the Magnuson-Stevens Act requirements to reduce bycatch and the mortality of bycatch. Additional detailed data on bycatch in the directed dolphin/wahoo fisheries will be provided through full implementation of ACCSP (which includes observer coverage).

5.2.10 Calico Scallop

5.2.10.1 Description of fishing practices, vessels and gear

Commercial Fishery

The commercial fishery for calico scallops has developed slowly and catches have fluctuated widely in all areas where commercial concentrations have been located. This is usually attributed to a combination of factors: yearly variations in the location and productivity of beds and problems of economically sorting, shucking, and eviscerating scallops because of their shape and small size.

Lack of knowledge by industry and resource agencies on the distribution and abundance of the calico scallop resource is one reason for the slow development of a commercial fishery until the late 1950s. Calico scallops had been taken by trawl fishermen sporadically since 1949, but no directed fishery developed from these early observations.

Part of the slow development of the fishery was because trawlers were primarily equipped for shrimp fishing in different areas and depths and part was because of the absence of an established market for calico scallops.

Exploratory fishing by private organizations from 1954 to 1958 located concentrations of calico scallops in the northeastern Gulf of Mexico in the general area of Cape San Blas, Florida (Bullis and Ingle 1959; Carpenter 1967). Exploratory fishing by the Bureau of Commercial Fisheries from 1957 to 1960 revealed extensive beds of scallops in 19 to 46 m (62.3 to 150.9 ft) between Carrabelle, Florida, and Mobile, Alabama.

Beginning in March 1958, a large bed of scallops in 13 to 37 m (42.7 to 121.4 ft) northwest of Cape San Blas was fished commercially, at first using shrimp trawls and later with four-foot wide dredges (Bullis and Ingle 1959). The catch was shucked by hand and during the spring and summer of 1958, four boats produced 1,200 to 2,000 gallons of shucked meats per week. By September 1958, the yield of meat per scallop had declined to the point that fishing was no longer profitable.

Between 1959 and 1975, the commercial fishery for calico scallops in the northeastern Gulf of Mexico operated sporadically. Over this 16-year period, maximum production of approximately 16,000 pounds of shucked meats (adductor muscles) occurred in 1962 and again in 1969. In 1975, landings increased significantly and peak production in this area occurred in 1976 when 1.8 million pounds of meat valued at approximately $1.2 million was produced by the 54 vessels operating in the fishery.

In 1959, calico scallops were discovered near Cape Lookout, North Carolina, by exploratory vessels of the Bureau of Commercial Fisheries (Cummins 1971). This discovery stimulated development of a commercial fishery off Carteret County which continued sporadically to 1973. The principal scallop grounds have been located northeast and southwest of Cape Lookout in 19 to 31 m (62.3 to 101.7 ft). Commercial production of calico scallops from North Carolina waters has fluctuated widely since 1959 when three boats produced 6,500 pounds of meat valued at $2,600 (computed as ex-vessel or dockside price of meats). Peak landings occurred in 1966 when 20 vessels operating in the fishery produced 1.86 million pounds of meat valued at $369,000.

As had been the case in 1962, 1963, and 1964, scallop production from the North Carolina grounds did not exist in 1968 and 1969. While the fishery resumed again in 1970, production was below 1966 levels and from 1974 to 1978, no production came from this area. In 1979 a productive bed was again located; harvesting occurred in 1979 and 1981.

In January 1960, large quantities of calico scallops were discovered off Daytona Beach, Florida, by the Bureau of Commercial Fisheries (Taylor 1967). Further explorations conducted by the Bureau from 1960 to 1968 defined a 3,108 square kilometer (1,200 square mile) scallop bed lying in 19 to 74 m (62.3 to 242.8 ft) of water from the St. Johns River south to Ft. Pierce (Cummins 1971). Publication of these observations also stimulated development of a commercial fishery in this area which is referred to as the Cape Canaveral beds.

Since 1973 trawls have been the only gear employed in the fishery. Commercial production has generally increased since 1967 when four shrimp-type scallop vessels produced approximately 21,000 pounds of meat from the Cape Canaveral beds. In 1975, production of approximately 1.4 million pounds of meat valued at $900,000 was produced by 13 vessels trawling on the Cape Canaveral grounds. In October 1980, harvesting began on a new viable bed located about 8.1 to 9.7 km (5 to 6 mi) offshore of New Smyrna at a depth of approximately 20 m (66 ft). However, mass mortality of this bed caused fishing to cease by January 1981, and the fishery moved to other productive beds located in the Cape Canaveral area. Peak production occurred in 1984 when approximately 43 million pounds of meat valued at $23.5 million were produced by about 75-150 vessels trawling on the Cape Canaveral grounds.

South Carolina's first commercial scallop bed (Anderson and Lacey 1979) was located in June of 1977 approximately 97 km (60 mi) offshore of the South Carolina-Georgia border. In early January of 1978, seven scallop trawlers moved up from Florida and began harvesting scallops from the South Carolina beds in depths of 37 to 45 m (121 to 148 ft). By March of 1978, approximately 45 major vessels from Florida, North Carolina, Georgia, and South Carolina were actively involved in this fishery. Numerous other fishermen, particularly shrimpers, entered the fishery toward the end of the harvest, attracted by the size and quality of the beds. A total of 611,000 pounds of meat valued at $803,000 were harvested during 1978. Commercial activity continued through mid-May until production was drastically reduced due to meat size reductions during spawning. In the fall of 1981, another bed of scallops was located off South Carolina.

Three boats landed over a thousand bushels in two days during January 1982. Scallop explorations have historically been very limited offshore of Georgia, although small numbers of calico scallops have occasionally been found by shrimp trawlers and during research cruises. During 1979, large amounts of calico scallops were harvested off Key West adjacent to the Dry Tortugas shrimp grounds, shifting some activity from the Cape Canaveral beds.

Participating User Groups

The domestic fishery for calico scallops is entirely commercial. Natural fluctuations in the abundance of the resource have precluded development of a long-term, directed fishery for calico scallops in many areas where concentrations have been located. Consequently, much of the commercial production has been by shrimp fishermen who have fished for scallops, when they are available, as an alternative to shrimp fishing during poor seasons or as means of supplementing their income during the off season. (R. Cummins, Fishery Management, NMFS, S.E. Center, Charleston, S.C.; pers. comm.) has estimated that between 40-50 shrimp vessels engaged in the calico scallop fishery on a part-time basis in the early 1980s.

An exception to this is off the east coast of Florida where, due to the large size of the Cape Canaveral beds, commercial production has occurred fairly consistently since 1967. In this area, up to 10 factory-type vessels, which were specially equipped for processing calico scallops, have been engaged in the fishery intermittently since 1969. During 1980, one factory-type vessel was fishing in the area and plans were made for two more to enter the fishery in the spring of 1982. Currently there are no at-sea processing vessels in the fishery.

During 1980 and 1981, the number of vessels harvesting scallops increased to between 75 and 150. These numbers included 15 processor owned shrimp vessels which had been rigged for use in the calico scallop fishery out of Cape Canaveral. As of this writing, there were no vessels operating in the fishery.

The fishery is unusual because most boats fish for only about 12 hours per trip, and are usually away from the dock no more than 24 hours. The entire catch remains on deck unsorted. On-shore the catch is culled; shell, shell fragments, and other by-catch are removed. The clean shell stock can then be processed with very little human contact using shakers, steam, rollers (evicerators), chillers, and packaging equipment. Fresh meat can thus reach the market within 24-48 hrs of harvest (Blake and Moyer 1991). This type of fishery has been labeled a Type I processor (Anonymous 1998). In this type of processing all by-catch and waste is buried in land fills. A Type II processor culls, shucks, and packages the entire harvest at-sea, and can thus remain on the fishing ground for extended periods. Type II fishers also return all bycatch and waste to the sea.

Most of the harvest has been conducted by modified shrimp trawlers. At the peak of the fishery, about 70 vessels and 7 processing plants were active (Rockwood and Pompe 1988). North Carolina's fishing fleet peaked at around 20 vessels, and during one brief period, a fleet of about 45 vessels harvested along the South Carolina-Georgia border (Anonymous 1981). In each case, most of the vessels are shrimp boats that convert their gear for scallop harvest when the stock becomes plentiful and resources are put in place to process the catch on-shore. At present, no vessels are harvesting calico scallops, and none of the processing plants remain in operation. The most common point for landing calico scallops, Port Canaveral, Florida, has increasingly converted dock space previously used for commercial fishing to tourist related industries - marinas and cruise ship terminals.

Vessels and Gear

Three basic types of vessels have been used in the calico scallop fishery. They, in turn, have used three types of gear with some interchange of gear between vessel types. These are shrimp trawlers, scallop vessels designed for use in the sea scallop fishery, and specialized calico scallop vessels with processing equipment aboard. The first two vessel types have basically sought to land shellstock (i.e., intact scallops including shell, viscera, and edible adductor muscle meat after sorting from debris) for processing ashore. The specialized calico scallop vessels are designed to produce scallop meats with the shucking and evisceration done at sea.

Almost all of the calico scallops harvested commercially in recent years have been taken by shrimp vessels using modified otter trawls. These offshore shrimp trawlers have wood, aluminum, steel or fiberglass hulls and generally range from 15.2 to 25.9 m (50 to 85 ft) in length. Many of the newer, larger offshore vessels (22.9-27.4 m; 75-90 ft in length) are double-rigged for towing two nets simultaneously. Typically, the vessels are diesel-powered with pronounced variations between length and horsepower in single and double-rigged vessels. Generally, the vessels in the 15.2-21.3 m (50-70 ft) class are powered by 100-200 horsepower diesels. A large portion of the vessels are equipped with electronic navigational and fish finding aids. Cost of vessels depends upon size, date of purchase, and amount of equipment on board.

Calico scallop landings by vessel size category from 1994, 1995, and 1997 were provided by Martha Norris, FL FWC (Table 5.2.10-1); there were no landings in 1996. Data were provided for vessels less than 50 feet, 50-59.9 feet, 60-69.9 feet, 70-79.9 feet, and 80-89.9 feet. In order to not show confidential data, landings were combined into the two vessel size categories shown in Table 5.2.10-1. The "Unknown" category includes landings by Florida Salt Water Products Licenses (SPLs) with no associated vessel information. Vessels in the 70-89.9 foot category harvested approximately half of calico scallops landed between 1994 and 1997. In 1994 there were two vessels under 50 feet, one in 1995, and none in 1997. In fact the smallest vessels harvesting calico scallops during 1997 were in the 60-69.9 foot category.

Table 5.2.10-1. Calico Scallop Landings by Vessel Size Category. Source: Martha Norris, Department of Environmental Protection, Florida Marine Research Institute, Division of Marine Resources. July 29, 1998. Note: Pounds are in meat weight.

VESSEL SIZE CATEGORY	YEAR					
	1994		1995		1997	
	POUNDS	# DEALERS	POUNDS	# DEALERS	POUNDS	# DEALERS
UNKNOWN	1,411,480	27	252,784	8	604,768	12
<70 FT	1,319,384	11	161,416	6	67,424	4
70-89.9 FT	2,258,736	17	530,893	10	873,100	11
TOTAL	4,989,600	55	945,093	24	1,545,292	27

Trawls

Scallops were first caught with sea scallop dredges. During the early exploratory phase of this fishery, 1950s to early 1970s, the main gear was a 6-8 foot "tumbler" dredge - a heavy frame with a net made of 2" steel rings. This dredge could be fished with either side up (Cummins 1971). Dredges began to be replaced (in 1966) with scallop trawls. Despite higher maintenance and repair costs, trawls proved to be a more efficient means of harvest (Cummins 1971). Beginning about 1973, all harvest was conducted with modified shrimp otter trawls (Anonymous 1998). The otter trawl used in the shrimp fishery basically consists of: 1) a cone-shaped bag in which the shrimp catch is gathered in the tail or codend, and 2) trawl doors or otter boards at the extreme end of each wing for holding the wings apart and the mouth of the net open. The trawl doors are attached to the net by top and bottom leg lines on each wing of the trawl.

The following description of a scallop trawl is from Rivers (1962). The otter trawl net commonly employed in the calico scallop fishery is similar to the two-seam, semi-balloon design used in the shrimp fishery with modifications to maximize contact with the substrate while minimizing damage to the net's webbing. Unlike the otter trawl nets used in the shrimp fishery, the scallop trawl net was designed so that it fishes with either side down, i.e., there is no overhang, and top and bottom sections are identical. This feature increases the longevity of the equipment in that when the original bottom section becomes worn, the trawl may be turned over so that the relatively unworn top becomes the new bottom. The 7.6 to 10.7 m (25 to 35 ft) scallop trawl nets are fitted with a "Texas drop chain" on the footrope and one to three "tickler chains." The latter chains are stretched across the mouth of the trawl and attached near the trailing bottom corner of each door. The Texas chain, similar to that used on shrimp trawl nets, consists of a length of chain cut one foot shorter than the length of the leadline and fastened to it at regular intervals by 2, 4, or 6-link chain drops. The extra "tickler" chains used on the scallop trawl are designed to increase the scraping and digging action of the trawl.
The belly sections of the scallop trawl are short so that the amount of webbing exposed to wear is as small as possible. Both the nets belly and the tail-bag are reinforced with heavy chafing gear of polyethylene strands or automobile inner-tube strips in order to decrease the shearing and abrasive effects of the calico scallops on the nets. For added protection, a false belly of heavy webbing is often laced over the bottom belly of the trawl. In addition, the leg lines between the doors and net wings are relatively short in order to facilitate the funneling effect of the doors. The complete scallop rig (boards, trawl, and accessories) is fished from a single cable that is connected to the boards by a 18.3 m (60 ft) bridle of 9.52 mm (3/8-in) wire rope.

The trawl is usually set and dragged from outrigger booms in the familiar shrimp-boat fashion. Owing to its light weight and small size, the trawl is easily handled. At the end of a drag, the splitting strap is brought to the rail of the boat and hooked to the hoisting tackle. The codend is brought aboard, and the catch dumped on deck. The trawl is then reset. Any scallops that might be in the webbing above the splitting-strap beckets are left in the net until the end of the next drag, or are allowed to spill back into the water. The time that would be consumed in making a second lift of the net to shake the scallops down into the codend and bring them aboard is used more profitably in making an additional drag. By limiting drags to 15-30 minutes or less, the catches usually fit well within the codend, and little loss is experienced.

Dredges

Dredges landed significant amounts of calico scallops from Florida beds between 1968 and 1972. While some of the vessels which have employed this gear include New England sea scallopers using 10-foot Georges Bank-type scallop dredges, most of the vessels were shrimp trawlers using scallop trawls and experimenting with tumbler dredges. A typical calico scallop dredge consists essentially of a rectangular frame measuring approximately 2.4 m wide by 0.46 m high (8 ft by 1.5 ft). The bag is made up of 50.8 mm (2 in) inside diameter rings held together with dredge links and attached to the rectangular frame. The dredge is towed on three flexible bridles (of chain or wire rope) attached at each end and center of the frame. This feature allows the dredge to "roll over" obstructions which would otherwise damage a trawl (Bullis and Cummins, 1961; Rivers, 1962). Dredges are no longer used in the fishery.

Assessment and Specifications of U.S. Harvesting Capacity

U.S. harvesting capacity is largely determined by the location and availability of scallops which vary constantly. For example, if scallops are located near a suitable port for short vessel runs to and from the grounds during cold weather periods, the shellstock would be landed and trucked to all available processing machinery presently located from North Carolina to the Florida west coast. Another example is when scallops are located many miles from the nearest suitable port during warm weather. Because shellstock is normally transported on deck, operations must be conducted at night in order to preserve quality; actual fishing time is reduced by vessel running time to port. Still another example is when scallops are located near a port such as Key West where weather is warm all year and trucks are weight limited to 36,000 pounds over the Keys bridges, thus increasing freight cost and at the same time causing a reduction in the amount of sellable finished product.

During the 1990s, some 40 to 50 vessels were involved sporadically on a part-time basis, the number depending upon conditions in the shrimp industry. About 25 vessels worked the scallop beds on a full-time basis, which includes time spent in locating new scallop beds. During late 1981 and early 1982, the number of vessels fishing the Cape Canaveral grounds varied from 75 to 150. Some processors in North Carolina and Florida offered a sizable reward to shrimpers who located a commercial size bed of scallops.

Scallop production and meat yield is so variable that the only meaningful measure is the pounds of finished product (edible meats) produced. Double-rigged shrimp-type vessels typically make four or five single-day trips per week, weather permitting. Drags are normally of short duration (10 minutes or less). Vessels are paid on a yield basis (i.e., on the amount of meats processed from landed shellstock) which reportedly ranges from two pounds to as much as six pounds per bushel. When large amounts of "trash" (old, broken, or empty shells) are encountered the yield is much lower. At the height of the fishery in the 1980s, most of the fishermen would process the entire catch dockside. No culling of the catch occurred at sea, meaning all bycatch had to be disposed of in landfills, in addition to any shell and viscera from the harvested scallops. For a time, processors were grading according to size (meat count) with larger meats commanding high prices. It was possible for a good shellstock vessel to produce several hundred 8-pound gallons per day. When scallops are found in abundance, harvesting capacity in the U.S. has been greater than processing capacity to date. The introduction of several new processing lines in 1981 (North Carolina and Florida) brought processing capacity equal to or greater than harvesting capacity. Since 2000, the loss of processing capacity has created a situation where the ability to harvest, through conversion of shrimp boats, could readily exceed the processing capacity, which is probably near zero as of 2006.

Assessment and Specifications of U. S. Processing Capacity

In 1978 there were some 16 scallop processing lines located in the southeastern U.S. and in 1979 and 1980 more were being built. However, much of the older equipment is outdated and some is not in operational condition. In 1980, two at-sea processing vessels were being outfitted with one or more processing lines. With the most effective updated shore-based processing equipment, steam is utilized in lieu of hot water for shucking. Some equipment is capable of sustained production rates well in excess of 100 gallons of meats per hour depending upon the size and condition of the meats and the amount of barnacle encrustation on the shells. Patent rights are held on most of the processing equipment and there was patent infringement litigation on a continuing basis during the 1980s. When large increases in scallop abundance occur, temporarily processing capacity is less than available shellstock. Currently, there is no active fishing, and no known processing plants for calico scallops.

The development of machine processing greatly changed the amount of effort required to process stock in relation to harvest effort. This has been referred to as the Processing/Harvesting Ratio (PHR) (Maiolo 1982). The PHR is based on Paredes et al. (1976). Prior to machine processing, hand shuckers were reluctant to process calicos because of the size which limited financial remuneration. When they did hand shuck, it is estimated that it took 13 units of effort to process stock that took one unit of effort to harvest. This ratio was reversed to 1:5, or one unit of effort to process what it took five to produce (the estimates were made in terms of hours) (Maiolo 1982). Presumably, this type of mechanized processing could be rebuilt, but significant capital would likely be needed.

Processing

Early in 1969 four factory-type processing vessels were engaged in the calico scallop fishery off Cape Canaveral, Florida. Two of these vessels, owned by a single firm, were steel hulled, and 26.2 m (86 ft) in length. They were powered by 335 horsepower diesels and had a cruising speed of ten knots. These vessels, and two similar ones, were equipped with culling, shucking, and eviscerating equipment capable of processing the catch as it was brought aboard by trawl or dredge (for a complete description of this on-board processing equipment see Cummins and Rivers 1970.) The processing time from culler to “ready for packing” required about 6 to 7 minutes. Three of the four vessels were “ice boats” which landed processed scallop meats in 10-pound containers packed in ice.

The seagoing processing machines were removed from these vessels after a few years and the reasons given are varied: the machine made the vessel unstable, the machinery was not designed for shipboard use in rough seas, and problems in maintaining constant hot water and steady temperatures (96°C; 205°F) necessary in the shucking procedure.

One processing vessel engaged in the calico scallop fishery persisted until 2003. This vessel was owned by Mr. William H. Burkhardt who served on the Council’s Calico Scallop Advisory Panel. Mr. Burkhardt provided a detailed description and diagrams of the separation and evisceration process (Anonymous 1998). Mr. Burkhardt reported that "when scallops are harvested from a typical bed, shell percentages can vary from approximately 90/10 to 10/90. On the average one half of shell stock is unwanted old dead shell. The other half becomes clean new shell once the meats are removed in steam process." Mr. Burkhardt designed the adjustable separator to do the following: "(A) Select the targeted scallop size. Adjust to varying shell size/meat size with a simple mechanical adjustment. (B) Immediately return to the sea alive, small scallops under the targeted size, attached spat and other species bycatch. Research has shown that most will live if quickly returned to the sea. (C) Separate the clean scallops and immediately discharge overboard the mud, shell and bycatch." In Mr. Burkhardt's opinion, at-sea processing has the following advantages: "1. Reduces weight improving vessel safety. 2. Improves product quality by removing bacteria in the washing process. 3. Reduces or eliminates same species and other species bycatch. 4. Return shell to the original bed."

Recreational Fishery

There is no recreational fishery for the calico scallop due to the depth of water where calico scallops occur and the gear necessary to harvest calico scallops.

Allowable gear

Calico scallops may be harvested commercially in the EEZ using trawl and dredge. Hand harvest is the only allowable means to harvest calico scallops recreationally.

5.2.10.2 Economic description of the fishery

The best economic analysis of the calico scallop fishery was produced by Rockwood and Pompe (1988) and pertained only to the Brevard County harvest - most of the scallops harvested from the Cape Canaveral beds. This report was produced just after the peak fishing years of 1984-1987. The authors estimated that the industry should be able to support 500 jobs and generate 77.6 million dollars (in 1988) of total economic output for the region. The total local expenditures were around $2 for every pound of meat harvested. Total employment (fishing and related support industries) ranged from 278 to 2616 jobs over a four year period. This translates into about 1 job for every 5500 pounds of meat harvested. Expenses ranged 28 - 43% for vessel operations, 35 - 60 % for processing, and 11 - 21% for office and overhead. Total labor accounted for about 35% of expenses. At that time fuel was a very minor expense, 0.6 - 2.5% of total expenses. The increased costs of diesel fuel would certainly need to be reanalyzed. Anecdotal reports from fishers indicate that when the price of one gallon of diesel surpasses the value of one pound of scallops, the fishery is no longer profitable.

5.1.10.3 Social and cultural environment

Employment

Employment in the harvesting sector of the calico scallop fishery depends, to a large extent, on the distribution/abundance of the resource which fluctuates widely on a year-to-year basis.

Since 1970, the number of fishermen employed on vessels which have participated in the scallop fishery has ranged from 32 (in 1974) to 350-450 (in 1981) over the region as a whole, including the mid-Atlantic and New England areas. The industry peaked in the early 1980s at 2,616 jobs. For many, if not most, of these fishermen, scalloping is a part-time and/or seasonal activity which provides a means of supplementing the income they derive from other fisheries. However, with the discovery of new beds, and the opening of new processing lines, the proportion of total income derived from calico scalloping has increased significantly. For many fishermen, during 1981, income obtained from fishing for scallops represented as much as 75 percent of the total for the year. As of 2005 there were no active calico scallop fishermen.

Machine processing has generated a sizable increase in the number of laborers in the processing houses. As of December 1981, the number was estimated to be over 200 people working nearly full time at an average of $5 per hour. Previously only a portion of total income had been derived from scalloping. During 1981, however, especially in North Carolina where shrimping was poor, a greater proportion of income was derived from processing calico scallops. In regard to total wages for processing all types of shellfish and finfish, calico scallop processing shifted from playing a minor role to one which is fairly significant, and back to non-existent by 2004.

Fishing and Landing Areas

Concentrations of calico scallops and principal fishing areas are located off North Carolina, northeast and southwest of Cape Lookout; off the east coast of Florida from Ft. Pierce northward to the St. Johns River; and in the northeastern Gulf of Mexico between Carrabelle, Florida and Mobile, Alabama (Cummins 1971). It should be noted that the location and productivity of beds within these three principal fishing grounds fluctuate annually and, to a lesser extent seasonally, and consequently, so does the distribution of fishing effort both within these areas and over the region.

In addition to the three traditional fishing areas identified above, some commercial scalloping activity has occurred offshore of Tampa and Key West, Florida, and offshore of the South Carolina/Georgia border.

Calico scallops are generally landed at ports where suitable shore-based processing facilities are located or at ports in reasonably close proximity to fishing grounds where the scallops can be quickly unloaded and transported to processing facilities. Basically, landing ports are chosen for having four criteria: 1) a sufficient depth of water on all tides, 2) a strong dock for offloading with turning space for tractor trailers, 3) adequate fuel facilities, and 4) processing plants to handle the scallops. Ports within the management area where scallops have been landed are listed below.

North Carolina:
Beaufort/Morehead City
Sneads Ferry

South Carolina:
Georgetown
McClellanville
Mt. Pleasant

Florida:
Apalachicola
Carrabelle
Ft. Myers
Ft. Pierce
Key West
Mayport
Port Canaveral
Port St. Joe

Georgia:
Brunswick
Darien
Savannah

St. Augustine
Tampa
St. Marys

Increasingly, available dock space has been converted to uses other than commercial fisheries. In Port Canaveral, FL, the primary use has become the cruise ship industry. In other areas of Florida, such as Apalachicola, seafood processing houses have been bought out and the real estate converted for use in luxury, waterfront condominiums.

Conflicts among Domestic Fishermen
The calico scallop fishery of the South Atlantic and Gulf coast has been free of competition from foreign fleets and sport fishermen. However, during late 1981, the number of boats and vessels fishing the Cape Canaveral grounds increased dramatically. Estimates of the number of boats and vessels vary from 75 to 150. In addition, these boats and vessels hailed from home ports along the Gulf of Mexico and the entire East Coast of the U.S. This large increase in number of boats and vessels, combined with the diverse makeup of the new entrants, resulted in stress and controversy. Competition became intense leading to near collisions, fishing in areas with large concentrations of small scallops, and fishing in areas with parasite infested scallops. Recriminations among fishermen and processors became common. During the 1990s, the number of vessels in the fishery was reported to be around 25 (Calico Scallop Advisory Panel and Scoping Meetings). By 2005, there were no active calico scallop vessels in either North Carolina or Florida.

5.2.10.4 Bycatch

In the 1980s, the State of Florida commissioned a study of the bycatch associated with the calico scallop fishery (Nelson 1992). The findings indicate a similar composition to the community structure found in earlier studied in the State of North Carolina (Stephan 1989). Most of the bycatch was not composed of commercial or recreationally valuable species. The most common fishes were small flounders (family Bothidae), blue spotted searobin (*Prionotus roseus*), and scorpionfishes (Family Scorpaenidae). Other common fauna were Portunid crabs and echinoderms. In current studies, common associated fauna include imperial venus (*Chione latilirata*), sea stars of the genus *Astropecten*, Venus clams, and gastropods (*Distorsio* spp.). Sand dollars (*Encope* spp.) can be common in nearby sandy bottom, which may be interspersed in the shelly habitat where scallops are more common.

One issue that developed in the 1990s was the elimination of any on-board culling. This practice meant that the entire catch was processed dockside meaning all bycatch was disposed of in landfills rather than at-sea. A concern had developed that disposal of viscera and discards was actually attracting predators and encouraging development of disease on the fishing ground. The effect of the practice was that millions of pounds of shell were removed from the habitat. The shell is believed to be the primary settlement substrate for juvenile scallops, so in effect, the practice was removing an essential fishery habitat for calico scallops. Wells and Wells (1964) had already shown that at least 112 species of fauna utilized scallop shells as settlement habitat - including juvenile scallops. Often, the weight of the epifauna can exceed that of the host shell. The effect is that the large volume of shell creates a valuable benthic community, one that is removed from the ocean when bycatch is not culled at-sea. This practice also eliminates attached juveniles and eliminates any possibility for survival of organisms present in bycatch. The potential that this large-scale removal of potential prey impacts nearby reef fish communities should be considered.

5.3 Other Managed Fisheries in the South Atlantic

5.3.1 Atlantic Menhaden

5.3.1.1 Description of fishing practices, vessels and gear

(from 2001 ASMFC FMP)
Atlantic menhaden have supported one of the United States' largest fisheries since colonial times. Landings records indicate that over 18 million mt of Atlantic menhaden have been caught by fishing fleets operating from Maine to Florida since 1940.

Native Americans were the first to use menhaden, primarily for fertilizer. During the 1940s, the primary use changed to high protein animal feeds and oil production. Menhaden meal was mixed into poultry, swine, and cattle feeds as the amount used for fertilizer was decreasing. The oil was used in the manufacture of soap, linoleum, waterproof fabrics, and certain types of paint.

Following World War II, the industry grew rapidly, reaching peak production during 1953-62. Sharp declines in landings thereafter resulted in factory closings and fleet reductions through the 1960s and into the early 1980s. Since that time, the menhaden industry has experienced major changes in processing capacity, resource accessibility, and development of new product markets.

Vessels and Domestic Harvesting Capacity
The early menhaden purse seine fishery utilized sailing vessels, while coal-fired steamers were introduced after the Civil War. In the 1930s, diesel-powered vessels began to replace the steamers, although a few sailing vessels were still in use. Reintjes (1969) described modern menhaden vessels and purse seines and summarized the significant technological advancements since World War II as follows:

- 1946 -- Use of spotter aircraft. Setting on a school is now directed by the spotter pilot via radio communication with the purse boats.
- 1946 -- Use of pumps to transfer fish from the nets to the carrier vessel resulted in shorter transfer time and more fishing time.
- 1954 -- Use of synthetic net material rather than cotton twine resulted in increased net life.
- 1957 -- Use of hydraulic power blocks in the purse boats to haul in the net permitted a reduction in crew size and reduced net retrieval time. Strong synthetic

net material was able to withstand the increased strain from the new haul technique.
- 1958 -- Introduction of lighter, stronger, and faster aluminum purse boats to replace wooden boats.

The refrigeration of vessel holds in the 1960s and 1970s was crucial for the industry to maintain its viability. Despite restricted access to a number of traditional grounds and a reduced fleet size, refrigerated holds enabled the fleet to maximize the harvest during peak resource availability.

Refrigeration also allowed the fleet to range over a larger area and stay out longer, greatly improving the ability to catch fish when and where they are available. Currently, commercial menhaden purse seine fishing operations utilize spotter aircraft to locate schools of menhaden and direct vessels to the fish. When a school is located, two purse boats with a net stretched between them are deployed. The purse boats encircle the school and close the net to form a purse or bag. The net is then retrieved to concentrate the catch, and the mother ship comes along-side and pumps the catch into refrigerated holds.

Individual sets can vary from 10 to more than 100 mt, and large vessels can carry 400-600 mt of refrigerated fish. Over the years, vessels participating in the Atlantic menhaden purse seine fishery have varied considerably in size, fishing methods, gear type, and intensity of effort. During the early 1960s, the commercial menhaden fleet experienced significant changes as larger, faster vessels replaced outdated models. Today, the 12 vessels operating in North Carolina and Virginia range from 166 ft (51 m) to 200 ft (61 m) in length. Typical menhaden vessels generally carry two purse boats approximately 39 ft (13 m) in length. A few small vessels have only one purse boat and are called "snapper rigs." These small boats have the ability to fish in shallow areas not available to the larger vessels. The catches of the snapper rigs (a small fraction of the total) are mostly sold for bait (sport fishery, crab pots, etc.) with minor quantities processed into meal, oil, and solubles.

The typical purse seine net has a bar mesh of 3/4 in (1.9 cm) to 7/8 in (2.2 cm). The net length ranges from about 1,000 ft (305 m) to about 1,400 ft (427 m) and the depth from about 65 ft (20 m) to about 90 ft (27 m).

Historically, the total number of vessels fishing for menhaden was generally related to the availability of the resource. Greer (1915) reported 147 vessels in 1912. During 1955 to 1959, about 115-130 vessels fished during the summer season, while 30-60 participated in the North Carolina fall fishery. As the resource declined during the 1960s, fleet size decreased more than 50%. Through the 1970s, approximately 40 vessels fished during the summer season, while nearly 20 were active in the fall fishery.

During 1980-1990, 16-33 vessels fished the summer season, and the level of effort in the fall fishery ranged from a low of 3 vessels in 1986 to a maximum of 25. During the 1990 season, the mid-Atlantic fleet, based in Virginia was composed of 20 vessels, and the south Atlantic fleet, based in North Carolina, consisted of one large vessel and two smaller vessels, each using two purse boats. One of the smaller vessels, however, fished exclusively for bait. An additional 3-4 large vessels from Virginia and/or the Gulf of Mexico fished in the south Atlantic during the fall fishery.

Due to company consolidation in 1997, there are presently 10 vessels in the mid-Atlantic fleet (at Reedville, Virginia) and two vessels in the south Atlantic (at Beaufort, North Carolina). Changes in fleet size since the 1980s are attributable to a number of factors. Reductions in effort during the mid-1980s were related largely to world commodity markets and economic considerations. The addition of vessels participating in the Gulf of Maine Internal Waters Processing (IWP) ventures reflected resource availability in Maine. Reduction of the Chesapeake fleet by several vessels was accompanied by improved operating efficiency. Vessels from the Gulf of Mexico fishery were added to the Atlantic fleet for the fall fishery in order to maximize harvest when weather and fish migratory behavior provided opportunities for large catches. In November 1997, Omega Protein purchased its competitor in Reedville, AMPRO Fisheries. For the 1998 fishing season, Omega dismantled the AMPRO factory and reduced the Virginia reduction fleet from 20 to 13 vessels. Further reductions in fleet size occurred during 1999.

All twelve vessels in the menhaden fleet currently utilize refrigerated fish holds, compared to only 60% of the fleet in 1980. Refrigeration enables vessels to deliver better quality raw material and serves to increase vessel range and extend time on the fishing grounds. This ability to maximize peak resource availability was critical in the 1970s and 1980s for the maintenance of the industry in the face of restricted access to traditional grounds and a reduced number of vessels landing at fewer plants.

Average hold capacity of menhaden vessels in the summer fishery declined from 1,101,000 standard fish (737,670 lb or 334.6 mt) in 1980, to 997,000 standard fish (667,990 lb or 303 mt) in 1990, a decrease of 9.4%. The total hold capacity of the current twelve vessel menhaden fleet is well below that of the late 1950s.

During peak landing years (1953-1962), an average of 112 vessels with a mean vessel capacity of about 678,000 standard fish (representing a total fleet capacity of approximately 76,000,000 standard fish) supplied the industry (Nicholson 1971). The fleet landed daily catches at 20 menhaden reduction plants from New York to Florida. In comparison, the 1990 fleet of 33 vessels, which operated within a more restrictive and regulated environment, landed their catch at five plants, including the foreign processing vessel. As previously noted, the current fleet of twelve vessels unloads menhaden at only two ports, Reedville, Virginia and Beaufort, North Carolina.

Fishing and Landing Areas

The Chesapeake Bay area (including the mid-Atlantic area) accounted for about 77% of the Atlantic menhaden landings in 1990 and about 73% during the 1980-1990 period. Plants in the north and south Atlantic areas, including one plant active during the fall fishery, processed about 27% of the annual landings. Three plants located in Virginia and North Carolina processed about 90% of the harvest.

In 1991, Chesapeake Bay, including the mid-Atlantic area, accounted for about 74% of the menhaden landings. The North Atlantic area contributed most of the balance of the landings, while the south Atlantic area contributed the remainder. The catch was landed at shoreside processing plants in Beaufort, North Carolina; Reedville, Virginia (2 plants); and Blacks Harbour, N.B., Canada. A Russian factory ship anchored at various locations within the territorial waters of southern Maine also processed menhaden under an IWP arrangement.

As no menhaden landings for reduction have occurred in New England since the summer of 1993, landings of Atlantic menhaden for reduction have been made exclusively by the Virginia and North Carolina vessels at Reedville, Virginia and Beaufort, North Carolina.

Between 1994 and 1997, the factories at Reedville processed an average 89% of the Atlantic menhaden catch for reduction; the remainder was unloaded at Beaufort.
Smith (1999b) summarized catch estimates of menhaden vessel captains in the Virginia and North Carolina fleets (excluding New England vessels) from Captains Daily Fishing Reports (CDFR's) during 1985-96. On average, over the twelve year study period, 52% of the catch by the Virginia and North Carolina fleets came from the Virginia portion of Chesapeake Bay, 17% was caught in North Carolina coastal waters, 16% in Virginia ocean waters, and 15% in ocean waters of Rhode Island, New York, New Jersey, Delaware, and Maryland and Delaware Bay combined. However, the New Jersey portion of Delaware Bay has been closed to the reduction fishery since mid-1989, the Delaware portion in mid-1992, and most of Long Island Sound has now been closed to the reduction fishery.

Fishing Seasons

The directed menhaden purse seine fishery for reduction is seasonal. The presence of menhaden schools is dependent on the temperature of coastal waters. Two fairly distinct fishing seasons occur, the "summer fishery" and the "fall fishery". The summer fishery begins in April with the appearance of schools of menhaden off the North Carolina coast. The fish migrate northward, appearing off southern New England in May-June. The fishery in the Gulf of Maine may extend into early October, although menhaden may not appear in the Gulf of Maine at all in some years. Menhaden stratify by age along their migration route as smaller, younger fish remain in the southern area, while larger, older fish travel farther to the north. Peak landings occur during June-September.

The fall fishery begins about 1 November as migratory fish appear off Virginia and North Carolina. In early fall, this southward migration is initiated by cooling ocean temperatures. By late November-early December, most of the fish are found between Cape Hatteras and Cape Fear, North Carolina. Menhaden vessels based in Beaufort, North Carolina and Reedville, Virginia harvest these fish during the fall fishery. Fishing may continue into January (and sometimes February), but is highly weather dependent. Menhaden generally leave the nearshore coastal fishing grounds in January, dispersing in ocean waters off the south Atlantic states.

Commercial Reduction Fishery

Atlantic menhaden have supported one of the United State's largest fisheries since colonial times. Menhaden have repeatedly been listed as one the nation's most important commercial fisheries species in terms of quantity. Total menhaden landings (Gulf of Mexico and Atlantic) in 1998 were 1.7 billion lb (816,467 mt) valued at $103.8 million (NMFS 1999). Preliminary Atlantic menhaden landings in 1999 totaled 416 million lb (188,662 mt) with an estimated ex-vessel value of $33.2 million (NMFS 2000).

Native Americans may have used menhaden for fertilizer before the European settlement of North America. Colonists soon recognized the value of whole menhaden for fertilizer, and local seine fisheries gradually developed from New York to Maine. Farmers applied 6,000 to 8,000 fish per acre (Harrison 1931). The use of whole fish as fertilizer continued into the nineteenth century. Union soldiers returning home from North Carolina and Virginia after the Civil War provided anecdotal reports on the abundance of menhaden in Chesapeake Bay and coastal North Carolina, sparking interest in a southern fishery, which soon developed.

The menhaden oil industry began in Rhode Island in 1811 (Frye 1999). It has grown steadily, with significant mechanization, including boilers for rendering raw fish and presses for removing oil. Oil was initially used for fuel and industrial processes, while the remaining solids (scrap) were used for fertilizer.

Numerous small factories were located along the coasts of the northeastern states. However, their supply was limited to fish that could be captured by the traditional shore-based seines. In 1845, the purse seine was introduced, and an adequate supply of raw material was no longer a problem. By 1870, the industry had expanded southward, with several plants in the Chesapeake Bay and North Carolina areas (Whitehurst 1973).

The industry gradually developed during the late 1800s and early 1900s and was described in considerable detail prior to World War I by Greer (1915). During this period the number of factories and vessels varied with the supply of menhaden. The principal use for the scrap was fertilizer, with different companies each producing their own formulation. A small amount of scrap was used to feed cattle and chickens.
The primary use of menhaden changed from fertilizer to animal feed during the period following World War I. Harrison (1931) described the uses of menhaden during the late 1920s as follows: "... much is being used in mixed feeds for poultry, swine, and cattle and the amount going to fertilizer is steadily decreasing. Menhaden oil is used primarily in the manufacture of soap, linoleum, water proof fabrics, and certain types of paints."

Following World War II the industry grew rapidly, reaching peak production during 1953-62. Sharp declines in landings thereafter resulted in factory closings and fleet reductions through the 1960s and into the early 1970s. Since that time, the menhaden industry has experienced major changes in processing capacity, resource accessibility, and access to new product markets.

Nine menhaden reduction plants on the Atlantic coast closed permanently during the 1980s while two new operations began. In 1990, five reduction plants with 37 vessels processed Atlantic menhaden for fish meal and oil. In the United States, land-based plants are currently located at Beaufort, North Carolina and Reedville, Virginia. An IWP venture operated in Maine state waters during 1988-92.

Menhaden have also been caught off the coast of Maine and transported to a reduction plant in Blacks Harbour, New Brunswick, Canada (Vaughan 1990). Since preparation of the 1981 Atlantic Menhaden FMP (AMMB 1981), there have been numerous regulatory changes affecting the menhaden fishery, such as season limits, area closures, and changes in license fees. In some state waters, a prohibition on commercial menhaden fishing operations using purse seines has been implemented.

(next two paragraphs from the 2005 ASMFC update to the FMP)
The 2004 harvest of Atlantic menhaden for reduction was 184,450 metric tons, which was 11%more than purse-seine landings during the 2003 season (166,097 mt), and 1% greater than average landings for the previous five years (182,475 mt) (NMFS 2005) (Figure 5.3.1-1). Nominal fishing effort in 2004 was 345 vessel-weeks, up 14% from nominal fishing effort observed in 2003 of 302 vessel-weeks (Figure 5.3.1-2). The increase in nominal fishing effort in 2004 was in part due to the addition of two vessels from the Gulf of Mexico to the factory at Beaufort, NC, during the fall fishery. Nevertheless, since the factory in Reedville, VA, downsized to 10 vessels in 2000, coastwide nominal fishing effort has varied by minor amounts, averaging 323 vessel weeks for the five-year period, 2000-2004, and ranging from 302 (2003) to 345 (2004) vessel-weeks.

A total of 13 reduction purse-seine vessels landed Atlantic menhaden during the 2004 season for reduction, one more than the previous year. There was no directed purse-seine activity for one in Reedville, VA, with ten vessels, and one in Beaufort, NC, with one vessel fishing summer through fall and two vessels added (from the Gulf of Mexico) in November for the fall fishery. The bait fishery for menhaden has become increasingly more important from North Carolina to New England.

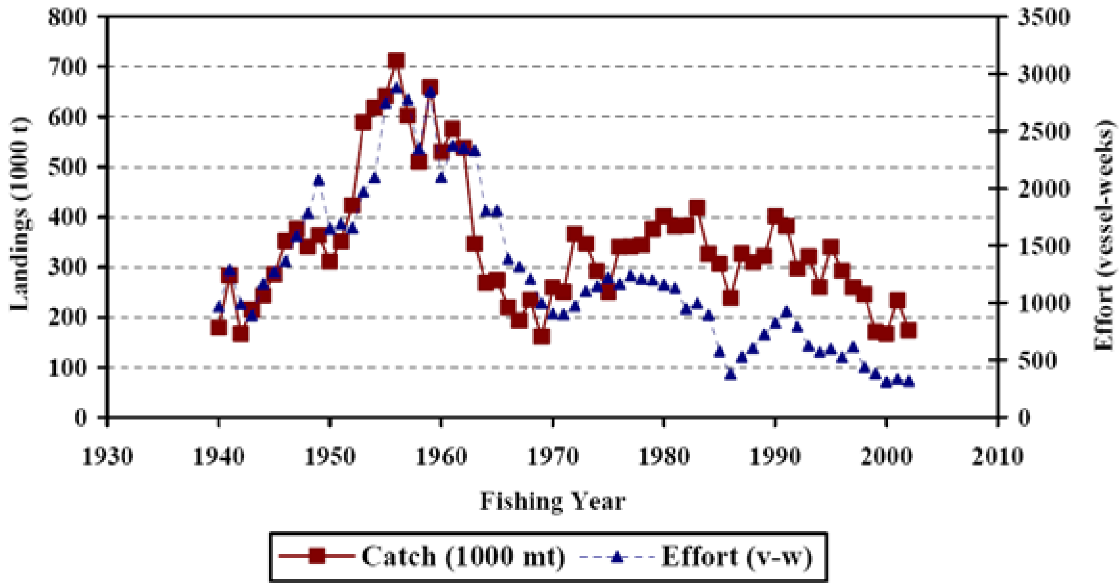


Figure 5.3.1-1. Atlantic menhaden reduction landings and nominal effort, 1940-2002 (2003 Stock Assessment).

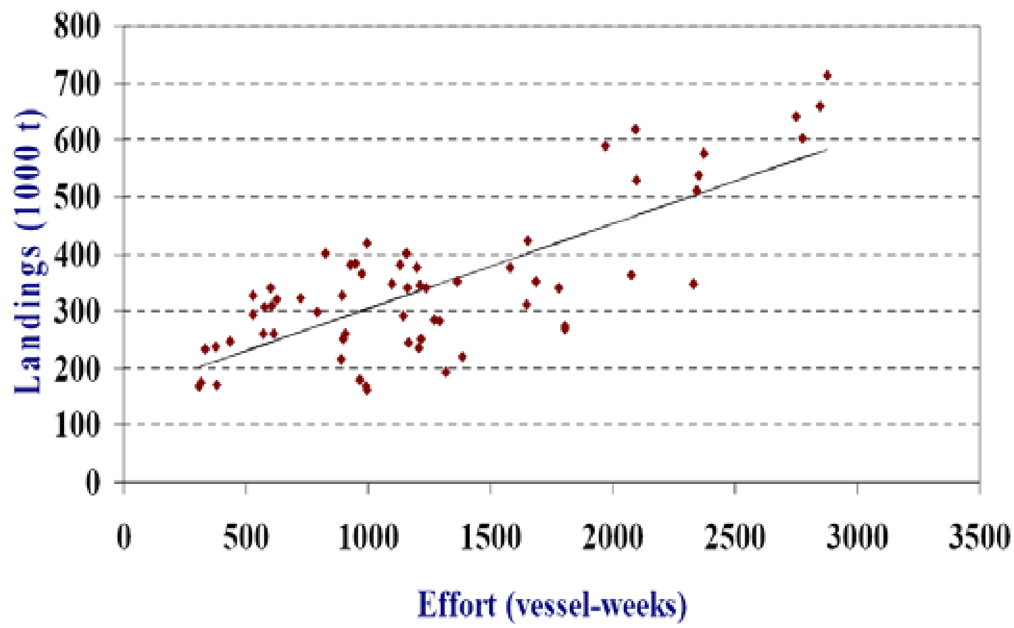


Figure 5.3.1-2. Atlantic menhaden reduction landings versus nominal effort, 1940-2002 (2003 Stock Assessment).

Commercial Bait Fishery

Information on the harvest and use of menhaden for bait is difficult to obtain because of the nature of the bait fisheries and data collection systems. Harvest comes from directed fisheries, primarily small purse seines, pound nets, and gill nets, and bycatch in various food-fish fisheries, such as pound nets, haul seines, and trawls. Menhaden are taken for bait in almost all Atlantic coast states and are used for bait in crab pots, lobster pots, and hook and line fisheries (both sport and commercial). A specialized use involves live menhaden as bait for coastal pelagic species.

Reported annual landings of Atlantic menhaden for bait along the Atlantic coast averaged about 33.7 mt (about 70.0 million pounds) for the period 1985-99. Reported bait landings usually accounted for approximately 10% of the total Atlantic menhaden landings each year from 1985-97. In 1998 and 1999, reported bait landings accounted for 13.7% and 17.3%, respectively, of the total Atlantic menhaden landings. The increase in percent of coastal landings are attributed to better data collection in the Virginia snapper rig bait seine fishery and a decline in coastal reduction landings due to reductions in processing plants and fleet size.

Closure of reduction plants in New England and the mid-Atlantic may have influenced growth in the bait fishery, making more product available for the lobster and crab pot fisheries, as well as bait and chum for sport fishermen. Additionally, the passage of a net ban in Florida in November 1994 reduced the availability of bait and chum in that state, which opened up new markets for menhaden bait caught in Virginia and the mid-Atlantic states. The appearance of growth in the Atlantic coast bait fishery must be tempered by the knowledge that reporting systems for bait landings, particularly for Atlantic menhaden, have historically been incomplete at best. In most cases, recent landings estimates are more accurate, but for some states, bait landings continue to be underestimated. The nature of the fishery and its unregulated marketing are causes of the under-reporting problem. There are some well-documented, large-scale, directed bait fisheries for menhaden using gears such as purse seines, pound nets, and gill nets. There are also many smaller-scale directed bait fisheries and bycatch fisheries supplying large quantities of bait with few, if any reporting requirements. Menhaden taken as bycatch in other commercial fisheries is often reported as "bait" together with other fish species. The “over-the-side” sale of menhaden for bait among commercial fishermen is under-reported (and often unreported). Common practices, such as utilizing menhaden for bait or chum in sportfishing tournaments is difficult to estimate when quantity sales are made to individual marinas and fishing clubs.

Despite problems associated with estimating menhaden bait landings, data collection has improved in many areas. Some states license directed bait fisheries and require detailed landings records. Catch-per unit-of-effort (CPUE) data, pounds caught per hour set and pounds caught per yard of net set are also reported for directed gill net fisheries in some states.

(paragraph below form the 2005 update to the ASFMC FMP)
Landings of Atlantic menhaden by the bait fisheries (all gears combined) in 2004 amounted to 34,743 mt; this was 16% of the combined (reduction and bait) total Atlantic menhaden landings in 2004. The majority of the bait landings are from purse-seine gear operating in Virginia and New Jersey waters. Through the period 1985-1997, bait landings generally comprised about 10% or less of the total Atlantic menhaden harvest. With the decline in the reduction landings in recent years, the relative importance of the

bait fishery has increased. More comprehensive reporting of bait landings has also contributed to this trend.

South Atlantic Bait Fisheries

Part of North Carolina's landings are reported directly, while the rest are estimated from fishery-dependent sampling. The principal use for menhaden as bait in North Carolina is in the blue crab pot fishery. South Carolina and Georgia have no directed menhaden fisheries, shrimp trawl bycatch and cast netting supply menhaden to crab potters and sport fishermen in those states. Florida's east coast had substantial menhaden landings for bait from gill nets and purse seines prior to the implementation of a net ban in 1994.

Domestic Processing Activities and Products

Menhaden reduction plants, through a process of heating, separating, and drying, produce fish meal, fish oil, and fish solubles from fresh menhaden. Meal is a valuable ingredient in poultry and livestock feeds because of its high protein content (at least 60%). The broiler (chicken) industry is currently the largest user of menhaden meal, followed by the turkey, swine, pet food, and ruminant industries. The aquaculture industry has recently demonstrated an increased demand for fish meal as well.

Menhaden oil has been used for many years as an edible oil in Europe. The oil is refined and used extensively in cooking oils and margarine. In 1989, the United States Food and Drug Administration (FDA) concluded that fully and partially hydrogenated menhaden oil is a safe ingredient for human consumption. In 1990, the FDA proposed an amendment, based on an industry petition, to the standard of identity for margarine to permit the use of marine oils. It was approved in 1997 and could provide a significant new market for omega-3 rich menhaden oil.

Solubles are the aqueous liquid component remaining after oil removal. In general, most meal producers add the soluble component to the meal to create a product termed "full meal." The use of solubles as an export product is limited because most companies in the feed industry are not equipped with the necessary storage tanks, pumps, and meters to handle a liquid product.

The world fish meal industry is in the process of adopting low temperature meal technology, a process which yields significantly higher protein content than previous technologies and produces feed components particularly valuable to aquaculturists. Investment in these new processes represents an opportunity for the U.S. industry to broaden its market base and add value to its products. Public sector support, in the form of research on markets, technology development, and new products, will be a key factor in maintaining the domestic menhaden industry's global competitive status.

Recreational Fishery

No significant directed recreational fisheries exist for menhaden. However, menhaden are an important bait in many recreational fisheries; some recreational fishermen employ cast nets to capture menhaden or snag them with hook and line for use as bait, both dead and live.

Current status of the fishery

(from the 2007 ASFMC Update)
The 2006 coastwide harvest (bait and reduction) of Atlantic menhaden was 183,583 metric tons. This is slightly down from 185,030 metric tons in 2005. The 2006 harvest for reduction purposes only was 157,385 metric tons. This is up 7% from the 2005 landings of 146,860 metric tons, but down 13% from the previous 5-year average of 180,833 metric tons; declines in landings during 2005 and 2006 mainly reflect the decision by Beaufort Fisheries Inc., to no longer participate in the reduction fishery. Reduction landings generally have gone down since the early 1990s (Figure 5.3.1-3). The coastwide bait harvest for 2006 was 26,198 metric tons, down 31.4% from the 2005 harvest of 38,170 metric tons, and down 28% from the average harvest of the previous five years (2001-2005)(Figure 5.3.1-3).

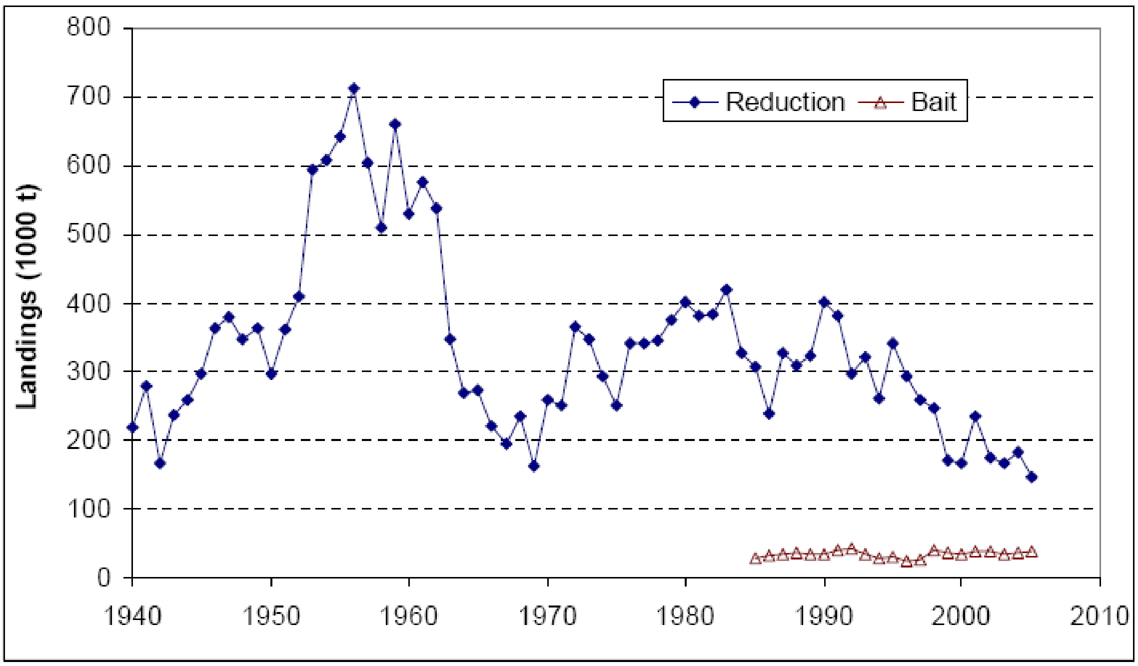


Figure 5.3.1-3. Landings from the reduction purse seine fishery (1940–2005) and bait fishery (1985–2005) for Atlantic menhaden (ASMFC 2006)

The largest percentage decrease in bait landings from 2005 to 2006 occurred in Maryland and Virginia, 59% and 51% respectively; this trend mirrors removals from Chesapeake Bay by the reduction fishery. All states from New Jersey and north reported an increase in 2006 landings over 2005. Potomac River Fisheries Commission and Florida also reported increased harvest.

The bait fishery appears to be expanding in the northern range of the species, i.e., New England, based on reported landings in recent years (Table 5.3.1-1).

Omega Protein's plant in Reedville, Virginia, is the only active menhaden reduction factory on the Atlantic coast. Eleven vessels fished out of this plant in 2006. Beaufort Fisheries Inc. has been closed since the 2004 fishing season.

Table 5.3.1-1. Menhaden Bait Landings by Region (1985 – 2006) [in 1,000s of metric tons] (ASMFC 2006, B. Muffley pers. comm. 2007)

Year	New England (ME – CT)	Mid-Atlantic (NY – MD Coast)	Chesapeake Bay (MD Bay, VA, PRFC)	South Atlantic (NC – FL)	Total (ME – FL)
1985	6.15	1.82	18.05	2.27	28.30
1986	13.75	1.31	13.64	2.44	31.15
1987	13.28	1.28	16.99	2.56	34.11
1988	19.73	1.20	12.38	2.88	36.19
1989	9.54	1.52	20.30	3.41	34.77
1990	11.19	4.38	13.98	4.07	33.61
1991	14.47	7.98	13.90	3.38	39.74
1992	12.44	12.73	14.15	3.10	42.43
1993	11.64	13.37	7.84	2.10	34.94
1994	0.43	17.79	5.76	3.17	27.15
1995	4.08	17.19	7.62	1.57	30.46
1996	0.04	16.21	6.47	0.58	23.29
1997	0.14	17.61	7.50	1.66	26.91
1998	0.21	15.17	23.71	1.33	40.42
1999	0.15	12.68	22.92	1.32	37.07
2000	0.19	14.25	19.68	0.93	35.05
2001	0.08	12.17	23.79	1.37	37.41
2002	0.69	11.29	24.11	1.13	37.22
2003	0.12	8.00	26.07	0.79	34.98
2004	0.03	9.59	25.20	0.50	35.32
2005	1.01	8.25	28.26	0.66	38.18
2006	1.49	9.87	14.35	0.50	26.21

Allowable gear

Atlantic menhaden may be harvested commercially in the EEZ using purse seine, trawl, gillnet and hook-and-line. Menhaden may be harvested recreationally using hook-and-line, snagging and cast nets.

5.3.1.2 Economic and social description

No recent studies have been conducted to assess the economic characteristics of the menhaden fisheries. The most recent information is included in the 1992 FMP (ASMFC 1992).

(text below excerpted from "Collection of Baseline Sociological Data to Describe The Atlantic Menhaden (Brevoortia tyrannus) Fishery by Dr. Brian Cheuvront, NCDMF)

As part of the ongoing effort to document changes in the menhaden fishery over time, Dr. Brian Cheuvront was contracted by the Atlantic States Marine Fisheries Commission (ASMFC) to conduct interviews with persons in Virginia and North Carolina who participate in the menhaden fishery. This section is directly out of Dr. Cheuvront's report to the ASMFC.

Menhaden (*Brevoortia* spp.) have repeatedly been listed as one the nation's most important commercial fisheries species in terms of quantity. Total menhaden landings (Gulf of Mexico and Atlantic) in 2002 were 1.4 billion pounds (633,985 metric tons) valued at $83.6 million. Atlantic menhaden (*Brevoortia tyrannus*) landings in 2002 totaled 385.5 million pounds (174,870 metric tons) with an estimated ex-vessel value of $22.1 million (NMFS, 2003). In North Carolina, Atlantic menhaden alone accounted for 62.4% of all finfish landed, and 13.5% of the value of all finfish landed in 2002 (NC DMF).

Historically, menhaden had many uses. It is thought Native Americans may have used menhaden for fertilizer. Colonists soon recognized the value of whole menhaden for fertilizer, and local seine fisheries gradually developed from New York to Maine. The use of whole fish as fertilizer continued into the nineteenth century. A southern fishery developed after the Civil War (Menhaden Resource Council, 2003).

The menhaden oil industry began in Rhode Island in 1811. It grew steadily, with significant mechanization, including boilers for rendering raw fish and presses for removing oil. Oil was initially used for fuel and industrial processes, while the remaining solids (scrap) were used for fertilizer. Numerous small factories were located along the coasts of the northeastern states. However, their supply was limited to fish that could be captured by the traditional shore-based seines. In 1845, the purse seine was introduced, and an adequate supply of raw material was no longer a problem. By 1870, the industry had expanded southward, with several plants in the Chesapeake Bay and North Carolina areas.

The primary use of menhaden changed from fertilizer to animal feed and other products during the period following World War I. At that time, menhaden oil was used in the manufacture of soap, linoleum, waterproof fabrics, and certain types of paints.

Following World War II the industry grew rapidly. Sharp declines in landings thereafter resulted in factory closings and fleet reductions through the 1960s and into the early 1970s. Since that time, the menhaden industry has experienced major changes in processing capacity, resource accessibility, and access to new product markets.

Nine menhaden reduction plants on the Atlantic coast closed permanently during the 1980s while two new operations began. In 1990, five reduction plants with 37 vessels processed Atlantic menhaden for fishmeal and oil. In the United States, land-based plants are currently located at Beaufort, North Carolina and Reedville, Virginia. Upper Chesapeake Bay in Maryland and the coast of New Jersey are closed to menhaden fishing operations. Most Atlantic states, however, remain open to menhaden fishing.

Currently there are only two menhaden processing plants working on the east coast of the United States. Omega Protein is located in Reedville, Virginia and Beaufort Fisheries is located in Beaufort, North Carolina. Of the two, Omega Protein processes about four to five times more menhaden than does Beaufort Fisheries. There are also a few smaller operations that fish for menhaden to be used primarily as bait for recreational fishermen and commercial crab pots.

In-person interviews were conducted involving 21 people from September to December of 2003. The in-person interviews took place in Beaufort, NC and Reedville, VA. People interviewed included: two plant general managers, one plant bookkeeper, one oils reduction plant supervisor, one oils reduction plant machine operator, seven menhaden fishing boat crew members (captains, mates, engineer, deck hands, etc.), two commercial pound netters, two bait fishery boat captains, two recreational fishermen who target menhaden using commercial gear and three people from the Reedville community involved in community affairs, but not directly involved in the menhaden fishery (including the Fisherman's Museum director). Topics of discussion included (as appropriate) work history, fishing effort, labor, race relations, current state of the industry, fishing communities, fisheries management, conflicts between user groups, and perceptions about the future. The interviews were recorded on standard cassette tapes. Once all were completed, they were transcribed verbatim.

Work History

Nearly all of the people interviewed for this study and who were currently worked in menhaden have done so for an average of about 25 years. Several of the people interviewed in Reedville were retired from some aspect of the menhaden industry. Menhaden processing is a field where most workers come up through the ranks, including general managers, beginning as either a crewmember or as an apprentice machine operator. All found the work to be hard, but rewarding. Several respondents said they had little formal education and found working in menhaden to be as financially lucrative as any job they could expect. Most expected to remain working in the fishery until they retired or the factory ceased operations.

Only the general managers and few others in working at the reduction facilities were able to work 12 months a year. They did not work in menhaden when there were no fish to catch or process. The fishing season typically lasts longer in Reedville than in Beaufort. Many of the workers at Omega Protein are able to work 10 to 11 months of the year. Aside from some maintenance and net repair workers, most employees at Beaufort Fisheries work about 6 months of the year.

Fishing Effort

Omega Protein currently has 10 boats that fish for menhaden. Beaufort Fisheries has two. There are 4 menhaden bait fishery operations using nets that work the Chesapeake Bay. All the people interviewed said their used to be a lot more effort targeting menhaden. Pictures of the Beaufort waterfront from the 1950's show as many as 30 or so boats tied up at the docks. The last couple of decades have seen the closure of a processing plant in Southport, NC and the consolidation of American Protein in Reedville by Omega Protein.

According to one informant, Omega Protein had about 13 boats actively working about 25 years ago and American Protein had a similar number. Crews were also larger in past years.

Comparatively speaking, the boats targeting menhaden today are more successful than their predecessors. Reliance on spotter planes has increased individual trip catches. But still, as one general manager put it, "it's not unheard of for us to travel 30 miles in one direction to get two fish."

Labor

Much of the heavy work on menhaden boats is now mechanized. Early crews consisted of a captain, pilot, mate, one or two engineers, a cook, and as many as two dozen crewmembers to haul nets (Garrity-Blake, 1994). Nowadays, crews average approximately 14 with only 8 crew members.

Availability of labor seemed to more of an issue for Beaufort Fisheries than Omega Protein. The working season tends to be shorter and workers need additional sources of employment that they can easily leave when the fish are present. Most jobs that allow this kind of movement are low paying. So as soon as menhaden workers find better paying jobs, they leave the menhaden fishery altogether. Finding quality replacements for them is difficult.

Omega Protein employees work for most of the year and can survive financially during the periods they are not fishing. Also, a major factor is that workers in Reedville have very few options for other employment. Omega Protein is the largest employer in Northumberland County, Virginia (2001 population: 12,412). Workers in the Beaufort area (Carteret County, 2001 population: 59,901) have more alternatives for employment.

Race Relations

Garrity-Blake (1994) addressed racial issues in the menhaden industry. At that time she stated that earlier vestiges of racism were beginning to change. The general managers interviewed both said that race is not a factor in who gets hired for any position. The most important factors are experience and skill. However, in both communities, African-Americans, on average have lower level of educational achievement and occupy a large percent of the lower level positions.

The African Americans interviewed expressed that they felt no different in terms of discrimination on their jobs. One African-American man who was interviewed worked in a reduction facility for twenty years. He had an 8th grade education. He was clear that he did not have the skills for doing other work and was happy to have the job that he does because it paid well. He saw the job as an opportunity in a living environment that was short of job opportunities for most people.

Both general managers spoke highly of African-American employees and insisted that all workers in their plants were more like family than employees, regardless of race. One spoke of company sponsored and financed programs to help any employee ("black, white, or green – it doesn't matter") who wished to advance through the ranks, including getting any necessary boating licenses.

There were three main categories of concerns expressed regarding the current state of the industry. The first concern was largely business related. The two reduction facilities were worried about staying profitable and staying competitive. The second concern was regarding fisheries management and affected all who worked the fishery. Harvesters and general managers alike were extremely concerned regarding conflicts between user groups particularly between commercial fishery interests and the interests of recreational fishermen who are concerned that there are not enough menhaden to feed the available striped bass and other prized sport fish populations.

Business Concerns

The two plant general managers spoke about some of the larger business concerns they have. Typical business concerns such as supply and demand of product were understandably important to them. But they were also concerned about markets for their products. One of the plants will shortly be undergoing a $16-17 million expansion program designed to be able to reduce menhaden oil for human consumption as Omega-3 fatty acids. Other competitors for their products include soybeans. For these businesses, they are not just concerned with fish stocks and ability to land them, but also competition from other products.

Other business concerns include pressure from outside development, and the previously mentioned labor issues. Outside development is increasing the property values where these plants are located. There is concern that newly arrived people in the community do not understand the history, nor appreciate the positive impact the industry has had on the surrounding community.

Fisheries Management and Environmental Regulation

All harvesters and plant managers who were aware of the stock status emphasized that they were pleased that the stocks are healthy. They are resigned to having to cope and react with regulations that limit their fishing activities. One spoke of his tremendous disappointment at the fact that industry representatives were no longer on the management boards. "…they kicked us off. It must have been about three years ago because we were involved in the menhaden business and hired a couple of sports fishermen to take our place."

The reduction facilities agree with the way the fishery is currently being managed, however, they fear what they see as increasing influence from recreational interests. Menhaden pound net fishermen were not as happy with fisheries management. They were unhappy because they must remove their nets from the water because of sea turtle encounters. "They found three dead turtles out of three hundred in pound nets so they decided to have an industry wide closure. They had a mandatory closure on the pound net fishery for two weeks [in 2003] and this year coming up [2004] they're talking like six weeks of closure."

Menhaden processors must not only deal with fisheries regulatory bodies, but also with air and water quality authorities. Depending on the actions of those government agencies, they are viewed as being benign or harassment. One processor said they specifically worked with the Environmental Protection Agency on smoke stack issues and did not feel they were overly hassled. On the other hand, one general manager complained about fish kills that occurred near his processing plant had the state division of water quality visiting him "11 straight days, Saturday and Sunday included, raising hell about that [leaking] raw box. It's been there over 100 years and never had a fish kill."

Conflicts Between User Groups

User group conflicts represented the most salient issue for many of the people interviewed. No one interviewed stated that they ever had conflicts with other commercial fishing interests. Currently, there are 14 vessels (10 from Omega Protein, 4 independent bait vessels) whose home ports are on the Chesapeake Bay, in or near Reedville. Vessels that target menhaden tend to be larger than most other nearby fishing vessels and the commercial vessels tend to stay away from each other.

Everyone interviewed was concerned about the ongoing conflicts with groups representing recreational fishing interests. Most were seriously worried that recreational interests would win out over commercial interests. They cited the larger number of people who fish recreationally and their lobbying power. Some expressed a feeling that there is a conspiracy against commercial fishing and recreational groups are using tactics to shut down commercial fishing altogether, especially in fisheries where there is significant recreational interest. Tactics mentioned included getting persons sympathetic to their issues appointed to management boards, lobbying state and federal legislators, misrepresenting facts, and fabricating stories to implicate commercial fisheries in the demise of recreationally valued species.

Some respondents said they have heard recreational groups feel that commercial menhaden harvest, particularly from the Chesapeake Bay, is removing a vital food source for striped bass, a fish whose numbers had been greatly reduced in the past, but now is back in record numbers. The commercial fishermen point to the stock assessment that says that Chesapeake Bay harvest of menhaden largely targets age 2 and 3 fish; however, the majority of striped bass are eating age 0 and 1 fish, along with some age 2 fish. They also pointed out that even though the striped bass are now back in record numbers, the harvest of this recovered fish stock clearly favors recreational fishermen. A commercial fisherman who sometimes uses a gill net said that the only way he could keep two striped bass for his own consumption was to go out and get a recreational fishing license, because as a commercial fisherman he was not allowed to keep any striped bass.

A few people interviewed stated the reason why the recreational fishermen are targeting menhaden is because they want to end commercial fishing altogether and will use any means to do so. There were some reports of conflicts on the water with recreational fishermen, as well. Both processing plant general managers expressed that there had been occasions when a recreational vessel would see purse seine boats heading for a school of fish, a recreational vessel would speed through the school of fish trying to break them up. However, these were represented as relatively rare occurrences.

The commercial menhaden fishermen feel as if they are the underdogs in this conflict. As one commercial fisherman put it, “the [recreational] industry and big dollar businesses are behind them pushing for this. They have all their magazines. They’ve got a lot of people with a lot of money.”

Fishing Communities

Menhaden fishing was seen as being very important to the history of both the Beaufort and Reedville communities. Elijah Reed founded the town of Reedville after the Civil War. He came to Virginia’s Northern Neck with the expressed purpose of finding a place to locate a menhaden processing plant. Beaufort was settled nearly two hundred years prior to the emergence of the commercial menhaden fishery in North Carolina. One town owes its identity to menhaden; the other considers menhaden to be an important part of its history.

Omega Protein is the largest employer in all of Northumberland County, Virginia, with about 250 employees most of the year. Beaufort Fisheries employs approximately 70 individuals when there are fish to harvest and process. There are many employers in Carteret County that have more workers than Beaufort Fisheries.

The employment differences between the communities have a large effect on the current role menhaden has locally. In Reedville, Omega Protein is highly visible and the company works hard to be perceived as a good community partner. All the people interviewed in Reedville, including a few who were not directly involved in the commercial harvest of menhaden perceived Omega Protein as a good corporate citizen. For example, several years ago Omega Protein made significant changes to their infrastructure to help reduce the smell from the reduction facility in response to community concerns.

One person interviewed mentioned that sometimes when new people (known locally as “come heres”) arrive in Reedville they complain about the processing facility. Over time, they realize the facility doesn’t present a problem. Some people said that if Omega Protein was to close down, Reedville would cease to exist.

Beaufort Fisheries has a different relationship with its local community. Long time residents are aware of the role of menhaden in the community, but the local importance of commercial fishing to the economy was long ago supplanted by tourism and coastal gentrification. Additionally, Beaufort Fisheries is located on a property primely situated for waterfront home development.

Tourism and coastal gentrification are issues for both communities. Many of the older fishermen used to come to Beaufort years ago as part of the menhaden fleet that followed the fish. These people, especially, look at recent developments of Beaufort with disdain.

One fisherman stated that the last thing he wanted for Reedville was for it to become like Beaufort with all the expensive houses and fancy restaurants.

Perceptions About the Future

Many of the people interviewed were asked whether they would recommend to a young person a career working in menhaden. Most of the respondents were too worried about the future of the commercial fishery to recommend it. Their biggest concerns were about the outcomes of brewing user group conflicts and being able to keep competitive in the markets where menhaden are used. For most, the work is hard and the outcome is uncertain. One processor general manager said, "I've got two boys and I told both of them I'm not going to allow them to come down here. I want something better for them than this." Exceptions to this feeling were among land-based workers with steady employment working at the processing plants.

Conclusions

The people who work in the menhaden industry have many things to worry about. Like all fishermen, they have to be able to find and catch the fish. But they also have to worry about competition, sometimes from non-fishery related products such as soybeans. Because menhaden are an industrial product rather than a seafood product, processors worry about additional issues such as compliance with environmental regulations of water and air quality. However, the long-term survivability of the industry may depend on the outcome of its current battles with recreational fishing interests.

Commercial menhaden harvesters and processors view the stocks as being more than adequate for the needs of both themselves and as forage food for striped bass and other fish. However, they are concerned that attacks on the menhaden industry are really attempts to eliminate commercial harvesting altogether. There is a sense that without some outside intervention their way of live may be lost in favor of recreational fishing interests. Whether or not this prophecy will be true remains to be seen.

5.3.1.3 Bycatch

(from 2001 ASMFC FMP)

Incidental bycatch of other finfish species in menhaden purse seines has been a topic of interest and concern for many years to the commercial and recreational fishing industry, as well as the scientific community (Smith 1896; Christmas et al. 1960; Oviatt 1977). Numerous past studies have shown that there is little or no bycatch in the menhaden purse seine fishery. Some states restrict bycatch to 1% or less of the total catch on a vessel by regulation.

A study of bycatch of other species in the Atlantic menhaden fishery was recently completed through funding provided by the Federal Saltonstall-Kennedy grant program (Austin et al. 1994). The Virginia Institute of Marine Science studied bycatch levels of finfish, turtles, and marine mammals in the Atlantic menhaden fishery. Results from that study indicated that bycatch in the 1992 Atlantic menhaden reduction fishery was minimal, comprising about 0.04% by number. The maximum percentage bycatch occurred in August (0.14%) and was lowest in September (0.002%). Among important recreational species, bluefish accounted for the largest bycatch, 1,206 fish (0.0075% of the total menhaden catch). No marine mammals, sea turtles, or other protected species were killed, captured, entangled or observed during sampling. A concurrent study was conducted by Louisiana State University for the Gulf of Mexico menhaden fishery (de Silva and Condrey 1997).

Additional data are available from the Gulf of Maine IWP fishery in 1991. Every catch unloaded onto the processing vessel was inspected by a state observer. A total of 93 fish were taken as bycatch along with about 60,000,000 individual menhaden (D. Stevenson, Maine DMR, pers. comm.; as cited in ASMFC 1992).

5.3.2 Striped Bass

5.3.2.1 Description of fishing practices, vessels and gear

Current status of the fishery

(all information in sections below from 2006 Review of the Striped Bass FMP)
Total striped bass harvest (commercial and recreational) comprised 3.32 million fish in 2005, a 33.7% increase from 2002 (2.48 million fish) but only a 0.9% increase from 2004 (3.29 million fish). This increase in total harvest from 2004 to 2005 is attributable to the commercial harvest (1.0 million fish), which rose by 11.25% from 2004, rather than the recreational fishery (2.31 million fish), which fell by 3.0% from 2004. On the other hand, discard losses in the recreational fishery (1.52 million fish) rose by 17.5% from 2004 to 2005, meaning that the total recreational catch (harvest plus discard losses) rose by 2.0% from 2004. An estimate of commercial discard losses for 2005 is unavailable at this time. In 2004, commercial discard losses measured 0.52 million fish, or 36.38% of the total commercial catch for the year.

Recreational harvest (2.31 million fish) and discard losses (1.52 million fish) account for 60.3% and 39.7%, respectively, of the total 2005 recreational loss. Maryland recreational fisheries harvested 21.4% of total recreational landings in number, followed by Massachusetts (17.0%), Virginia (16.1%), New Jersey (13.8%), New York (10.9%), and North Carolina (6.8%). The remaining states each landed 5% or less of the total recreational landings in number.

The commercial harvest (1.0 million fish) was dominated by Maryland’s commercial fisheries, which made up 56.5% of the total commercial landings by number in 2005. Virginia accounted for 11.8% of the commercial landings by number, followed by PRFC (8.0%), New York (7.0%), North Carolina (6.6%), and Massachusetts (5.9%). The remaining states each landed 3% or less of the total commercial landings in number.
A reliable estimate for commercial discards is unavailable at the writing of this report. Thus, the 2004 data are used to portray the proportion of the total catch attributable to recreational harvest and discards and commercial harvest and discards (Figure 5.3.2-1).

Table 2. Striped Bass Landings and Discards (numbers of fish) from 2002-2005

	Recreational		Commercial	
	Harvest	Discard Losses	Harvest	Discard Losses
2002	1,828,367	1,118,538	654,062	168,201
2003	2,405,707	1,168,907	865,689	262,078
2004	2,381,823	1,373,430	907,328	518,847
2005	2,309,670	1,520,854	1,009,437	N/A

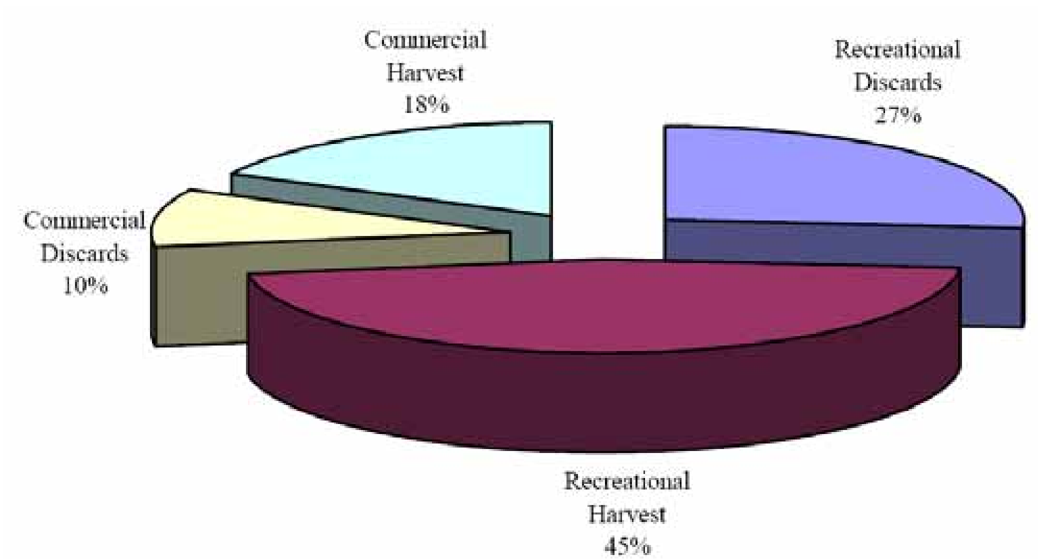


Figure 5.3.2-1. 2004 Striped Bass Total Catch (5.2 million fish)

Allowable gear

No harvest or possession in the EEZ. In state waters, the predominant gear types in the commercial fisheries are gillnets, pound nets, and hook and line. Commercial fisheries operate in 8 of the 14 jurisdictions regulated by the Atlantic States Marine Fisheries Commission FMP. Commercial fishing for striped bass is prohibited in New Jersey, Pennsylvania, Connecticut, New Hampshire, Maine and the District of Columbia. Massachusetts allows commercial fishing with hook and line gear only, while other areas allow net fisheries.

5.3.2.2 Economic and social description

5.3.2.3 Bycatch

Studies are currently being conducted to evaluate the interactions between striped bass, bluefish, weakfish and prey species, such as Atlantic menhaden. ASMFC has contracted out for the development of a dynamic trophic model or a multispecies model to determine the effect of the abundance for a suite of species has on each other (see Section 1.4.4.2

Multispecies Management as an Element of Ecosystem Management of ASMFC's Amendment 6 to the Striped Bass FMP). As the abundance of striped bass has increased striped bass are more frequently encountered as bycatch in other fisheries, but the data on discard and frequency of interactions is limited. Amendment 6 creates a bycatch and discard mortality monitoring program to determine which fisheries are catching striped bass as bycatch and to evaluate the discard mortality associated with the gear used in these fisheries (see below). As more information becomes available, Atlantic States Marine Fisheries Commission intends to incorporate the data into the Atlantic striped bass management program.

Under Amendment 6 to the Striped Bass FMP, the Management Board will be developing a bycatch data collection and management program. However, if prior to the completion of this work the Board identifies a significant discard problem, the Board may require the state/jurisdictions to make management changes to reduce the impacts of discards.

In general, states shall undertake every effort to reduce or eliminate the loss of striped bass from the general population due to bycatch discard mortality. The Technical Committee shall examine trends in estimated by-catch annually.

Bycatch Monitoring and Research Program

The issue of striped bass discards from the commercial and recreational fisheries has increased in importance as the population has rebuilt through the 1990's. However, the data on the magnitude of discards and the mortality associated with these discards is limited. In order to increase the accuracy of the discard data, the Striped Bass Management Board will, through the adaptive management program, develop a mandatory data collection program. The program will be developed during the first two years of implementation of this amendment.

The following two paragraphs generally describe the data collection program and research projects that need to be established to address the discard data deficiencies.

The MRFSS collects information on the number of striped bass released alive from recreational fishermen, however, the mortality of these released fish has been the source of debate for a number of years. Currently, the Technical Committee applies an 8% mortality rate to all released striped bass. To further refine this mortality estimate, there are two additional pieces of information that need to be determined. First, recreational fishermen need to be surveyed to determine the proportional use of different gear type and fishing practices (e.g. fly fishing, live bait fishing, circle hooks, treble hooks, etc). The second piece of information that needs to be determined is the mortality rate associated with each of the particular gear types and fishing practices.

The latest stock assessment for striped bass (2001) noted that there is considerable uncertainty in the estimate of discard mortality from commercial fisheries. As in recreational fishing, two data elements need to be collected to increase the accuracy of the commercial discard estimates; (1) at-sea observers need to be placed on commercial vessels that are targeting striped bass as well as vessels that may encounter striped bass to collect information on the number of fish that are being discarded from the various commercial gear types and (2) scientific studies need to be conducted to determine the discard mortality associated with all of the commercial gear types that are currently encountering striped bass.

Bycatch Management Program
Following the implementation of the discard data collection program, the Management Board will develop a bycatch management program. This program will be designed to implement penalties for "excessive" bycatch problems and/or incentives to states/jurisdictions that implement measures to minimize the impact of discards. This program will be developed through the adaptive management process and should be ready for implementation four years after the implementation of Amendment 6 to the Striped Bass FMP.

5.3.3 Anadromous and Catadromous Species

5.3.3.1 Description of fishing practices, vessels and gear

Current status of the fisheries

American Eel (from the 2006 Review to the 1999 ASMFC FMP)
American eel currently support important commercial fisheries throughout their range. Fisheries are executed in rivers, estuaries, and ocean. Commercial fisheries for glass eel/elver exist in Maine, South Carolina, and Florida (though in Florida, no commercial glass eel/elver landings were recorded in 2005), whereas yellow/silver eel fisheries exist in all states/jurisdictions with the exception of Pennsylvania and the District of Columbia (though in New Hampshire, Rhode Island, South Carolina and Georgia, no commercial yellow/silver eel landings were recorded in 2005).

Commercial
Commercial landings decreased from the high of 1.8 million pounds in 1985 to a low of 641 thousand pounds in 2002. Landings of yellow/silver eels in 2005 totaled 867,861 pounds.1 New Jersey, Delaware, Maryland, and the Potomac Rivers Fisheries Commission each reported landings over 100,000 pounds of eel, and together accounted for 83% of the coastwide commercial total landings in 2005. Landings data for 2005 comes from the 2006 State Compliance Reports.

Recreational
Few recreational anglers directly target eel. For the most part, hook and line fishermen catch eel incidentally when fishing for other species. The NMFS Marine Recreational Fisheries Statistics Survey (MRFSS), which has surveyed recreational catch in ocean and coastal county waters since 1981, shows a declining trend in the catch of eel during the latter part of the 1990's. According to MRFSS2, 2005 recreational total catch was 94,119 fish, which represents a slight decrease in number of fish from 2004 (112,001 fish). Florida and Georgia combined, represent 53% of the recreational American eel catch; Florida, Georgia, Delaware, and Maryland combined, represent 78% of the recreational American eel harvest in 2005. About 87% of the eel caught were released alive by the

anglers (MRFSS 2005 total recreational harvest was 12,100 fish). Eel are often purchased by recreational fishermen for use as bait for larger gamefish such as striped bass, and some recreational fishermen may catch their own eels to utilize as bait.

Shad and River Herring

(from the 2006 FMP Review)

American shad, hickory shad, and river herring formerly supported important commercial and recreational fisheries throughout their range. Fisheries are executed in rivers (both freshwater and saltwater), estuaries, tributaries, and oceans. Although recreational harvest data are scarce, most harvest is believed to come from the commercial industry. Commercial landings for all these species have declined dramatically from historic highs. Following is a summary of fisheries by species:

American Shad

Total combined river and ocean commercial landings decreased from a high of 2,364,263 pounds in 1985 to a low of 1,390,512 pounds in 1999, but increased in 2000 to 1,816,979 pounds. Based upon landings data provided in Compliance Reports from individual states and jurisdictions, an all-time low has been reached in 2005 with landings of 680,061 pounds. This new low is likely a direct result of the closure of all ocean-intercept fisheries. Combined landings from New Jersey, Delaware, North Carolina and South Carolina accounted for 84.3% of the commercial harvest in 2005. No directed shad harvest was reported in state Compliance Reports from Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, Pennsylvania, Maryland, the District of Columbia, and Florida. The National Marine Fisheries Service reported no harvest from Massachusetts, Pennsylvania, the District of Columbia, South Carolina, Georgia, and Florida.

Shad bycatch landings from ocean waters in 2005 decreased greatly from 2004 levels, comprising 7,411 pounds, or about 1% of the coastwide total. Only five states—Maine, New Hampshire, New York, New Jersey, and North Carolina—reported landings of ocean bycatch. Substantial shad sport fisheries occur on the Connecticut (CT and MA), the Hudson (NY), the Delaware (NY, PA and NJ), the Susquehanna (MD), the Santee and Cooper (SC), the Savannah (GA), and the St. Johns (FL) Rivers. Shad sport fisheries are also pursued on several other rivers in Massachusetts, Virginia, North Carolina, South Carolina, and Georgia. In 2005, recreational creel limits ranged from zero to 10 fish per day. The exception to this is the Santee River (SC), which is permitted to have a 20 fish per day creel limit due to the approval of a conservation equivalency plan in 2000. Tens of thousands of shad are caught by hook and line from large East Coast rivers each year but detailed creel surveys are generally not available. Actual harvest (catch and removal) may amount to only about 20-40% of total catch, but hooking mortality could boost this "harvest" value substantially. Several comprehensive angler use and harvest surveys are planned or have been recently completed.

MRFSS Data for American Shad are unreliable due to the design of MRFSS that focuses on active fishing sites along coastal and estuarine areas. For 2005, MRFSS does not report the harvest or catch of any American shad.

Several creel surveys were completed in 2005 including the Hudson River (NY), the Connecticut River (CT), the Susquehanna River below the Conowingo Dam (MD), the Tar-Pamlico River (NC), the Tailrace Canal of the Cooper River (SC), the Ogeechee River (GA), and the St. John's River (FL). Of the 6,582 shad caught on the Hudson, anglers harvested only 508, a retention rate of 8%. Catch per unit effort ranged from 0.123 fish/hour in early spring to 0.585 fish/hour in late spring. Anglers in Connecticut that targeted shad were successful 32% of the time when fishing from shore and boats were successful 41.2% of the time. Total effort in Connecticut has declined 75% since the last creel survey conducted in 2000, while total catch shows a similar decline of 73.2%. In Maryland, the catch and release fishery for American shad reported a catch rate of 0.49 American shad per hour. Anglers on the Tar-Pamlico River had a total catch of 7,575 shad (combined American and hickory) with an estimated harvest of 1,212 fish (American shad = 1,192 fish), and a success rate of 1.6 fish caught per angling hour. The estimated harvest for the Cooper River recreational fishery was 14,629 fish, 65% of which were males. Fishermen surveys report that catch per hour as 1.60 shad and that 22% of fish caught were released on the Cooper River. The harvest on the Ogeechee River from January 30 through April 2, 2005, was 442 fish (379.9 pounds) with effort estimated to be 1754 hours. The creel survey on the St. John's River in Florida for the 2004-2005 season reported 1,270 shad caught with an estimated harvest rate of 21% (269 fish).

Hickory Shad
The Potomac River Fisheries Commission, North Carolina, South Carolina, and Georgia reported hickory shad commercial landings in 2005. North Carolina reported the highest landings with 173,779 pounds. In 2005, the coast-wide commercial landings for hickory shad were 179,919 pounds (from 2006 State Compliance Reports). This is a decrease from the 2004 total preliminary landings of 187,464 pounds.

MRFSS Data for hickory shad are unreliable due to the design of MRFSS that focuses on active fishing sites along coastal and estuarine areas. For 2005, MRFSS does not report the harvest or catch of any hickory shad.

River Herring (Blueback Herring and Alewife)
Commercial landings of river herring declined 90% from over 13 million pounds in 1985 to about 1.33 million pounds in 1998. In 2005, river herring landings were reported from Maine, New Hampshire, Massachusetts, New York, New Jersey, Delaware, PRFC, and North Carolina, totaling 692,827 pounds, down from 2004's total of 2,120,881 (from 2006 State Compliance Reports). MRFSS Data for river herring are unreliable due to the design of MRFSS that focuses on active fishing sites along coastal and estuarine areas. For 2005, MRFSS does not report the harvest or catch of any river herring.

Allowable gear

5.3.3.2 Economic and social description

5.3.3.3 Bycatch

5.3.4 Red Drum

5.3.4.1 Description of fishing practices, vessels and gear

Commercial

(from Amendment 2, 2002, commercial and recreational sections reviewed by C. Wenner)

There is no directed commercial fishery for Atlantic red drum in state waters, and the EEZ was closed to harvest by the SAFMC in 1990 to prevent any directed fishery for red drum, especially for adults, from developing in these waters. Traditionally, landings have occurred almost exclusively in state waters as prior to the EEZ closure landings in federal waters were a bycatch of other fisheries and did not exceed 2,000 lbs in any year since 1985 (Table 5.3.4-1). Commercial landings of red drum along the Atlantic coast were high during the early 1950's and have generally fluctuated from 150,000 to 400,000 lbs since (Table 5.3.4-2).

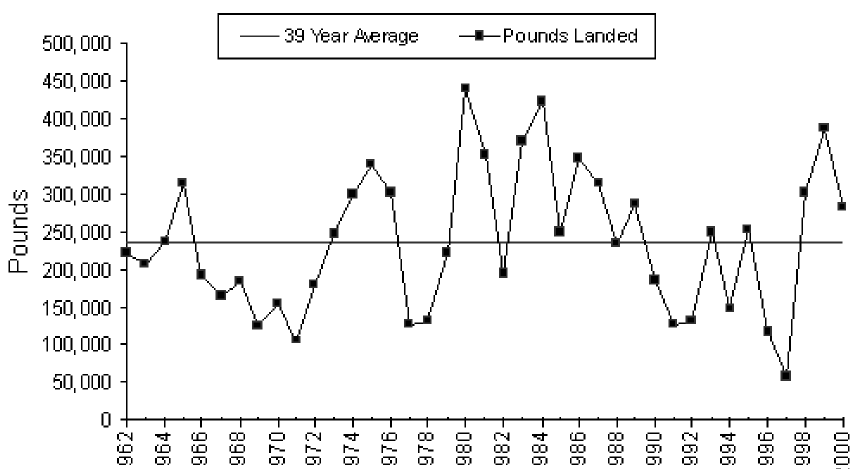
Currently, North Carolina is the only state along the Atlantic coast with any significant annual landings of red drum and has accounted for greater than 95% of the coastwide landings since 1989. Landings of red drum in North Carolina are primarily a bycatch in other fisheries, particularly those targeting flounder, striped mullet, spotted seatrout and weakfish. Virginia consistently reports annual landings but has only exceeded 10,000 lbs in three of the last 10 years. Landings north of Virginia are less frequent. Florida has had a no sale provision on native caught red drum since January 1, 1989. In 1987, South Carolina declared red drum a gamefish and established a no sale provision except for mariculture grown fish with the appropriate documentation. Landings in Georgia are limited to hook and line captured fish and typically do not exceed 3,000 lbs. Overall Atlantic landings for the period of 1989 through 2000 were dominated by anchored and runaround gill nets followed by long hauls, pound nets and beach seines. Georgia allows the sale of red drum as long as they are within the state's regulations (size & bag limits) and the individual has their equivalent of a land and sell license – fish must be taken with hook and line

Table 5.3.4-1. EEZ commercial red drum bycatch harvested in the Atlantic (Source: NMFS SEFC).

Year	Pounds	Ex-vessel Value (1982 Dollars)
1979	679	108
1980	19,992	3,621
1981	3,985	992
1982	3,913	887
1983	4,920	1,244
1984	11,778	2,882
1985	1,832	488
1986	1,883	707
1987	1,149	428
1988	991	248

Historic landings data along the Atlantic coast are from the period prior to when Florida and South Carolina prohibited the sale of native red drum. Commercial landings and nominal value can be subdivided into five major gear categories: gill nets, pound nets, seines, hand gear and trawls.

Table 5.3.4-2. Total commercial landings of red drum in the Atlantic (Source: NMFS Annual Reports).



North Carolina

Red drum are commercially harvested in North Carolina with a variety of gears and constitute a bycatch fishery and historically have not been a major component of commercial landings. Prior to the imposition of a possession limit on red drum greater than 32 inches TL (changed to 27 inches TL in 1992) by North Carolina, Outer Banks fishermen occasionally targeted large red drum with long haul seines in Pamlico Sound. The increase in the legal minimum size in 1991 limit for red drum from 14 to 18 inches TL reduced mortality of immature red drum. This resulted in an increase in the age of entry into the commercial fishery of about 8 months. Due to current size restrictions (18-27 inches TL), commercially harvested red drum are generally from a single year class. Therefore, catches vary annually and depend on year class strength. Age-1 and age-2 fish presently dominate the landings and the harvest of adults is prohibited.

Historically, annual landings of red drum have been highly variable from year to year. These ranged from 7,500 to 214,000 lbs during the 1970's with an average of 83,009 lbs per year whereas landings from the 1980's were greater than in the 1970's, averaging 203,813 lbs per year with a range of 52,561 to 283,020 lbs.

Landings averaged 186,932 lbs per year and ranged from 52,548 to 372,749 lbs during the 1990's. The majority of these originated from fishing operations in Pamlico and Core sounds and the Atlantic Ocean. No commercial gear dominated landings in the 1970's, although long haul and common haul seines generally were the most productive with gill and pound nets, and fish trawls occasionally contributing larger catches. During the 1980's and 1990's, anchored and run-around gill nets accounted for greater than 70% percent of annual commercial landings. Most of these net fisheries are seasonal, and target spotted seatrout, (southern and/or summer) flounder, and striped mullet along the barrier islands and mainland shorelines.

They catch red drum incidentally and make an important contribution to the overall catch.

A directed fishery used run-around gill nets to encircle schools of red drum developed in the mid-1990s. This gear accounted for 31% of the commercially catch from 1994-1998.

Prior to the implementation of trip limits in 1998, nearly half of the total annual commercial harvest of red drum was taken by a few trips which landed large amounts of red drum. Slightly more than 1% (1.1%) of the trips that landed red drum accounted for 48.5% of the total harvest. For this period, the largest landings of red drum primarily occurred behind the 'Outer Banks' from Oregon Inlet to Ocracoke during the spring and fall. Gears that typically had large landings of red drum were runaround gill and long haul nets. These were effective in circling large schools of red drum. Participation in the run-around gill net fishery increased during this period as many of these fishers actively pursued schools of red drum., A typical catch for a run-around gill net trip would range from 100 to 1000 pounds whereas a few exceptional long haul sets caught up to 10,000 pounds.

Implementation of a 100-pound trip limit on the commercial harvest of red drum in October of 1998 effectively eliminated any large-scale directed fishery for red drum. Some fishers still actively targeted this species even at these reduced harvest limits. This resulted in reduction of the daily commercial trip limit to levels ranging from 10 to 5 red drum. Also, at least 50% of the landings by weight for an individual trip consist of edible finfish other than red drum. The intent of the rule is to make this exclusively a bycatch fishery.

South Carolina
South Carolina designated red drum a gamefish in 1987. They can be sold only when transported into the State with proper documentation showing legal capture, or if the fish are produced by a bonafide mariculture operation. Red drum landings never exceeded 14,000 lbs with a nominal value of $12,000 in the last 30 years.

Georgia
Georgia had a small commercial gill net fishery prior to the 1950s, but presently there is no directed commercial fishery for red drum. Landings enter the market through recreational fishermen who sell their catch, often directly to restaurants. This is not illegal as long as they were not harvested with net gear. As a result, many red drum are not recorded in official commercial statistics.

Florida
Commercial landings on the east coast of Florida fluctuated annually between 85,000 lbs and 250,000 lbs from 1962 to 1987. Most of the catch was taken by either as bycatch of the mullet gill net fishery or by a directed fishery utilizing trammel nets. Commercial landings ceased when regulations prohibiting their sale became effective in 1988. The existence and potential red drum harvest in the EEZ off the east coast of Florida is recognized by both commercial and recreational fishermen.

Recreational
Recreational fishing for red drum along the Atlantic coast historically extended farther north than at present. Red drum was a prized sport fish as far north as Barnaget Light, New Jersey. There, surf fishermen commonly landed large adult fish (25-45 lb). This fishery no longer exists; only an occasional large red drum is caught.

The recreational fishery for trophy red drum along the South Atlantic is primarily a surf fishery along the outer beaches of barrier islands. The largest (94 lbs 2 oz) red drum ever caught by recreational angler was taken in the surf on the Outer Banks of North Carolina. Fishing in estuaries from Chesapeake Bay to Florida catch small red drum. Salt-water angling surveys indicate that 88% of red drum caught in the Mid-Atlantic region in 1965 came from sounds, rivers and bays. In 1970, only 47% were caught in estuarine waters. Along the southeastern Atlantic coast, more red drum (59%) were caught in the ocean in 1965; however, in 1970, 79% were caught in sounds, rivers and bays. Catch data for red drum on the eastern shore of Virginia from 1955 to 1965 showed small catches. Highest rates occurred during 1957 and 1962 (0.14 fish per man-hour). More fish were landed during May and September, but catch rates were highest for April, June and September. A low of 0.01 fish per man-hour occurred in 1959. A 1963 sport fishery survey in the Cape Canaveral area of Florida found that catch per unit effort was highest in October and April.

Seasonality

Along the barrier beaches and inlets of the North Carolina coast, surf fishing is best from March to June and mid-September to November. Large red drum are available from mid-May through early October around river mouths and high shoals in Pamlico Sound. Small fish are caught along barrier island beaches during a seven month period (June through December) with a peak period from September through December. During these months, red drum are also caught in estuarine waters, particularly around grass flats and shorelines. Red drum fishing occurs throughout the year from South Carolina to southeastern Florida with the best fishing for small fish from August to December inshore. Large fish are targeted from March to May and September to December along the beach and shoal areas. Best fishing for small red drum from St. Lucie Inlet to southern Florida is from April to August and from August to November for large ones. Adult red drum generally remain in coastal waters during spring and fall months and during late summer move offshore, presumably to spawn. Generally, adult drum move offshore during the coldest months.

Fishing Gear

Red drum are caught by bottom fishing, jigging and casting from shore, as well as, bottom fishing, casting, live-lining and trolling from boats. Baits include soft or shedder crabs, shrimp, clams, squid, cut or whole mullet, spot, herring or menhaden, as well as artificial lures such as spoons, jigs, weighted bucktails, feathers, plugs and streamer flies. Red drum have been harvested by gill nets and gigs for home consumption in North and South Carolina. In South Carolina, 94% of the individuals using gill nets in 1978, fished recreationally. This fishery no longer exists since the State of South Carolina declared red drum a gamefish and harvest is restricted to hook and line and, during designated months, gigs.

For-Hire Fishery (from the 2002 ASFMC FMP)

The for-hire fishery for red drum is charter boat fishery, concentrated on the Atlantic Coast from North Carolina to Florida, with a substantial fishery in the Gulf of Mexico as well. A head boat fishery for red drum is virtually nonexistent (ASMFC 1994b). NMFS headboat survey data from 1981 to 1997 estimated headboat landings of red drum to be far less than 1% of total recreational fishery landings (Holiman 1999).

Whitmore (1994) looked at relative directed effort in the South Atlantic charter fishery. Relative effort was based on the product of the number of boats and the number of months/12 fished. Directed red drum effort ranked 9th out of 16 species, well behind black sea bass, groupers, and king mackerel, but ahead of summer flounder, Spanish mackerel, and sharks. Nearly 50% of the relative effort occurred in Georgia, with the remaining effort distributed fairly evenly between North Carolina and South Carolina. Florida did not have a charter fishery directed at red drum in 1994 and 1995.

From 1983 to 1998, estimated red drum harvest in the South Atlantic charter fishery fluctuated between 3,348 fish (8,868 lbs.) in 1989 and 119,067 fish (283,813 lbs.) in 1995. Harvest declined annually from 1995 to 1998. The 1998 harvest of 14,769 fish

(91,303 lbs.) comprised 39% of the catch and 5% (7% by weight) of the total recreational harvest. From 1983 to 1998, the percentage of party/charter boat trips targeting red drum has fluctuated between 0.20% in 1985 to 5.22% in 1995. This peak of 5.22% in 1995 coincides with peak catch and landings over the same time period. This percentage has declined annually from 1995 to 1.15% in 1998. In contrast, the percentage of anglers targeting red drum in the shore and private/rental boat fisheries in 1998 was 3.19% and 5.10%, respectively (Holiman 1999). Comparing the charter boat fisheries by state, the highest percentage of charter boat anglers targeting red drum in 1998 was South Carolina (4.4%), followed by Georgia (2.4%), Florida East Coast (0.9%), North Carolina (0.2%), and Virginia (0.0%).

Popularity of fishing for red drum by charter boat anglers has increased from 1998 to 2000 in Florida (0.9% to 3.9%) and Georgia (2.4% to 8.7%), while decreasing in South Carolina (4.4% to 2.2%) and essentially remaining very low in North Carolina (0.2% to 0.1%). In South Carolina, red drum has been the most sought-after species in the inshore charter-boat fishery from 1995 to 1999. In 1999, of 2,900 inland boat trips, 1,476 (51%) were targeted at red drum, followed by anglers targeting any species (16%), and spotted seatrout (15%). The number of permitted boats fishing in inland waters (where the majority of the effort is directed at red drum) has increased nearly annually from 39 boats in 1993 to 98 boats in 1999. Directed effort for red drum increased significantly from 1,359 angler-hours in 1993 to 12,875 angler-hours in 1999. Catch has shown an increasing trend similar directed effort from 1993 to 1999, while CPUE has fluctuated between 0.5 and 0.7 fish per angler-hour. By comparison, private boat CPUE showed the same trend though was consistently lower than charter CPUE. Of the reported 10,656 red drum caught by the charter fishery, 85% were released (Low 2001).

<u>Seasonality</u>

A 1994 ASMFC survey of Atlantic seaboard charter and headboat fisheries showed that the charter boats fish year-round for red drum in South Carolina and Georgia, and fish 9 months for red drum in North Carolina (data indicated no red drum charter fishery in 1994) (ASMFC 1994b). In South Carolina prior to 1998, the charter-boat effort for red drum peaked in April and during September - November. The fishery has since evolved into a year-round fishery, with substantial effort each month in 1999 (Low 2001). Charter boats near Brunswick, Georgia, will target red drum year-round, with peak the season from September through December in the saltwater marshes surrounding St. Simons Island.

<u>Fishing Gear</u>

Charter boats are generally not exclusive to red drum, turning to target other species when the bite is hot and at different times of the year. Fly fishing charters are gaining popularity. Fishing is for red drum is predominantly inshore and estuarine. In 1993, 15% of charter trips in South Carolina were in estuarine waters. These estuarine charters sought red drum and spotted seatrout as the principal species. The majority (70%) of South Carolina charter trips was offshore and not targeting red drum. Common fishing techniques include bottom fishing from North Carolina through Georgia, with additional live lining in North Carolina and trolling in South Carolina (ASMFC 1994). Charter boats near Cape Canaveral, Florida, will pole flat-bottom boats in estuarine waters and fish with spinning gear on light line (6-10 lbs.). In the fall near Morehead City, North Carolina, charter boats fish the estuarine waters for red drum using cut bait. Historically, Matlock (1978) indicated that charter boats were still, troll, and drift fishing in the open ocean and bays.

In South Carolina, 98% of red drum effort, and 95% of the catch is concentrated in inland waters. The remaining effort is concentrated in open ocean waters from 0-3 miles, with some effort in ocean waters >3 miles. Open ocean effort is typically bottom fishing over natural structure, but does include some manmade structure. Inland trips are typically made with smaller boats with an average of 2 anglers. Ocean trips are typically larger boats carrying an average of 4 anglers.

Current status of the fishery

Commercial Fishery

(from 2006 ASMFC FMP review)

Few commercial landings of red drum have been recorded in states north of Maryland since 1960 (Table 4.3.4-3). Only Rhode Island, New York, and New Jersey have reported any commercial landings since 1980. Coastwide commercial landings show no particular temporal trends, ranging from approximately 55,000 to 422,000 pounds annually between 1960 and 2005 (Figure 5.3.4-1). The greatest harvest was reached in 1980, while the lowest was reached in 2004. In 2005, coastwide commercial harvest increased to 129,980 pounds, the majority (~99%) from North Carolina (Table 4.3.4-3). Landings in Georgia (<500 lbs), Virginia (656 lbs), Maryland (37 lbs), and New Jersey (517 lbs) comprise the remaining 1% of the commercial landings for red drum.

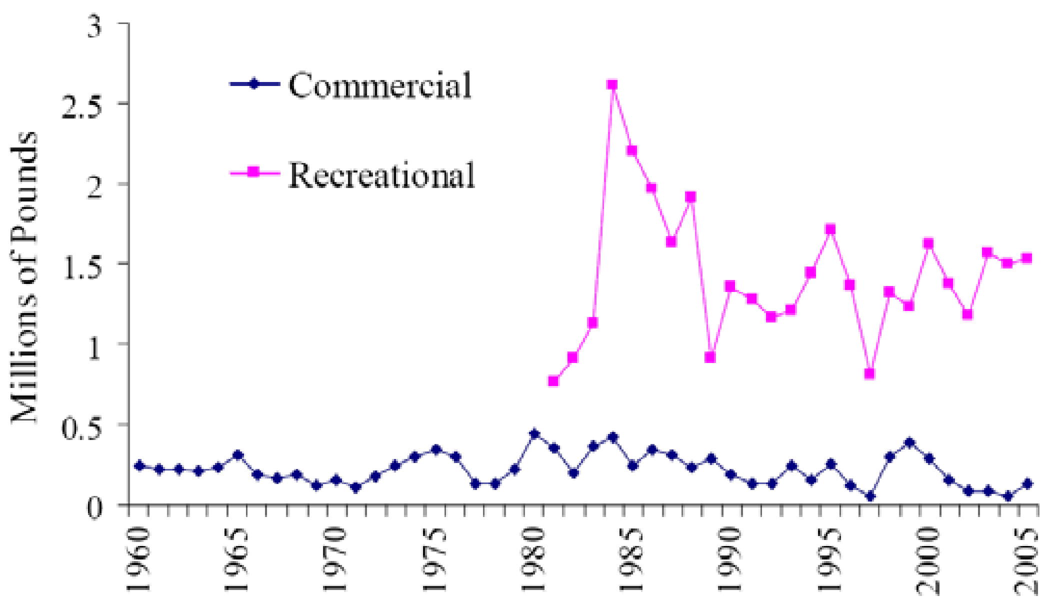


Figure 5.3.4-1. Red Drum Commercial and Recreational Harvest (pounds). (Source: NMFS Office of Science and Technology, 2006; state compliance reports, 2006).

Historically, the major commercial harvesters were North Carolina and Florida. However, commercial harvest has been prohibited in Florida under state regulations, since January 1988. South Carolina has also banned the commercial harvest or sale of native caught red drum since 1987. In North Carolina, an annual cap of 250,000 pounds limits the commercial harvest of red drum. In 1999, the North Carolina Marine Fisheries Commission implemented rules through the development of a state red drum FMP that: prohibited the possession or sale of red drum larger than 27 inches; reduced the recreational bag limit to 1 fish per day between 18-27 inches; imposed a commercial daily trip limit of seven (7) fish with a 250,000 pound annual cap; and required fishermen to attend gill nets less than five-inch stretched mesh from May 1-October 31 in order to reduce regulatory discards. In 2003, the South Atlantic State/Federal Fisheries Management Board approved a motion to allow the North Carolina Fisheries Director to raise or lower the seven fish commercial trip limit while maintaining the 250,000 pound harvest cap.

Table 4.3.4-3. Commercial landings (in pounds) of red drum along the Atlantic coast, 1960-2005 (1960-2004 Data: NMFS Fish. Stats. & Econ. Division, 2006; 2005 Data: state compliance reports, 2006).

Year	RI	NY	NJ	DE	MD	VA	NC	SC	GA	FLEC	Total
1960					200	29,400	79,300	4,200	400	129,000	242,500
1961						12,000	89,700	900	1,000	114,500	218,100
1962						12,900	60,900			149,300	223,100
1963						2,700	71,200			134,200	208,100
1964						4,600	101,500	11,500		119,000	236,600
1965					1,200	94,900	71,400			146,300	313,800
1966					200	3,100	35,200	200	2,700	153,000	194,400
1967						1,100	12,800	900	5,800	147,100	167,700
1968						100	12,500		5,500	167,000	185,100
1969					400	700	3,900	700	2,700	119,000	127,400
1970						100	7,500	400	2,200	146,800	157,000
1971						700	17,200	1,300	1,200	85,200	105,600
1972						5,900	42,900	1,200	3,400	128,400	181,800
1973				900		6,200	70,300	600	3,700	166,500	248,200
1974						15,700	142,000	2,300	3,100	137,300	300,400
1975				200		19,600	214,000	12,400	10,000	83,300	339,500
1976						18,600	168,200	2,600	7,300	106,000	302,700
1977				200		300	19,700	800	5,000	103,500	129,500
1978				300		2,100	21,774	4,325	328	104,696	133,523
1979					100	1,900	126,517	1,767	935	92,684	223,903
1980						400	243,223	4,107	1,493	191,222	440,445
1981						200	93,420		261	258,374	352,255
1982						1,700	52,561	2,228	251	139,170	195,910
1983					100	41,700	219,871	2,274	1,126	105,164	370,235
1984						2,600	283,020	3,950	1,961	130,885	422,416
1985						1,100	152,676	3,512	3,541	88,929	249,758
1986					1,000	5,400	249,076	12,429	2,939	77,070	347,914
1987						2,600	249,657	14,689	4,565	42,993	314,504
1988					8,100	4,000	220,271		3,281	284	235,936
1989					1,000	8,200	274,356	165	3,963		287,684
1990					29	1,481	183,216		2,763		187,489
1991					7,533	24,771	96,045		1,637		129,986
1992					1,087	2,352	128,497		1,759		133,695
1993					55	8,637	238,099		2,533		249,324
1994	5,094				859	4,080	142,160		2,141		154,334
1995		668			6	2,992	248,200		2,578		254,444
1996		8			215	2,073	113,401		2,271		117,968
1997	43				22	4,049	52,548		1,395		58,057
1998	165	57	311		336	6,436	294,415		672		302,392
1999		47	241	6	504	12,368	372,996		1,115		387,277
2000		1,215			843	11,457	271,013		707		285,235
2001		58	14		727	5,318	149,674				155,791
2002		116			1,161	7,752	79,767				88,796
2003		43			631	2,716	81,364				84,754
2004					12	638	54,086				54,736
2005			517		37	656	128,770				129,980
Total	5,302	2,212	1,083	1,606	26,357	398,276	6,040,873	89,446	98,215	3,566,871	

Recreational Fishery
(from the 2006 update)
The number of red drum harvested by recreational fishermen ranged between approximately 175,000 and 1,000,000 fish from 1981 to 1988; since then, the number has been in the 250-530,000 range (Figure 5.3.4-2). Over a million fish were taken in both 1984 and 1985, but this was exceptional. The recreational harvest for 2005 was 498,761 fish (~1.5 million pounds) (Table 5.3.4-4). By number of fish, Florida takes approximately 38% of the catch, but takes over 50% by weight. South Carolina, Georgia, and Florida are responsible for 88% of the catch by number of fish (Table 5.3.4-5). The number of red drum released by recreational fishermen was approximately 2.4 million in

2005, an increase from the previous year, and the second highest for the time series (Table 5.3.4-6).

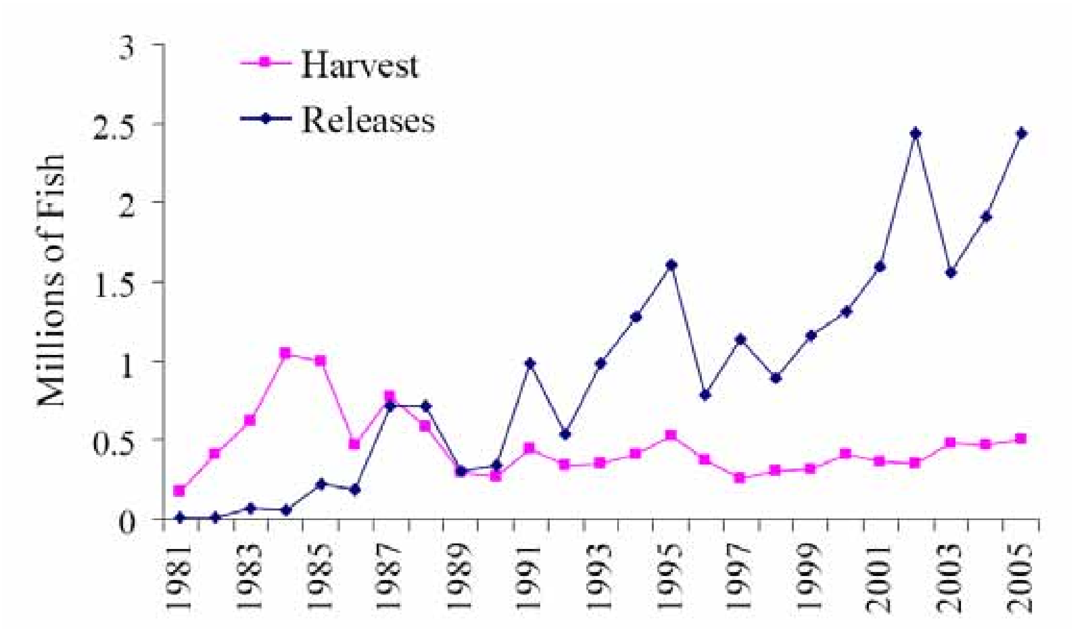


Figure 5.3.4-2. Recreational harvest of red drum in number of fish (A + B1 fish) (Source: NMFS Office of Science and Technology, 2006).

Table 5.3.4-4. Recreational harvest (pounds of A + B1 fish) of red drum along the Atlantic coast, 1981-2005 (Source: NMFS Office of Science & Technology, 2006).

Year	DE	MD	VA	NC	SC	GA	FLEC	Total
1981		4,370	347,939	31,519	50,230	9,442	317,963	761,463
1982				37,511	340,686	52,150	480,676	911,023
1983		3,018	51,299	109,540	222,691	67,298	675,924	1,129,770
1984			1,285	1,160,539	183,282	294,583	976,971	2,616,660
1985				70,677	1,532,316	185,887	414,176	2,203,056
1986		754,161	145,517	31,594	498,586	173,837	360,725	1,964,420
1987			44,332	200,729	913,639	250,795	227,222	1,636,717
1988			9,030	451,974	1,050,049	385,860	12,507	1,909,420
1989		2,348	27,236	214,849	396,771	127,245	146,064	914,513
1990		2,679		302,994	631,819	161,712	258,569	1,357,773
1991		5,635	30,582	108,268	284,290	337,207	516,999	1,282,981
1992			55,324	109,134	411,484	198,751	396,555	1,171,248
1993			45,505	266,459	282,614	328,245	290,930	1,213,753
1994			3,684	192,060	314,632	353,616	578,412	1,442,404
1995			66,270	405,620	417,595	300,337	525,231	1,715,053
1996			1,512	204,556	396,394	164,756	596,483	1,363,701
1997			1,810	39,077	296,155	129,836	345,390	812,268
1998			34,861	591,428	129,619	84,348	487,091	1,327,347
1999			92,794	326,303	103,777	166,630	540,310	1,229,814
2000			95,596	316,029	93,043	228,965	885,447	1,619,080
2001	860		51,890	132,578	188,198	155,854	853,714	1,383,094
2002	* 860	15,154	155,213	182,226	103,830	170,572	551,128	1,178,123
2003			57,214	118,808	449,399	234,865	729,445	1,589,731
2004			31,748	114,434	402,789	286,486	668,179	1,503,636
2005			7,366	242,019	318,882	194,706	773,480	1,536,453
Total	1,720	787,365	1,358,007	5,960,925	10,012,770	5,043,983	12,609,591	

*Weight estimated from same number of fish (275) caught in previous year

Table 5.3.4-5. Recreational harvest (numbers of A + B1 fish) with percent standard error (PSE) of red drum along the Atlantic coast, 1981-2005 (Source: NMFS Office of Science & Technology, 2006).

Year		DE	MD	VA	NC	SC	GA	FLEC	Total
1981	Harvest		601	49,630	15,054	27,319	6,323	75,244	174,171
	PSE (%)		48	60.2	38.7	45.7	37.2	36.7	
1982	Harvest				16,445	160,760	30,757	204,401	412,363
	PSE (%)				34.7	18.2	37.2	27.5	
1983	Harvest		2,413	32,940	81,528	104,806	56,854	344,513	623,054
	PSE (%)		51.8	48.2	55.6	37.8	27.7	19.1	
1984	Harvest			1,457	108,787	129,547	258,188	549,381	1,047,360
	PSE (%)			100	67.8	30.7	21.9	16.1	
1985	Harvest			0	22,077	530,110	183,837	265,185	1,001,209
	PSE (%)			0	32.7	30.6	18.6	22.2	
1986	Harvest		12,804	28,139	17,501	193,188	102,279	113,440	467,351
	PSE (%)		67.4	22.4	65.7	19.8	18.8	19.8	
1987	Harvest			2,186	61,100	522,420	138,062	51,225	774,993
	PSE (%)			58.8	19.9	17.7	18.4	30.9	
1988	Harvest			4,311	142,626	287,916	147,042	9,542	591,437
	PSE (%)			70.7	18.3	20.2	28.4	72.6	
1989	Harvest		1,014	12,007	62,359	127,492	51,557	34,748	289,177
	PSE (%)		90.9	32.2	16.3	20.8	21.9	24.3	
1990	Harvest		1,279	0	33,149	118,666	76,304	44,280	273,678
	PSE (%)		100	0	28.2	22.4	22.5	22.7	
1991	Harvest		2,745	17,119	38,658	125,833	162,802	102,727	449,884
	PSE (%)		51.6	39.4	15.3	22.6	23.2	15.7	
1992	Harvest			13,275	23,593	112,534	83,861	104,265	337,528
	PSE (%)			38.3	19.3	15.6	16.7	14.1	
1993	Harvest			14,005	49,493	119,189	105,710	65,140	353,537
	PSE (%)			50	12	16.9	17.9	10.5	
1994	Harvest			1,378	28,953	129,515	134,214	120,938	414,998
	PSE (%)			60.8	16.4	21.5	17.5	9.9	
1995	Harvest			3,665	88,593	202,430	134,915	96,927	526,530
	PSE (%)			53.6	12.3	25.4	17.1	10.7	
1996	Harvest			572	36,746	130,649	60,251	146,823	375,041
	PSE (%)			99.2	15	14.9	20	16.1	
1997	Harvest			1,920	8,749	129,022	39,041	75,235	253,967
	PSE (%)			62.3	25.7	12.7	19.2	14.1	
1998	Harvest			13,070	114,638	46,509	24,929	107,982	307,128
	PSE (%)			30.2	12.1	15.9	20.3	10.3	
1999	Harvest			12,425	64,739	44,069	67,283	126,180	314,696
	PSE (%)			38.7	14.5	18.3	23.7	7.8	
2000	Harvest			22,603	61,618	37,217	94,144	191,070	406,652
	PSE (%)			27.8	12.9	23.3	19.7	8.4	
2001	Harvest	275		6,967	23,142	61,420	90,376	177,633	359,813
	PSE (%)	100.1		39.8	15.9	26.8	30.3	8.2	
2002	Harvest	275	5,521	49,795	42,541	41,190	90,993	119,010	349,325
	PSE (%)	99.8	71.2	22.8	15.4	21.6	19.1	8.7	
2003	Harvest			13,607	25,481	162,484	122,259	159,331	483,162
	PSE (%)			38.1	16.5	23.1	16.9	8.5	
2004	Harvest			4,975	30,165	134,079	139,074	162,016	470,309
	PSE (%)			65.6	18.9	15.2	22.2	8.5	
2005	Harvest			2,673	53,154	143,769	108,286	190,879	498,761
	PSE (%)			100.1	20.5	18.7	18.6	9.0	
Total Harvest		550	26,377	308,754	1,249,550	3,818,598	2,506,777	3,634,716	

Table 5.3.4-6. Recreational releases (numbers of B2 fish) with percent standard error (PSE) of red drum by state, 1981-2005 (Source: NMFS Office of Science & Technology, 2006).

Year		NH	NJ	DE	MD	VA	NC	SC	GA	FLEC	Total
1981	Released	1,334					2,230	417	0	9,042	13,023
	PSE (%)	100					100	100	0	70.8	
1982	Released						0	2,496	3,377	10,172	16,045
	PSE (%)						0	80.2	65.4	66.9	
1983	Released						1,866	6,751	1,417	54,723	64,757
	PSE (%)						100	63	60	40.2	
1984	Released						2,931	0	4,232	47,196	54,359
	PSE (%)						100	0	52.9	38.1	
1985	Released					1,115		16,688	6,315	193,399	217,517
	PSE (%)					73.4		31.3	31.3	29.1	
1986	Released					7,595		24,018	56,045	100,095	187,753
	PSE (%)					68.1		32.4	23	22.4	
1987	Released						18,499	82,595	234,676	377,959	713,729
	PSE (%)						36.7	26.6	19.7	21.1	
1988	Released					3,958	24,874	269,176	177,319	233,988	709,315
	PSE (%)					71	57.8	23.6	24.6	27.6	
1989	Released				2,918	7,038	7,566	42,824	71,162	172,303	303,811
	PSE (%)				75.5	57.3	34	40.8	27	21.3	
1990	Released				0	934	12,452	102,611	156,263	68,667	340,927
	PSE (%)				0	100	38.2	39.2	38.9	18.3	
1991	Released				4,432	14,461	121,178	99,968	92,803	645,773	978,615
	PSE (%)				66.6	76.1	14.4	42	31.2	23.3	
1992	Released		301			15,383	60,230	46,269	128,066	284,893	535,142
	PSE (%)		99.9			43.5	17.9	27.5	21.4	11.5	
1993	Released					50,434	182,301	146,324	140,386	465,656	985,101
	PSE (%)					44	20.1	27	27.7	11.8	
1994	Released					10,684	107,662	324,706	146,039	691,261	1,280,352
	PSE (%)					34.7	14.3	17.2	24.6	10.4	
1995	Released					33,560	164,520	362,844	356,618	683,706	1,601,248
	PSE (%)					40.4	10.5	14.9	23.9	9.1	
1996	Released					2,424	35,752	176,517	71,983	500,374	787,050
	PSE (%)					46.3	17.9	15.9	24.1	9.3	
1997	Released			2,571		109,754	259,570	175,772	22,736	560,559	1,130,962
	PSE (%)			80.6		36.1	10.6	25	29.7	9.7	
1998	Released				2,768	93,660	199,701	84,274	33,882	481,009	895,294
	PSE (%)				79.7	22.3	11.3	14.6	21.3	8.7	
1999	Released				2,148	232,893	247,146	87,776	18,586	565,981	1,154,530
	PSE (%)				73.5	31.4	10.3	14.9	50	8	
2000	Released				1,458	196,541	203,967	94,050	129,190	693,152	1,318,358
	PSE (%)				100	35.7	14.2	18.6	22.4	7.3	
2001	Released					30,365	238,552	221,045	249,892	850,044	1,589,898
	PSE (%)					31.1	13.7	18.5	25.2	7.5	
2002	Released			1,388	18,412	801,239	640,857	142,931	168,902	663,879	2,437,608
	PSE (%)			45.8	36.7	14.7	10.7	18.6	18.6	9.1	
2003	Released			731	2,935	43,379	75,561	430,052	272,897	732,141	1,557,696
	PSE (%)			100	75.2	40.1	15	17.5	16.5	8.5	
2004	Released			68		33,148	191,593	403,591	167,146	1,117,636	1,913,182
	PSE (%)			100		29.5	10.1	16.9	18	7.9	
2005	Released					31,146	327,859	498,537	330,193	1,247,109	2,434,844
	PSE (%)					33.2	15.1	12.7	19.9	7.4	
Total	Released	1,334	301	4,758	35,071	1,719,521	3,120,275	3,830,066	3,034,992	11,413,838	

Allowable gear
There is no harvest or possession of red drum allowed in the EEZ.

5.3.4.2 Economic and social description

Commercial fishery
(from Amendment 2)
Reported annual red drum commercial landings (i.e. pounds) in the Atlantic states had averaged about 322,000 pounds with an average, deflated (i.e. 1982 dollars) total value of $140,00 during the 1980's (Table 5.3.4-7), a 61% increase in the total value compared to 1970's. In contrast, the average reported landings in the Atlantic states in the 1990's were only 61% of 1980's average landings, and the total deflated ex-vessel value declined to an average of about $100,000 (Table 5.3.4-7) even though the highest nominal ($412,000) and deflated ($215,000) total ex-vessel value was recorded in 1999. In general, the overall ex-vessel prices, nominal and deflated, in the Atlantic states have generally increased since the 1970's (Table 5.3.4-7).

These trends in red drum landings and values in the Atlantic states mainly reflect the interaction of regulatory actions and market demand. Before the 1980's, commercial red drum landings in both the Atlantic and Gulf states were generally associated with commercial fishing effort in near-shore and estuarine waters and catches of juvenile red drum. In the early 1980's, the ex-vessel price of red drum began to increase significantly as Cajun-style blackened redfish was introduced to restaurant menus (Martin 1986) through out the country. Commercial fishermen in the Gulf began targeting schooling adult red drum in the EEZ (GMFMC 1987) and concern grew in the Atlantic states that large-scale purse seine fishing would begin developing along the Atlantic coast which could lead to recruitment over fishing (ASMFC 1984). Recreational fishing lobbying efforts to assign the red drum "gamefish" status also began developing in the Atlantic states, especially Florida (e.g. Thunberg et al. 1993). In 1987, the red drum was given gamefish status in South Carolina, and Florida began taking management actions to remove red drum as a commercially targeted species. In 1988, the ISFMP (ASMFC 2001) requested that all states from Maine to Florida implement red drum regulations "...to prevent development of northern markets for southern fish." By January 1989, Florida had implemented a one-fish bag limit for recreational and commercial fishermen and a ban on sale of native red drum.

Table 5.3.4-7. Commercial red drum landings (lbs) and ex-vessel value in Atlantic states including North Carolina, 1970-2000 (Pers. Comm. NMFS, Fish. Stats. and Econ. Div.).

	All Atlantic States					North Carolina			NC percent of:	
Year	Pounds Landed	Nominal Value	Defl. Value	Nom. Price/lb	Defl. Price/lb	Pounds Landed	Nominal Value	Defl. Value	Atlantic Pounds	Defl. Value
1970	157,000	$ 30,061	$ 94,830	$ 0.19	$ 0.60	7,500	$ 648	$ 2,044	4.8%	2.2%
1971	105,600	20,068	64,115	0.19	0.61	17,200	1,718	5,489	16.3%	8.6%
1972	181,800	35,992	91,350	0.20	0.50	42,900	5,228	13,269	23.6%	14.5%
1973	248,200	54,651	115,297	0.22	0.46	70,300	7,775	16,403	28.3%	14.2%
1974	300,400	57,606	115,443	0.19	0.38	142,000	15,777	31,617	47.3%	27.4%
1975	339,500	57,007	112,885	0.17	0.33	214,000	21,537	42,648	63.0%	37.8%
1976	302,700	62,522	90,743	0.21	0.30	168,200	21,700	31,495	55.6%	34.7%
1977	129,500	43,487	55,117	0.34	0.43	19,700	2,672	3,387	15.2%	6.1%
1978	133,523	51,458	58,542	0.39	0.44	21,774	2,480	2,821	16.3%	4.8%
1979	223,903	72,609	71,890	0.32	0.32	126,517	21,728	21,513	56.5%	29.9%
1980	440,445	155,134	170,103	0.35	0.39	243,223	47,133	51,681	55.2%	30.4%
1981	352,255	158,851	168,096	0.45	0.48	93,420	18,817	19,912	26.5%	11.8%
1982	195,910	123,912	123,912	0.63	0.63	52,561	12,273	12,273	26.8%	9.9%
1983	370,235	142,161	148,704	0.38	0.40	219,871	51,958	54,349	59.4%	36.5%
1984	422,216	187,111	164,421	0.44	0.39	283,020	82,458	72,459	67.0%	44.1%
1985	249,758	122,950	101,277	0.49	0.41	152,676	50,384	41,502	61.1%	41.0%
1986	349,669	190,776	169,721	0.55	0.49	249,076	106,808	95,025	71.2%	56.0%
1987	314,814	206,651	142,322	0.66	0.45	249,657	148,205	102,070	79.3%	71.7%
1988	235,936	132,658	76,814	0.56	0.33	220,271	125,289	72,547	93.4%	94.4%
1989	287,684	182,552	134,924	0.63	0.47	274,356	173,755	128,422	95.4%	95.2%
1990	187,489	110,658	77,819	0.59	0.42	183,216	106,450	74,859	97.7%	96.2%
1991	129,986	73,696	54,109	0.57	0.42	96,045	56,989	41,842	73.9%	77.3%
1992	133,350	93,072	59,738	0.70	0.45	128,497	86,859	55,750	96.4%	93.3%
1993	249,390	210,566	124,008	0.84	0.50	238,099	203,955	120,115	95.5%	96.9%
1994	154,626	108,270	61,727	0.70	0.40	142,159	102,322	58,336	91.9%	94.5%
1995	254,437	228,609	132,297	0.90	0.52	248,193	223,413	129,290	97.5%	97.7%
1996	117,753	117,013	63,080	0.99	0.54	113,392	112,915	60,871	96.3%	96.5%
1997	58,059	61,285	36,986	1.06	0.64	52,548	56,950	34,369	90.5%	92.9%
1998	302,475	294,590	172,578	0.97	0.57	294,415	288,429	168,968	97.3%	97.9%
1999	387,227	411,656	214,740	1.06	0.55	372,749	397,974	207,603	96.3%	96.7%
2000	285,269	308,437	169,099	1.08	0.59	271,013	294,864	161,658	95.0%	95.6%
Ten Year Averages:										
1970	212,213	$ 48,546	$ 87,021	$ 0.24	$ 0.44	83,009	$ 10,126	$ 17,069	32.7%	18.0%
1980	321,912	160,275	140,029	0.52	0.44	203,813	81,708	65,024	63.5%	49.1%
1990	197,479	170,942	99,708	0.84	0.50	186,931	163,626	95,200	93.3%	94.0%

The deflated ex-vessel price of red drum has generally increased between 1994 and 2000, while the ex-vessel price index of edible fish has displayed a downward trend during the same time period (NMFS 2001a). The red drum ex-vessel price increase during this time period compared to the edible fish index would suggest that the demand for red drum has outpaced the overall demand for fish in the U.S. To make definitive statements on how changes in demand and supplies, including imported red drum products, over time have affected red drum prices would require an extensive econometric analysis and an understanding the market structure. Regardless, it appears that the increase in red drum ex-vessel prices during the 1990's probably included regulatory constraints on U.S. caught red drum commercial fishing (supplies), as well as an increase in the demand for red drum. It should also be noted that harvesting of adult red drum with a lower ex-vessel price compared to estuarine-oriented juveniles complicates the analysis of price trends during the 1970's and 1980's (SAFMC 1990b) compared to the 1990's, but other factors may moderate this complication. Specifically, the harvest of adults was obviously constrained by regulatory actions in the Atlantic states starting in the 1980's, and the higher market prices for juvenile created a strong incentive for targeting juvenile fish compared to adults.

Commercial landings of red drum in North Carolina have represented the most consistent and nearly sole source of red drum landings and related ex-vessel values in the Atlantic states. During the 1990's, North Carolina commercial harvest has annually averaged about 93% and 94%, respectively, of the total landings and deflated ex-vessel value for the Atlantic states (Table 5.3.4-7) while in the 1970's the deflated value of North Carolina landings only averaged 18% of the Atlantic total. During the 1990's, nominal total ex-vessel value for red drum landings in North Carolina averaged $163,600 fluctuating between approximately $57,000 in 1991 to $398,000 in 1999. The deflated total ex-vessel value averaged about $95,200 (Table 5.3.4-7) during the 1990's and also reached a high in 1999, about $208,000 and a low of approximately $34,400 in 1997. Both the nominal and deflated ex-vessel price of red drum in North Carolina has shown a generally increasing trend during the 1990's with the nominal price reaching a low of $0.58 in 1990 to a high of $1.08 in 1999 (Figure 5.3.4-3). The deflated ex-vessel price fluctuated between $0.65 in 1997 and $0.41 in 1990 (Figure 5.3.4-3). As previously discussed, the upward increase in North Carolina ex-vessels was probably influenced by the decline in red drum supplies due to regulatory actions in the Southeast, especially in the Gulf states.

Trends in the total annual ex-vessel value by major gear groups in the Atlantic states during the 1980's reflect the decline in Florida landings and the increase in North Carolina landings. Before 1985, red drum catches from the "Combined Gear" category, as reported for the east coast of Florida, comprised more than 50% of the total nominal ex-vessel value of Atlantic red drum landings (Table 5.3.4-8). With a decline in Florida landings after 1985, gill net catches, mostly from North Carolina, represented over 50% of the total nominal ex-vessel of Atlantic red drum landings (Table 5.3.4-8) by 1988. Seine catches also accounted for a significant portion of the total ex-vessel value during the 1986-98 period (Table 5.3.4-8).

Annual average, deflated ex-vessel prices for red drum by gear groups have been the highest from hand gears and lowest for pound nets and incidental trawl catches (Table 5.3.4-8) plus trawl prices had the lowest deflated minimum price during the 1980-2000 period. Fish size may account for the higher prices for hand gear catches compared to other gears because hand gear catches are often composed of one or two year old fish which usually fetch a higher price per pound than large adult fish which were historical caught by trawls or other gear used in the EEZ (SAFMC 1990b).

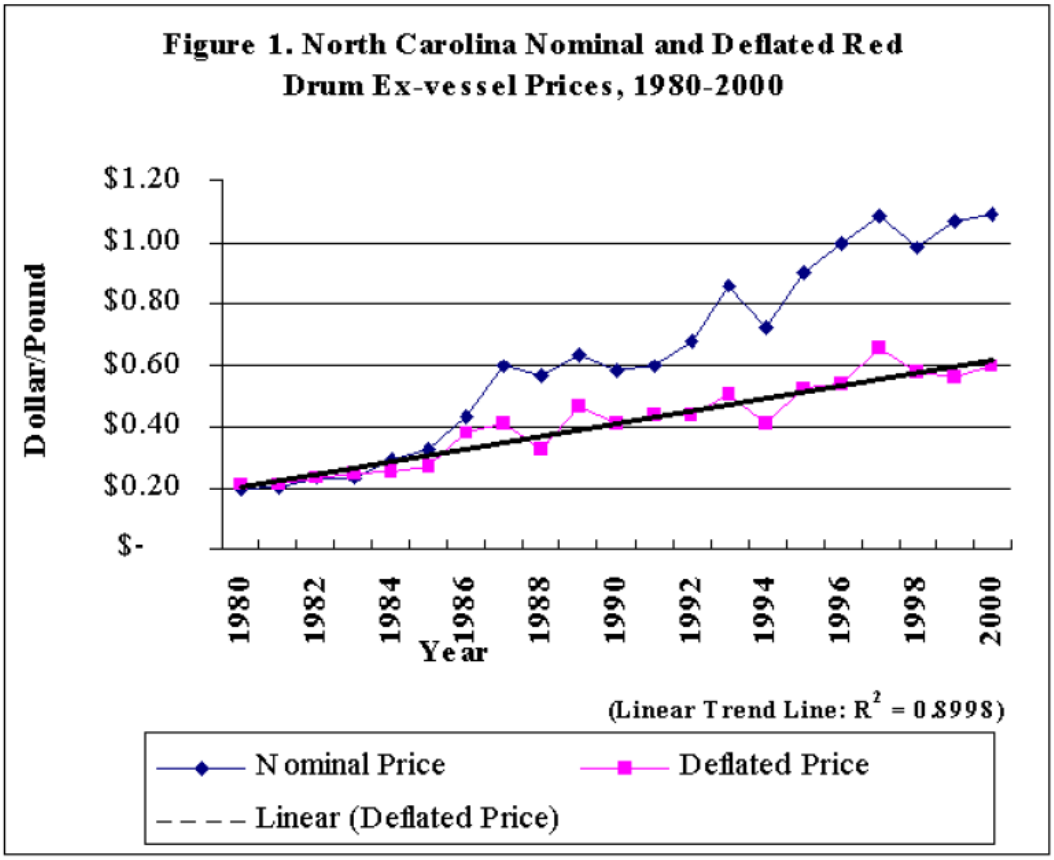


Figure 5.3.4-3. North Carolina nominal and deflated red drum ex-vessel prices, 1980-2000.

There is no recent research on the red drum marketing (e.g. retail price trend analysis, import trends, market structure, etc) in the United States. Except for commercial aquaculture operations, the lack of available market studies on red drum is partly indicative of the lack of interest in developing markets for red drum due to current regulatory constraints on directly harvesting and/or marketing red drum in the U.S. It does appears that there is at least a regional demand for red drum in the Gulf states because anecdotal information indicates that some of the red drum caught in North Carolina are sold in the Gulf states. A small amount of red drum is still landed in the Gulf states, about 38,000 pounds in 2000 at a nominal ex-vessel price of $1.52.

Table 5.3.4-8. Average deflated ex-vessel prices of red drum landings by gear in the Atlantic states, 1980-2000.

Gear Group	Average	Maximum	Minimum
"Combined Gear"*	0.69	0.79	0.57
Gill Nets	0.42	0.65	0.22
Seines	0.40	0.65	0.22
Hand Gear	0.70	1.05	0.47
Other	0.51	0.71	0.18
Pots & Traps	0.53	0.78	0.37
Pound Nets	0.38	0.54	0.18
Trawl	0.35	0.79	0.13

"Combined Gear" - category used for all Florida red drum landings in the 1980s; * Commercial harvesting was disallowed in
Florida after 1988
Gill nets - includes runaround, anchor and other gill nets
Seines - includes beach, common and long haul seines
Hand Gear - includes hand lines, spears (gigs), rakes and rod and reel
Other - all other gear
Pots & Traps - includes fish and crab traps
Trawls - includes shrimp, finfish and crab otter trawls

Recreational fishery

Starting in 1999, a recreational fishing expenditure survey was conducted in the Southeast region as an "add-on" to the NMFS Marine Recreational Fisheries Statistics Survey (MRFSS) (Genter et al. 2001).

Angler daily trip expenditures were estimated for each fishing mode by resident group (i.e. non-resident and state resident) within each state including North Carolina, South Carolina, Georgia, and Florida. For example, resident private boat anglers fishing in North Carolina, South Carolina, Georgia, and on the east coast of Florida, averaged $71, $36, $161, and $37, respectively. Non-resident anglers averaged $92, $67, $78, and $141, when saltwater fishing in North Carolina, South Carolina, Georgia, and along the east coast Florida, respectively (Genter et al. 2001).

Expenditures related to anglers targeting a given species such as red drum were not estimated in the above study. Southwick Associates (2001) did prepare a preliminary estimate of red drum expenditures by red drum anglers in Virginia, the Carolinas, Georgia, and Florida by applying the average expenditure to the number of red drum targeting trips in a given state (Table 5.3.4-9). On a per-trip basis, largest expenditures are reported for resident activity in Florida, South Carolina and North Carolina (Table 5.3.4-9). The average expenditures are significantly higher when equipment items are included compared to trip-related costs only. Equipment expenditures are primarily comprised of boat and tackle costs. The large difference between trip-related and equipment expenditures is also seen in the U.S. Fish and Wildlife Service's 1996 National Survey (USFWS 1997), but was not as prevalent in the 1991 National Survey when the general economy was not as robust as in 1996 and 1999. It can be speculated that increased expenditures for equipment by red drum and other anglers may be driven in part by a strong economy as well as other factors such as fish population, changing angler preferences (i.e. flats boats), etc.

Based upon these preliminary estimates, 1999 expenditures by all anglers was over $1.3 billion, and resident and non-resident anglers targeting red drum in 1999 were $75.7 million and $1.26 billion, respectively (Table 5.3.4-9). Within the South Atlantic states, Florida had the highest estimated total expenditure by non-resident anglers, $59.2 million, followed by North Carolina, $10.4 million; South Carolina, $4.0 million; and Georgia, $111,000 (Table 16). Estimated resident angler expenditures within the South Atlantic states were $1.1 billion, $78.8 million, $32.1 million, and $11.1 million for Florida, South Carolina, North Carolina, and Georgia, respectively (Table 5.3.4-9). For the South Atlantic states, estimated red drum angler expenditures represented over 20 % of all marine angler expenditures in the South Atlantic states as reported by Genter et al. 2001. The economic "importance" and impacts of these angler expenditures and related implications will be discussed in Sections 1.5.3.1 and 1.5.3.2. (sections reference ASMFC Red Drum Amendment 2)

Table 5.3.4-9. Trips and expenditures per state for red drum, 1999 (Southwick Associates 2001). NEEDS UPDATING

The NMFS also conducted an add-on survey to the MRFSS in the southeast region during 1997. The purpose of the add-on survey was to obtain socio-demographic, economic and fishing behavioral information on recreational anglers throughout the southeastern United States (Holiman 2000).

Summarized information on the demographic and economic characteristics of the recreational fishery in North Carolina was also provided in the FMP (NCDMF 2001) for 1997-1998. The majority (95.4%) of recreational anglers targeting red drum in North Carolina waters in 1997 were white and predominantly male (83.5%) and averaged 18.2 years of experience in recreational fishing. The majority (68%) of North Carolina red drum anglers surveyed was between 26 and 55 years of age and about 73% of them were employed, earning between $15,000 to over $175,000 per year. Slightly more than half reported earning over $45,000 per year.

Table 5.3.4-10. Red drum target effort trips in the South Atlantic by state for the period 1985-2000. Figures are thousands of trips (Source: MRFSS data as reported by Holiman 1999 and Southwick 2001).

Year	North Carolina	South Carolina	Georgia	East Florida	Total
1985	3,380.36	1,571.87	438.86	9,926.71	15,317.80
1986	2,977.06	1,447.73	639.43	9,840.15	14,904.37
1987	3,861.94	1,648.12	751.35	10,686.78	16,948.19
1988	4,762.89	1,906.13	666.72	11,485.19	18,820.93
1989	3,848.90	1,080.63	625.89	10,805.93	16,361.35
1990	3,867.93	931.06	705.44	8,067.60	13,572.03
1991	3,762.39	1,796.21	740.82	11,086.64	17,386.06
1992	4,372.00	1,457.23	572.15	10,340.03	16,741.41
1993	4,716.08	1,776.21	673.46	9,630.11	16,795.86
1994	5,170.14	1,987.30	955.82	11,815.06	19,928.32
1995	5,106.67	1,530.25	781.72	11,617.80	19,036.44
1996	4,741.82	1,434.08	617.36	10,525.86	17,319.12
1997	4,891.51	1,606.38	575.87	11,298.96	18,372.72
1998	4,461.46	1,714.09	571.86	10,089.81	16,837.22
1999	4,555.04	1,213.32	472.58	8,194.17	14,435.11
2000	6,090.99	1,276.87	763.93	11,162.94	19,294.73
Total	70,567.18	24,377.50	10,553.26	166,573.72	272,071.66

Although marine angler expenditures at the state and county level are useful, economists do not consider expenditures and related economic impacts to be the best approach for determining the economic value of the recreational fishing experience. From an economic perspective, the appropriate approach to quantifying the economic value of recreational fishing is based upon consumer surplus (Edwards 1991).

In general, consumer surplus or welfare is the value of the trip over and above the actual expenditure on the trip. For non-market goods, like shore or private boat fishing, consumer surplus can be directly estimated by asking anglers what they are willing to pay or be compensated for changes in quantity or quality of their fishing experience (SAFMC 1990b). Consumer surplus can also be indirectly approximated using a specialized travel cost model, Random Utility Models (RUMs), which is used to estimate angler site selection patterns based on individual trip costs and other site characteristics including fish catch rates. A RUM oriented valuation of marine recreational fishing for private boat angler was done by Haab et al. (2000) using data collected during the 1997 MRFSS add-on in the Southeastern states. Controlling for other site selection characteristics, they estimated the marginal value of an increase in historical catch and keep (harvest) by one additional fish harvested in a given state. In the South Atlantic states, the estimated value of one additional red drum caught per trip was the highest for South Carolina ($5.13), followed by Florida's east coast ($3.39), Georgia ($1.88), and North Carolina ($.36). It is assumed that a reduction in the number of red drum that could be caught and retained by the angler due to more stringent bag limits would have a similar magnitude in value change per fish for an angler. The loss of red drum fishing opportunities per trip for the following South Atlantic states was also estimated: South Carolina ($20.79), Florida's east coast ($8.73), Georgia ($3.04), and North Carolina ($1.87). For example, if "elimination of access" to North Carolina's red drum recreational fishery occurred, it would result in a consumer surplus or welfare loss of almost $232,000 based upon 124,053 annual red drum targeting trips, i.e. the value of red drum above angler expenditures (Haab et al. 2000).

Besides the specifics of eliminating "access", there are other qualifiers to this estimate. The RUM analysis will tend to overestimate losses from reduction in catch and keep rates because it does not account for switching to other species by anglers (Haab et al. 2000). In addition, values associated with catch and releases vs. retention were not addressed, although the importance of red drum catch and retention in fishing success has been debated by researchers (e.g. Duda 1993).

Non-Consumptive Factors

Non-consumptive considerations include non-consumptive use values and non-use values. Consumptive use values are associated with capture fisheries including catch-release fishing while non-consumptive use values are usually associated with "eco-tourism." A field trip to view the schooling of juvenile red drum in their estuarine habitat or a fish-watching hobbyist visiting an aquarium to watch large adult red drum in a tank are examples of activities that generate non-consumptive use value related to red drum. In contrast, "non-users" may also derive benefits of some part of the environment, such as red drum, based upon the knowledge that actions have been or will be taken to enhance and/or preserve a portion of the environment (Russell 2001). Economists also divide non-use value into two categories, bequest value and "pure" existence value. As the name implies, bequest value is based upon concern for future generation use or non-use of natural resources while existence value is oriented toward current generations. Consequently, total value (TV) of a resource from an economic perspective can be categorized into the three components as adapted from Hanley & Spash (1993):

$$TV = CS + XV + BV$$

where CS is consumer surplus (i.e. use value) including expected CS, XV is existence value, and BV is bequest value. Estimating total value and/or component values can be problematic, but in general, these values can be estimated two major methods. The indirect methods attempt to analyze markets or other behavioral information (e.g. fishing access site selection by anglers) in order to estimate willingness to pay (WTP) and/or willingness to accept (WTA) changes in environmental quality like catch and retention rates (Russell 2001). Random Utility Models or RUMs are one example of an indirect method, which can be used to estimate changes in consumer surplus related to red drum fishing. In contrast, the direct method is limited to one methodology, the Contingent Valuation Method (CVM).

CVM is based upon directly asking a relevant sample of consumers, not necessarily users of a resource, carefully constructed hypothetical questions about environment goods (e.g. red drum) in order to estimate WTP or WTA related to changes in a portion of the environment (Russell 2001). Both approaches have strengths and weaknesses, but the CVM approach is the only method for estimating nonuse values (Hanley & Spash 1993).

Pace (1995) estimated the total value of stocking or "enhancing" red drum stocks in South Carolina (SC) by surveying a sample of SC anglers and respondents in sample of all SC households using a CVM oriented mail questionnaire in 1994. Pace (1995) pooled angler and non-angler household, but the weighting of the sample results are skewed toward many of the non-angler respondents which have little or no interest in recreational fishing or other uses (e.g. "fish watching"). Consequently, it is assumed that their responses are a rough approximation of nonuse values (benefits) related to stocking red drum in South Carolina. Pace (1995) reported that the average, annual WTP per household (1994 dollars) was $1.73 for red drum stocking with annual aggregate value of about $2.2 million based on total SC households in 1994. The average of the WTP value seems reasonable because it has similar magnitude as reported by Haab et al. (2000) for red drum anglers as approximated using RUMs. Regardless, the preservation and enhancement of red drum stocks can also generate benefits for non-users, not just anglers.

For-hire recreational fishery

5.3.4.3 Bycatch

5.3.5 Weakfish and other Sciaenids

5.3.5.1 Description of fishing practices, vessels and gear

Current Status of the Weakfish Fishery

The majority of commercially and recreationally caught weakfish are landed from state waters. The dominant commercial gears used include gill nets, pound nets, haul seines, and trawls. The majority of commercial landings occur in the fall and winter months, presumably as the fish congregate to migrate. The recreational fishery catches weakfish using live or cut bait, jigging, trolling, and chumming. Recreational harvests typically peak in the warmer months (May through October) when effort tends to be greatest.

Typically recreational landings are recorded in numbers and commercial landings are recorded in pounds. However, Table 5.3.5-2uses recreational landings in pounds to compare the landings of the fisheries. Both commercial and recreational landings fell consistently from 2000 to 2004, reaching all-time lows. In 2005, commercial landings continued to decrease, while recreational landings increased 84% from 2004.

Commercial Fishery

The NMFS compiles commercial weakfish landings. The data are cooperatively collected by the NMFS and state fishery agencies from state mandated trip-tickets, landing weigh-out reports from seafood dealers, federal logbooks, shipboard and portside interviews, and biological sampling of catches. The NMFS data were not available for 2005 at the time of this report, thus the 2005 landings rely on preliminary data from annual state compliance reports. Massachusetts had no preliminary data to report and no estimate is included in the total.

The commercial weakfish fishery occurs during the fall and winter as the species migrates from estuaries to over-wintering grounds in the South Atlantic (Hogarth et al. 1995). Weakfish are taken primarily by trawls, pound nets, gill nets, and haul seines. Weakfish landings were dominated by the trawl fishery from the 1950's through the mid - 1980's, when gill net landings began to account for the majority of the landings. Gill net landings in the latter half of the 1990's were about double that of the trawl fishery.

From 2000 to 2003, there was an increasing trend of the commercial fishery accounting for a higher percentage of the total catch (Table 5.3.5-1). However, this trend appears to have stopped in 2004. In 2005, commercial landings contributed less than 50% of the total landings for the first time in the time series (1982-present). Coastwide commercial weakfish landings have ranged from a time series high of 21.2 million pounds in 1986 to a low of 1.3 million pounds in 2005.

Table 5.3.5-1. Amendment 4 Control Rule

	FISHING MORTALITY RATE	FEMALE SPAWNING STOCK BIOMASS
TARGET	$F_{30\%} = F = 0.31$	X
THRESHOLD	$F_{20\%} = F = 0.50$	$SSB_{20\%}$ = 31.8 million pounds

Table 5.3.5-2. Comparison of Atlantic coast commercial and recreational weakfish landings

Year	Recreational Landings (pounds)	Commercial Landings (pounds)	Total Pounds	% Total as Commercial
1982	8,285,323	19,478,274	27,763,597	70%
1983	11,730,620	17,475,003	29,205,623	60%
1984	7,013,779	19,773,587	26,787,366	74%
1985	5,489,027	16,953,357	22,442,384	76%
1986	10,141,785	21,187,973	31,329,758	68%
1987	6,749,894	17,072,159	23,822,053	72%
1988	6,331,649	20,526,402	26,858,051	76%
1989	2,177,234	14,162,178	16,339,412	87%
1990	1,347,259	9,438,190	10,785,449	88%
1991	2,130,564	8,692,760	10,823,324	80%
1992	1,398,977	7,453,788	8,852,765	84%
1993	1,102,338	6,853,579	7,955,917	86%
1994	1,795,515	6,190,522	7,986,037	78%
1995	1,855,546	7,098,658	8,954,204	79%
1996	2,925,391	6,940,038	9,865,429	70%
1997	3,692,716	7,297,783	10,990,499	66%
1998	4,044,973	8,419,604	12,464,577	68%
1999	3,143,428	6,905,158	10,048,586	69%
2000	4,154,793	5,400,529	9,555,322	57%
2001	2,722,629	4,999,539	7,722,168	65%
2002	2,192,603	4,772,978	6,965,581	69%
2003	864,960	2,001,271	2,866,231	70%
2004	860,086	1,523,919	2,384,005	64%
2005	1,584,547	1,315,859	2,900,406	45%

*Commercial landings for 2005 are preliminary. Massachusetts landings are not included in the coastwide total. One hundred pounds was included for Georgia's commercial landings; the state reported "confidential but no more than 100 lbs."

North Carolina, Virginia, and New Jersey have dominated commercial weakfish landings since 1950. North Carolina has annually landed the most weakfish since 1982 and Virginia has consistently landed the second most since 1993. North Carolina has accounted for over half of all the weakfish commercially landed since 1982.

Recreational Fishery

Recreational catch statistics are collected by the NMFS in the Marine Recreational Fisheries Statistics Survey (MRFSS). Effort data is collected through telephone interviews. Catch expansions are based on angler interviews and biological sampling conducted by trained interviewers stationed at fishing access sites.

Recreational landings hit a time series high of 11.7 million pounds in 1983. Landings were relatively high from 1983-1988, but abruptly fell in 1989. Annual recreational landings fluctuated between 1.1 million and 4.1 million pounds from 1993 to 2002, but fell to approximately 864,000 pounds in 2003. The lowest recreational landings on record occurred in 2004 (860,065 pounds). Recreational landings rebounded to over 1.5 million pounds in 2005, with New Jersey taking over 1.1 million pounds (~72% of recreationally landed weakfish). North Carolina is a distant second at 157,018 pounds (~10% of recreationally landed weakfish). The number of fish released alive by anglers has remained above 1 million fish since 1993, peaking at over 5 million in 1996, and decreasing to ~1.8 million fish in 2005.

Recreational landings from the EEZ account for only about 13% of the total coastwide recreational landings by pounds since 1982. From 1995 to 2005, recreational harvest in the EEZ has contributed less than 5.3% to each year's recreational landings, and only 1.8% in 2005.

Since 1982, over half of the total recreational harvest in pounds has come from inshore saltwater and brackish water bodies such as bays, estuaries, and sounds. In 2005, these areas contributed 73.6% of the recreational landings.

Current Status of the Spot Fishery

Spot support commercial fisheries along the Atlantic coast, particularly from the Chesapeake southward. They are harvested by a variety of commercial gear including haul seines, pound nets, gillnets, and trawls. Commercial catches have fluctuated widely since 1930 with no apparent long-term trends. Landings peaked in 1952 at 14.5 million pounds, and have since ranged between 3.9 and 12.7 million pounds. Since 1983, commercial landings on the Atlantic coast have remained steady, ranging from four to nine million pounds. Commercial landings were 4.37 million pounds in 2005.

Spot is a popular recreational species that is sought by anglers from Delaware Bay to northern Florida. Most of the Atlantic recreational harvest is taken within three miles of the coast, from shore or by private or rental boats rather than by party or charter boats. The recreational catch of spot has fluctuated from a high of 6.9 million pounds in 1981 to a low of 1.6 million pounds in 1999. In 2005, 3.6 million pounds were landed, the highest number in almost a decade.

Spot are short-lived and year-to-year fluctuations in landings can be expected since the catch in most years consists of a single year class. Moreover, year class abundance is thought to be determined by environmental conditions that prevail on the spawning and nursery areas in any particular year. Changes in fishing effort, habitat degradation, and economic conditions may also affect the quantities of fish caught in any year.

2006 ASMFC FMP update
Total landings of spot in 2005 were estimated at 7,924,737 pounds. The commercial fishery removed approximately 55 percent of this total, and the recreational fishery removed 45 percent.

The commercial fishery has consistently landed more pounds of spot than the recreational fishery since at least 1981; however, the proportion attributable to the commercial fishery in 2005 was the lowest in the time series.

Commercial landings of spot have fluctuated between 3.8 and 14.5 million pounds from 1950-2005. During this time series, landings have been over 10 million pounds thirteen times, four of those occurring during the peak of landings from 1972-75, and the last occurring in 1982. The 2005 landings were approximately 4.4 million pounds, the lowest since 1969 (Figure 5.3.5-1). Small spot are a major component of the bycatch in seine, fish/shrimp trawl, and pound net fisheries in the Chesapeake and in North Carolina, as well as a part of the bycatch of the South Atlantic shrimp trawl fishery.

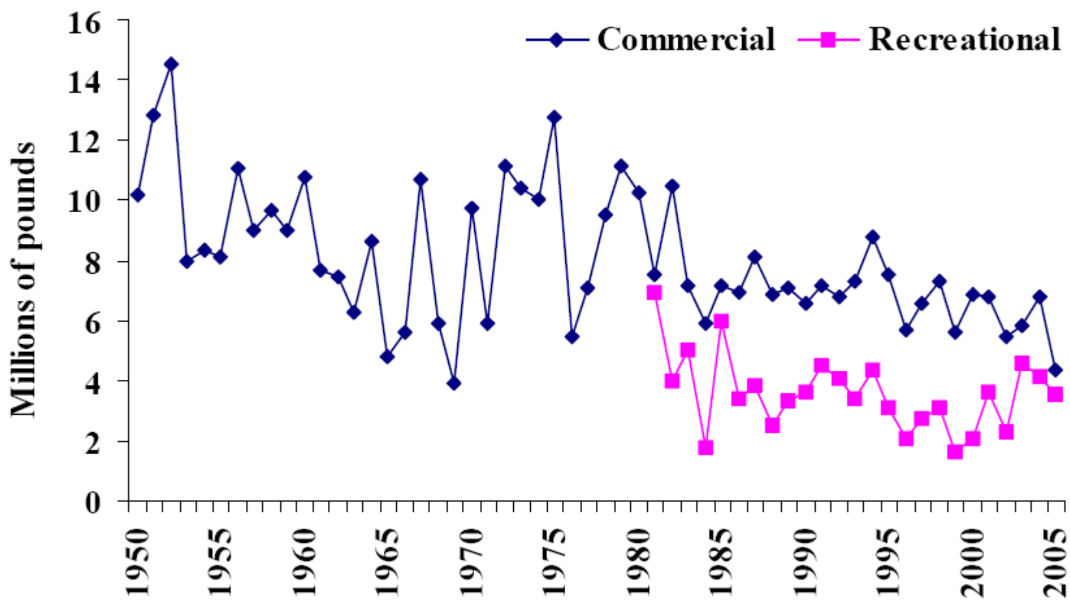


Figure 5.3.5-1. Spot commercial and recreational landings (pounds), 1950-2005

Between 1981 and 2005, the recreational harvest (A + B1 fish) of spot from along the Atlantic coast has varied between 3.6 million fish and 20.1 million fish, but has not exceeded 10 million fish since 1994. From there, spot landings declined steadily to the low point in 1999, after which landings increased gradually (Figure 5.3.5-2). The recreational harvest in 2005 was 8.8 million fish (3.5 million pounds), an increase in the number of fish, yet a decrease in pounds from 2004. The estimated number of spot released annually by recreational anglers from 1981 has remained relatively constant, ranging from 2.0 to 6.3 million fish with the exception of 1981 (11.1 million fish), 1990 (7.3 million fish), and 1991 (10.6 million fish). The number released alive in 2005 was

5.9 million fish, a nearly two-fold increase from the 3.1 million fish released alive in 2004.

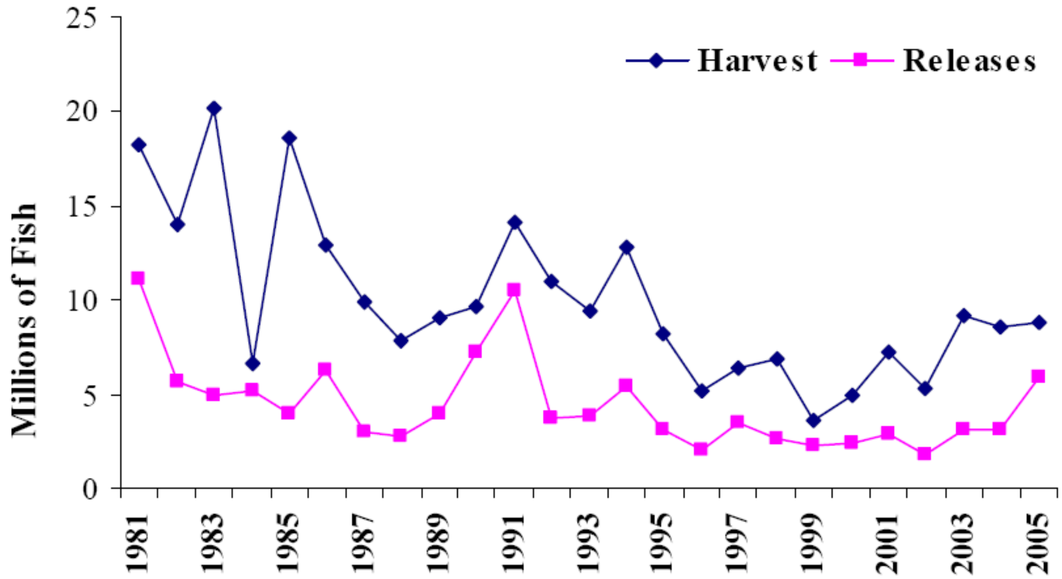


Figure 5.3.5-2. Spot recreational harvest and releases (numbers of fish), 1981-2005

Current Status of the Atlantic Croaker Fishery

Atlantic coast commercial landings of croaker have varied from one million pounds in 1970 to 64 million pounds in 1945. Commercial landings increased steadily each year from a low of 3.7 million pounds in 1991 to more than 28 million pounds in 2003. Commercial landings decreased in 2004 to approximately 25.5 million pounds coastwide, and again in 2005 to 22.5 million pounds; however, coastwide commercial landings have remained above 20 million pounds since 1996 (Figure 5.3.5-3). While commercial fishermen from New Hampshire south have landed Atlantic croaker in at least one year since 1960, the majority of landings come from the mid-Atlantic states (New Jersey through North Carolina) and Florida. Commercial landings from the remaining states are small and sporadic or only a recent component. Virginia and North Carolina have dominated the commercial harvest since 1960.

Atlantic croaker is the major component of the North Carolina and Virginia “scrap fishery”. A number of regulations instituted by North Carolina, such as banned flynet fishing south of Cape Hatteras, the introduction of BRDs in shrimp trawls, incidental finfish limits taken by shrimp and crab trawls in inside waters, minimum mesh size restrictions in trawls and culling panels in long haul seines may have indirectly reduced catches of juvenile croaker and changed the size and age distributions of the harvest. In the last stock assessment, aggregate, unculled (“scrap”) bait fisheries landings data were included for North Carolina and Virginia, and at-sea discard data was included from gill net and trawl fisheries. Scrap landings and discards were combined in the model. Between 1973 and 1995, scrap/discards accounted for an average 20% of removals, and from 1996 to 2002, an average 3% of removals. In Georgia, trawl-caught croaker is sold as unsorted mixed fish along with spot, whiting, and small flounder, therefore, commercial landings are a tenuous measurement of croaker landings there. Small croaker were previously a major part of the bycatch of the south Atlantic shrimp trawl fishery, however the use of TEDs and BRDs has reduced this bycatch.

Recreational landings are from the National Marine Fisheries Service Marine Recreational Fishery Statistics Survey (MRFSS). From 1981-2005, recreational landings of Atlantic croaker (Type A+B1 in numbers) from New Jersey through North Carolina have varied between 1.3 million pounds (1981) and 11 million pounds (2001), with landings showing a strong linear increase over this period (Figure 5.3.5-4).The recreational harvest in 2005 was 11.6 million fish (10.6 million pounds) (Tables 4 and 5). By number of fish, this is the third highest recreational landings for the time series, and the second highest by pounds. The majority of the landings are from Virginia (~68% by pounds). The increased landings in recent years have been at the northern range of the fishery (New Jersey to Virginia). The number of recreational releases in 2005 was estimated at 13.3 million fish, an increase from 2004 (Figure 5.3.5-4).

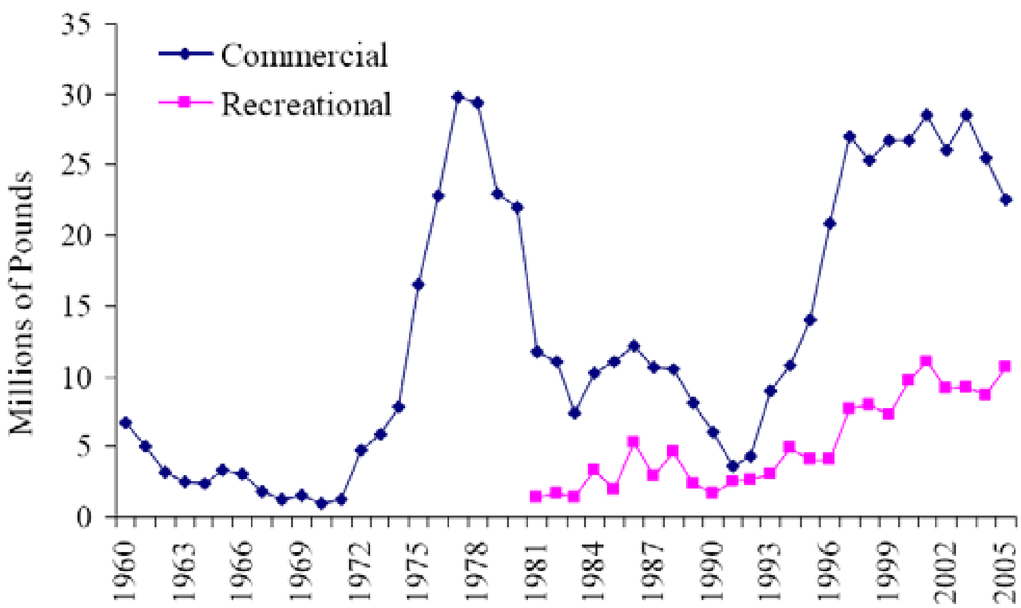


Figure 5.3.5-3. Atlantic croaker commercial and recreational harvest (pounds) (NMFS Office of Science & Technology 2006; State Fishery Agencies, pers. com. 2006).

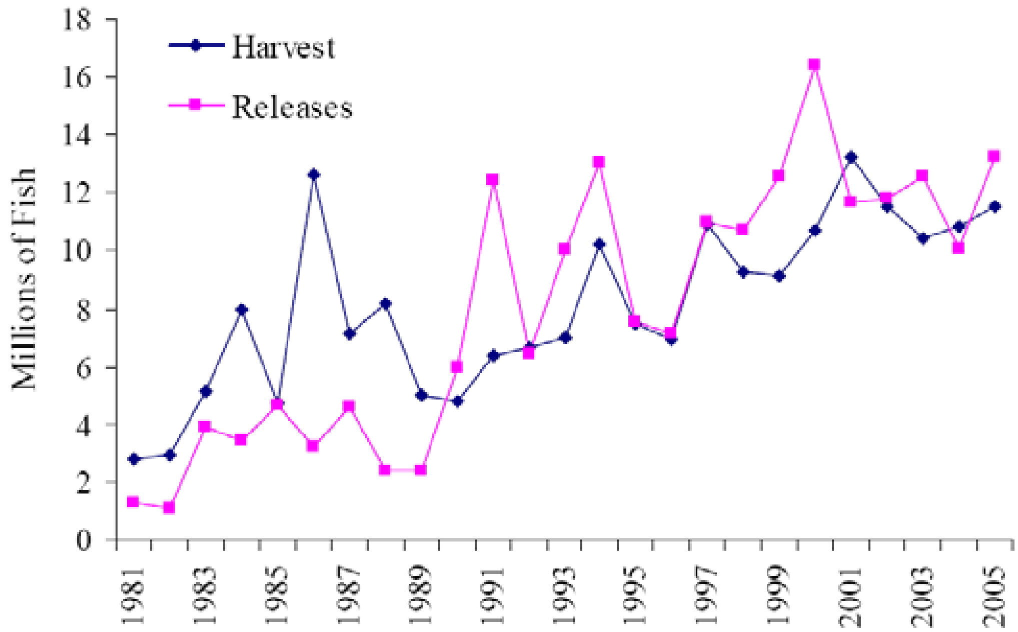


Figure 5.3.5-4. Atlantic croaker recreational harvest (A+B1 fish) and releases (B2 fish), 1981-2005 (NMFS Office of Science & Technology 2006).

Allowable gear

Allowable gear for the commercial harvest of weakfish in the EEZ includes trawl, gillnet, hook-and-line and rod and reel. Weakfish may be harvested recreationally using hook-and-line and spear.

5.3.5.2 Economic and social description

Weakfish Fishery

The Atlantic commercial weakfish fishery is prosecuted between Massachusetts and Florida. There are, however, limited commercial landings in the states of Maine, South Carolina, and Georgia. Maine reported landings of five pounds in 1995; South Carolina had reported landings in 1982 and 1989; and Georgia reported landings, except for 1988 and 1989, between 1982 and 1990. There are no reported landings for New Hampshire. Between 1950 and 2000, total Atlantic Coast landings (Maine through east coast of Florida) declined by 51,021 pounds per year or at the annual rate of 0.64% per year. In 1950, total landings equaled 7.99 million pounds; in 2000, landings equaled 5.38 million pounds ((Figure 5.3.5-4). During the 1970s, however, landings dramatically increased and exceeded 10.0 million pounds in each year until 1990. Between 1990 and 2000 landings decreased from 9.44 to 5.38 million pounds or by nearly 43.0 percent.

The ex-vessel value or first sale value (also referred to as dockside value) followed the same pattern as landings ((Figure 5.3.5-4). In 1950, the ex-vessel value equaled $5.74 million (in 2001 constant dollar values), but declined to $3.78 million in 2000. The decline represented an annual decrease of $38,486 or an annual rate of 0.67 percent.

Between 1978 and 1989, the annual ex-vessel value regularly exceeded $10.0 million per year.
North Carolina has traditionally had the highest level of landings of weakfish (Table 6). On an average annual basis, New Jersey ranks second in terms of landings, and Virginia ranks third. Landings of weakfish in the three states, combined, accounted for 87.9% of the total landings of weakfish between 1980 and 2000 (Table 6). In terms of total ex-vessel or dockside value, North Carolina has traditionally ranked first; Virginia and New Jersey rank second and third, respectively (Table 10). Between 1980 and 2000, all states, except Rhode Island and Connecticut experienced declines in ex-vessel value.

The ex-vessel prices of weakfish have varied substantially over time and among the states (Tables 10 and 11). Between 1980 and 2000, the lowest constant dollar price occurred in 1980. Connecticut, Rhode Island, and New York have generally had the highest ex-vessel prices per pound. North Carolina has typically received the lowest ex-vessel price per pound. The price differences are likely related to product size, market demand, and seasonality of product. Weakfish are generally locally marketed, and prices, therefore, likely reflect local market conditions. In addition, weakfish are highly perishable, and thus, cannot easily be processed and shipped to distant markets.

In describing the economic aspects of a commercial fishery, it is common to describe the size of the fishery, the number of vessels involved, the number of individuals engaged in the fishery, and economic returns. In the case of the weakfish fishery, data necessary for providing a detailed economic description are not available. For the most part, the weakfish fishery is prosecuted in state waters, and few states collect the information required for an extensive economic overview.
Commercial fishermen indicate that there is a varying degree of dependence on weakfish based on the location/port and the gear type used. For some gillnet fishermen in the northern states, weakfish represents one third of the economic value of their total annual catch, while others state that it is one of the three primary species they target during the year. Others suggested that it only represents 10% of their annual catch in terms of value. However, these fish are targeted and caught at a time that helps them “make it through the year.”

Some fishermen have suggested that while they currently target weakfish only minimally, historically it was a sought-after species. This follows a reported trend among fishermen who vary their targeted species based on environmental changes or reductions in the number of fish they see when on the water. The fact that 10 years ago some fishermen targeted weakfish only minimally was more a reflection on the condition of the stock and not the desire for the species.

5.3.5.3 Bycatch

5.3.6 Bluefish

5.3.6.1 Description of fishing practices, vessels and gear

(from the MAFMC Amendment 1 to the Bluefish FMP)

Bluefish have been commercially harvested in the U.S. for centuries. Bigelow and Schroeder (1953) concluded bluefish were plentiful at the time that New England was first settled based on the accounts by an author in 1672. However, the abundance of bluefish in southern New England waters has fluctuated periodically since then. An interesting recent account describes the "mosquito fleet" which operated out of Charleston, South Carolina, throughout the nineteenth and first half of the twentieth century (Bishop et al. 1994). This fleet of vessels 20 to 35 feet in length sailed daily from Charleston, out of sight of land with no navigational aids, and provided fresh bluefish, among other species, to the residents, a feat which won the respect and admiration of the community.

In more recent times, total coastwide bluefish landings (commercial and recreational) have averaged 86 million lbs (1981-1989), with commercial landings comprising roughly 17% of the total landings during that time. Since 1981, commercial landings have averaged about 13 million lbs. However, commercial landings declined 44% from a peak of 16.5 million lbs in 1981 to only 9.3 million lbs in 1996.

Bluefish are pursued in both state and EEZ waters by a variety of commercial gears. Coastwide (1987-1996 combined) most bluefish (48%) were landed by gill nets (all types combined) followed by otter trawls (19%). Fish pound nets accounted for 7% of the commercial catch followed by hand and troll lines (6%) and haul seines (3%) during the same time period.

During the period 1976-1987, beach haul seines harvested a significant portion of bluefish in New York and South Carolina. The quantities of bluefish harvested by this gear during 1987-1996 declined considerably relative to earlier years, with measurable landings only in New York, Maryland, Virginia, and North Carolina. The states of Maryland and South Carolina had more bluefish landed commercially by hand lines from 1987 to 1996 than any other gear type. Fish otter trawls were predominant in Rhode Island, Connecticut, and New York. Some type of gill net caught significant amounts of bluefish in all states except Connecticut, South Carolina, Georgia and Florida. Almost all of the bluefish in Maine and New Hampshire were caught by gill nets and this gear type was also predominant in Delaware waters. Runaround gill nets were predominant in New Jersey.

Since 1985, gill nets (all types combined) and otter trawls have been the predominant gear types while the other major gear types (haul seines, paired trawls, purse seines, pound nets, troll and hand lines) has remained relatively consistent at low levels or have declined in importance

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Seasonally, most bluefish were harvested commercially from May through October. Average monthly landings for the period 1987-1996 peaked at 1.2 million lbs in October. Most bluefish were caught during the fall months from September through November.

Bluefish are very important in the Atlantic coast recreational fishery. Wilk (1980) noted that no other species on the Atlantic coast is as abundant throughout such a wide range and variety of habitats as bluefish. MRFSS data indicate that since 1981 recreational bluefish landings averaged 50 million lbs, ranging from 95 million lbs in 1981 to 14 million lbs in 1995. In 1996, bluefish recreational landings were approximately 15 million lbs. In 1987, bluefish were the fish most sought by marine anglers in the North Atlantic, second only to summer flounder in the Mid-Atlantic, and fourth in preference for anglers in the South Atlantic (MAFMC 1990a). During 1987, bluefish comprised 34% by weight of all species caught by recreational fishermen along the Atlantic coast (MAFMC 1990a). The 1979 to 1987 recreational catch represented a substantial increase over the 1960 to 1970 recreational harvest when bluefish averaged approximately 10% of all species caught by marine anglers along the Atlantic coast.

Bluefish were the predominant species (by number) harvested by anglers in 1987. After reaching a secondary peak in 1986, recreational bluefish landings began to decline. The decline in bluefish recreational catch and landings continued over the last decade. MRFSS data indicate that anglers caught an estimated total of 27.6 million bluefish in 1987, with the numbers declining to a low of 9.9 million in 1993. Numbers increased to approximately 12 million in 1994, but then decreased to 10.5 million in 1995 and, in 1996, decreased again to a low of 9.9 million. The weight of bluefish landed by anglers declined from about 77 million lbs in 1987 to just less than 15 million lbs in 1996. The average weight of the bluefish landed has fluctuated during the years 1987 through 1996 between a low of 2.7 pounds (1994) and a high of 4.9 pounds (1988). The percent of the catch released by anglers has continued to increase from the 24 % reported for 1987 to 54 % in 1996.

An analysis of the recreational landings by subregion indicates more bluefish by weight were landed in the Mid-Atlantic than in the North and South Atlantic every year from 1987 to 1996, except for 1993 and 1994 when North Atlantic landings were highest. In most years, and on average, the weight of the Mid-Atlantic landings (average 55.7%) exceeded those from the North Atlantic (average 33.1%) and South Atlantic (average 11.2%) regions.

Current status of the fishery

(from the ASMFC 2006 FMP review)
Recreational catch of bluefish has averaged over 41 million pounds since 1981 although catch declined steadily over the time period. In 2004, recreational anglers along the Atlantic Coast landed 6,939 bluefish. Most of the recreational activity occurs from July to October, when almost 70% of the bluefish harvest is taken. Most of the recreational catch of bluefish is taken in the North and Mid-Atlantic states (New York to Virginia). Recreational landings hit a low of 3,682 fish in 1999 but has averaged over 5,900 fish since 1999 (Table 5.3.6-1).

Table 5.3.6-1. Estimated number of bluefish caught and the estimated number of bluefish landed by marine recreational fishermen each year, 1981 to 2004.

Year	Catch ('000)	Landings ('000)
1981	31,261	23,888
1982	27,220	23,724
1983	30,137	24,884
1984	26,508	20,798
1985	22,474	19,246
1986	30,411	24,441
1987	27,603	21,076
1988	13,365	9,905
1989	18,637	13,600
1990	16,446	11,365
1991	18,292	11,943
1992	11,440	7,158
1993	9,925	5,725
1994	11,920	5,768
1995	10,494	5,168
1996	9,521	4,205
1997	12,574	5,413
1998	9,204	4,202
1999	11,488	3,682
2000	16,260	4,897
2001	20,412	6,663
2002	15,217	5,300
2003	14,679	5,888
2004	18,679	6,939

Commercial landings decreased from 16.5 million pounds (lbs) in 1981 to 7.3 million lbs in 1999. Commercial landings have been regulated by quota since implementation of Amendment 1 in 2000. Since implementation of Amendment 1, landings have varied with a low of 6.8 million pound landed in 2002. Preliminary landing estimates for 2004 increased to 7.2 million pounds.

Allowable gear

Allowable gear for the commercial harvest of bluefish in the EEZ includes Trawl, gillnet, longline, handline, hook and line, rod and reel, bandit gear, cast net, pot, trap, lampara net and spear. Allowable recreational gear includes rod and reel, handline, spear, hook and line, hand harvest, bandit gear, powerhead, gillnet, cast net.

5.3.6.2 Economic and social description

(sections below from the 2007 bluefish specifications document – except as indicated from Amendment 1 to the Bluefish FMP)

Commercial fishery

In 2005, the value of bluefish landings was approximately $2.3 million. Average ex-vessel price of bluefish was $0.33/lb in 2005. On average (1985-1994), the ex-vessel value of bluefish commercial landings from state waters was about twice that from the Exclusive Economic Zone (EEZ) waters.

Bluefish comprised 0.17% and 0.59% of the total ex-vessel value and pounds of all finfish and shellfish species landed along the Atlantic coast of the U.S. in 2004, respectively. The contribution of bluefish to the total value of all finfish and shellfish vary by state, ranging from less than 0.01% in Maine, South Carolina, and Georgia to approximately 1% in New York. The contribution of bluefish to the total pounds landed of all finfish and shellfish vary by state, ranging from less than 0.01% in each Maine, South Carolina, and Georgia to approximately 4% in New York. Relative to total landings value, bluefish were most important in North Carolina and New York, contributing the largest percentage of ex-vessel value of all commercial landings in those states (Table 5.3.6-2). This contribution has not changed considerably from the previous fishing year (i.e., 2004), and it is not expected to change considerably in 2007.

Table 5.3.6-2. The percentage contribution of bluefish to the commercial landings and value of all species combined from Maine through East Coast of Florida, 2005 (Source: NMFS Dealer Weighout data and South Atlantic General Canvass data).

State	Pounds of Bluefish as a Percentage of all Species	Value of Bluefish as a Percentage of all Species
ME	< 0.01%	< 0.01%
NH	0.11%	0.10%
MA	0.14%	0.06%
RI	0.54%	0.20%
CT	0.23%	0.04%
NY	4.17%	1.01%
NJ	0.57%	0.27%
DE	0.63%	0.17%
MD	0.27%	0.12%
VA	0.10%	0.07%
NC	6.60%	1.10%
SC	< 0.01%	< 0.01%

GA	< 0.01%	< 0.01%
FL (East Coast)	0.42%	0.11%
Total	0.59%	0.17%

The economic impact of the commercial bluefish fishery relative to employment and wages is difficult to determine. According to NMFS, commercial fishermen in the western Atlantic landed approximately 1.62 billion lb of fish and shellfish in 2004. Those landings have been valued at approximately $1.33 billion. Total landed value ranged from approximately $14 million in Georgia to $367 million in Maine. However, it can be assumed that only a small amount of the region's fishing vessel employment, wages, and sales are dependent on bluefish since the relative contribution of bluefish to the total value and poundage of all finfish and shellfish is very small.

NMFS VTR data indicate that a total of 11,786 commercial trips targeting bluefish (bluefish ≥ 50% of total catch) resulted in landings of 4.3 million lb from Maine to North Carolina in 2005. Landings from directed trips are approximately 60% of total commercial landings for 2005 (i.e., 7.026 million lb in Table 5.3.6-3). Two major gear types accounted for over 90.3% of the total commercial catch: gillnets and bottom otter trawls. Gillnets comprised 35.0% of the total trips that landed bluefish and 60.2% of the catch, while bottom otter trawls comprised 41.6% of the trips and 30.1% of the catch.

Table 5.3.6-3. Bluefish commercial and recreational landings (‘000 lb), 1981-2005.

Year	Comm	Rec	Total	% Comm	% Rec
1981	16,454	95,288	113,725	15	85
1982	15,430	83,006	98,436	16	84
1983	15,799	89,122	104,921	15	85
1984	11,863	67,453	79,316	15	85
1985	13,501	52,515	66,016	20	80
1986	14,677	92,887	107,564	14	86
1987	14,504	76,653	91,157	16	84
1988	15,790	48,222	64,012	25	75
1989	10,341	39,260	49,601	21	79
1990	13,779	30,557	44,336	31	69
1991	13,581	32,997	46,578	29	71
1992	11,477	24,275	35,753	32	68
1993	10,122	20,292	30,414	33	67
1994	9,495	15,541	25,036	38	62
1995	8,009	14,307	22,316	36	64
1996	9,301	11,746	21,047	44	56
1997	9,063	14,302	23,366	39	61
1998	8,247	12,334	20,581	40	60
1999	7,307	8,253	15,338	48	54

2000	8,036	10,606	18,642	43	57
2001	8,689	13,230	21,919	40	60
2002	6,864	11,371	18,235	38	62
2003	7,403	13,136	20,376	36	64
2004	8,041	15,203	22,839	35	67
2005	7,026	16,162	23,188	30	70
Avg 81-05	10,992	36,349	47,309	23	77
Avg 95-05	7,999	12,786	20,713	39	62
Avg 00-05	7,677	13,285	20,867	37	64

Description of the Areas Fished
The Northeast Region is divided into 46 statistical areas for Federal fisheries management. Eight of these areas comprised at least 5 percent of the total commercial bluefish catch in 2005, and collectively accounted for 71.41% of the commercial trips that caught bluefish and 77.1% of the bluefish catch. These eight areas include 635, 611, 636, 613, 612, 614, 615, 623; the percentages associated with each area are provided in Table 5.3.6-4. It may be noted that the vessel log database used to characterize the distribution of commercial harvest does not extend outside of the Northeast Region (i.e., to SC, GA, FL).

Table 5.3.6-4. Statistical areas that accounted for at least 5 percent of the bluefish catch and/or trips in 2005, NMFS VTR data.

Statistical Area	Catch (percent)	Trips (percent)
635	14.0%	2.3%
611	11.9%	26.7%
636	11.8%	1.0%
613	11.5%	14.2%
612	11.2%	12.3%
614	5.7%	4.8%
615	5.5%	2.6%
623	5.5%	0.2%

Processing sector, marketing and consumption (from MAFMC Am 1 to the bluefish FMP)

Bluefish is primarily a fresh fish product. It is generally iced both on board the vessel and at the dock during unloading before it is shipped to market. The limited extent of the fresh fish market has been one of the major factors constraining the commercial harvest of bluefish. Should methods become available to maintain a quality product over longer periods of time, and current efforts to develop markets in the central portions of the country prove successful, the demand for bluefish and bluefish products could increase. At a local level, demand for bluefish by processors is relatively low, and the market can be saturated quickly. When this occurs, the price for bluefish drops to a low level and, consequently, fishermen target other species (MAFMC 1990a).

A relatively small amount of bluefish is filleted and smoked each year. Slightly more than 2% of bluefish landed in 1983 were processed in this manner (MAFMC 1990a). A number of inquires to NMFS indicated interest in processing bluefish increased in 1986 and 1987 (R. Ross pers. comm.). Most of these inquires concern cured bluefish or bluefish pate rather than fillets. A decrease in New England groundfish stocks and an increase in consumer demand for fish may explain this increased interest.

The price per pound of processed bluefish varies by product type. A telephone survey conducted in 1987 (MAFMC 1990a) indicated that fresh fillets were the most common form of processed bluefish product along the Atlantic coast (averaged $1.43 per pound, wholesale, in constant 1985 dollars). Frozen fillets averaged $0.96 per pound whereas smoked bluefish averaged $3.62 per pound. Smoked bluefish comprised an average of 14% of the total value of the output from the plants that processed them while the fresh and frozen fillets averaged 2% and 1%, respectively.

Along the Atlantic coast between 1992 and 1996, an average of 307,410 lbs of bluefish was processed with an average value of $649,973 (in nominal dollars) (Koplin pers. comm.). The largest volume of bluefish was processed in 1992 at 481,274 lbs ($732,302), and the smallest amount processed was in 1995 (186,591 lbs valued at $493,417). The bulk of the bluefish processing from 1987 to 1996 took place in the New England area. The number of processing plants handling bluefish between 1992 and 1996 along the Atlantic coast averaged 13; total employment at these plants averaged 324 people, and bluefish comprised an average of 2.5% of the total output value and 1.7% of the total output weight.

Recreational fishery

The fishery for bluefish is one of the most important recreational fisheries on the Atlantic Coast. For example, during the period 1981 to 1996, bluefish accounted for 29% of the Atlantic coast recreational harvest of finfish by weight (the greatest of any species), ranging from 42% in 1981 to 11% in 1995. From 1996 to 2004, bluefish comprised an average of 10% of total recreational landings, with a low of 7% in 2000 and a high of 12% in both 1998 and 2004. In 2005, bluefish accounted for over 13% of the Atlantic coast recreational harvest of finfish by weight. MRFSS data indicate that the average number of overall recreational fishery participants was relatively constant (~ 5 million) from 1985 – 1999 but has shown a positive trend in recent years, topping off at a little less than 8 million in 2005. This positive trend is consistent with the recent increases in bluefish recreational landings.

During the 1980s, a significant portion of Mid-Atlantic recreational participants depended upon bluefish, particularly those fishing from party/charter vessels. For example, in 1985 party/charter boats in the Mid-Atlantic region landed a total of 22.2 million lb of fish, over half of which were bluefish (12.3 million lb). In 1990, a Council survey was conducted of party and charter boat owners between Maine and Virginia. The survey indicated that bluefish ranked first in the catch and was the second most desired species for party boat owners, while for charter boats, bluefish ranked third in terms of desirability and second in terms of success rate. No survey exists for the more recent time-frame; however, from 1996 – 2005, the proportion of party and charter trips that targeted bluefish has remained relatively constant.

MRFSS catch data by mode indicates that 51% of bluefish were caught by private and rental boats between 1995 and 2004 (Table 5.3.6-5). In addition to private and rental boats, 43% of bluefish were caught from shore and 6% from party and charter boats (Table 5.3.6-5) from 1995 to 2004.

Table 5.3.6-5. The percentage (%) of bluefish caught and landed by recreational fishermen for each mode, Maine through Florida, 1995-2004 (Source: MRFSS).

Mode	Catch (Number A+B1+B2)	Landing (Weight A+B1)
Shore	43	20
Party/Charter	6	21
Private/Rental	51	59

Trends in directed fishing for bluefish from 1991 to 2006 are provided in Table 5.3.6-6. The lowest annual estimate of directed trips was 1.3 million in 2000; the highest annual estimate of directed trips was 5.8 million trips in 1991. In 2003, anglers targeted bluefish in 2.1 million trips bluefish. MRFSS estimates of directed effort since 2003 are not yet available.

Table 5.3.6-6. Number of bluefish recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 2006.

Year	Number of Fishing Trips[a]	Recreational Harvest Limit (‘000 lb)	Recreational Landings (‘000 lb)[b]

1991	5,811,446	None	32,997
1992	4,261,811	None	24,275
1993	3,999,487	None	20,292
1994	3,414,337	None	15,541
1995	3,409,966	None	14,307
1996	2,523,984	None	11,746
1997	2,021,713	None	14,302
1998	1,838,525	None	12,334
1999	1,316,939	None	8,253
2000	1,279,035	25,745	10,606
2001	1,914,480	28,258	13,230
2002	1,880,539	16,365	11,371
2003	2,099,771	26,691[c]	13,136
2004	n/a	21,150[c]	15,146
2005	n/a	20,157[c]	16,162
2006	n/a	16,473[c]	n/a

[a]Number of fishing trips as reported by anglers in the intercept survey indicating that the primary species sought was bluefish, North Atlantic, Mid-Atlantic, and South Atlantic regions combined. Estimates are not expanded. MRFSS Data.
[b]Atlantic coast from Maine through Florida's east coast.
[c]Adjusted for RSA.
n/a = Data not available.

Because of the importance of bluefish to recreational anglers, a change in expenditures by bluefish anglers would be expected to impact the sales, service, and manufacturing sectors for the overall recreational fishing industry. The total value recreational anglers place on the opportunity to fish can be divided into actual expenditures and a non-monetary benefit associated with satisfaction. In other words, anglers incur expenses to fish (purchases of gear, bait, boats, fuel, etc.), but do not pay for the fish they catch or retain nor for the enjoyment of many other attributes of the fishing experience (socializing with friends, being out on the water, etc.). Despite the obvious value of these fish and other attributes of the experience to anglers, no direct expenditures are made for them, hence the term "non-monetary" benefits. In order to determine the magnitude of non-monetary benefits, a demand curve for recreational fishing must be estimated. In the case of bluefish, as with many recreationally sought species, a demand curve is not available. Part of the problem in estimating a demand curve is due to the many and diverse attributes of a recreational fishing experience: socializing, weather, ease of access and site development, catch rates, congestion, travel expenditures, and costs of equipment and supplies, among others. A recreational angler's willingness-to-pay for bluefish must be separated from the willingness-to-pay for other attributes of the experience. Holding all other factors constant (expenditures, weather, etc.), a decrease in the catch (or retention rate) of bluefish would decrease demand and an increase in the catch (or retention rate) should increase demand. Each change will have an associated decrease/increase in expenditures and non-monetary benefits.

Recreational fishing contributes to the general well being of participants by affording them with opportunities for relaxation, experiencing nature, and socializing with friends. The potential to catch and ultimately consume fish is an integral part of the recreational experience, though studies have shown that non-catch related aspects of the experience are often as highly regarded by anglers as the number and size of fish caught. Since equipment purchase and travel-related expenditures by marine recreational anglers have a positive effect on local economies, the maintenance of healthy fish stocks is important to fishery managers.

Economic impact of the recreational fishery

Anglers' expenditures generate and sustain employment and personal income in the production and marketing of fishing-related goods and services. In 1998, saltwater anglers from Maine through Virginia spent an estimated $903.3 million on trip-related goods and services (Steinback and Gentner 2001). Private/rental boat fishing comprised the majority of these expenditures ($561.8 million), followed by shore fishing ($259.8 million) and party/charter fishing ($81.7 million). Survey results indicate that the average trip expenditure in 1998 was $47.42 for anglers fishing from a private/rental boat, $32.48 for shore anglers, and $67.12 for anglers that fished from a party/charter boat. Adjusted average expenditures in 2005 dollars are $81.93 for party/charter boat trips, $57.80 for private/rental boat trips, and $39.64 for shore trips.1 Trip-related goods and services included expenditures on private transportation, public transportation, food, lodging, boat fuel, private boat rental fees, party/charter fees, access/boat launching fees, equipment rental, bait, and ice. Unfortunately, estimates of trip expenditures specifically associated with bluefish were not provided in the study. However, if average trip expenditures are assumed to be constant across fishing modes, estimates of the expenditures associated with bluefish can be determined by multiplying the proportion of total trips that targeted bluefish by mode (expanded estimates) by the total estimated trip expenditures from the Steinback and Gentner study. According to this procedure, anglers fishing for bluefish from Maine through Virginia spent an estimated $104.69 million on trip-related goods and services in 2005. Approximately $37.26 million was spent by anglers fishing aboard private/rental boats, $60.50 million by those fishing from shore, and $6.93 million by anglers fishing from party/charter boats. Apart from trip-related expenditures, anglers also purchase fishing equipment and other durable items that are used for many trips (i.e., rods, reels, clothing, boats, etc.). Although some of these items may be purchased with the intent of targeting/catching specific species, the fact that these items can be used for multiple trips creates difficulty when attempting to associate durable expenditures with particular species. Therefore, only trip-related expenditures were used in this assessment.

The bluefish expenditure estimates can be used to reveal how anglers' expenditures affect economic activity such as sales, income, and employment from Maine through Virginia. During the course of a fishing trip, anglers fishing for bluefish purchase a variety of goods and services, spending money on transportation, food, boat fuel, lodging, etc. The sales, employment, and income generated from these transactions are known as the direct effects of anglers' purchases. Indirect and induced effects also occur because businesses providing these goods and services also must purchase goods and services and hire employees, which in turn, generate more sales, income, and employment. These ripple effects (i.e., multiplier effects) continue until the amount remaining in a local economy is negligible. A variety of analytical approaches are available for determining these impacts, such as input-output modeling. Unfortunately, a model of this kind was not available. Nonetheless, the total sales impacts can be approximated by assuming a multiplier of 1.5 to 2.0 for the Northeast Region. Given the large geographical area of the Northeast Region, it is likely that the sales multiplier falls within those values. As such, the total estimated sales, income and employment generated from anglers that targeted bluefish in 2005 was likely to be between $157.04 million ($104.69 million * 1.5) and $209.38 million ($104.69 million * 2.0) from Maine through Virginia. A similar procedure could be used to calculate the total personal income, value-added, and employment generated from bluefish anglers' expenditures, but since these multiplier values have been quite variable in past studies, no estimates were provided here.

For-hire recreational fishery

(from MAFMC Amendment 1 to the bluefish FMP)
Vessel trip report data (VTR) has been collected by NMFS since 1994 for the recreational and commercial fisheries. In the recreational fishery, this data is collected from party/charter vessels that have permits to operate in federal waters as required by the FMPs or amendments for Summer Flounder, Scup, Black Sea Bass, Northeast Multispecies, and Atlantic Mackerel, Butterfish, and Squids.

Party and charter vessels with a federal permit are required to report all their activities regardless of location (e.g., federal or state waters) when they engage in a fishery for one or more of the species mentioned above. As such, these vessels are required to report all their catches, including bluefish. If a party/charter vessel does not have federal permit as specified above and operates exclusively in nonfederal waters, it is exempt from reporting and this activity is not included in the VTR data system (Power pers. comm.).

Vessel trip reporting data indicate that bluefish contributed over 13% of the total catch (by number) made by party/charter vessels in 1996. The contribution of bluefish to the total catch of party/charter vessels fluctuated throughout the year, ranging from 0% in January, February, March, April, and December to 20% in August, with the largest proportion of bluefish caught to other species caught occurring from June through August. Analysis of the recreational landings by state indicates that bluefish contributed with less than 1% of the total catch of party/charter vessels in Delaware and Maryland, and over 67% in Connecticut.

Social Description

Ports and communities that are dependent on bluefish are fully described in the 2002 Bluefish Specification Document (section 4.3; MAFMC 2001) and are available via the internet at http://www.nero.noaa.gov/ro/doc/nr02.htm.

NMFS dealer data from 2005 were used to rank fishing ports in order of importance for bluefish commercial landings. Ten ports qualified as "top bluefish ports", i.e., those ports where 100,000 pounds or more of bluefish were landed. Wanchese, NC was by far the most important commercial bluefish port with over 2.1 million lb landed, which is more than four times the landings from the second ranked port (Belford, NJ; 493 thousand lb).

The ranking of recreational fisheries landings (numbers of fish) by state in 2005 is provided in Table 5.3.6-7.

Table 5.3.6-7. MRFSS preliminary estimates of 2005 recreational harvest and total catch for bluefish.

State	Harvest (A+B1)		Catch (A+B1+B2)
	Pounds of Fish	Number of Fish	Number of Fish
ME	81,284	18,662	68,150
NH	63,437	11,296	50,024
MA	2,289,770	568,294	2,330,056
RI	738,839	296,618	829,977
CT	1,072,452	354,276	1,303,606
NY	2,471,381	2,275,304	5,514,409
NJ	5,843,489	1,879,237	4,472,785
DE	288,260	157,676	364,029
MD	618,443	240,906	585,699
VA	595,392	366,226	959,138
NC	1,108,237	1,243,669	3,365,739
SC	234,979	292,507	651,688
GA	2815	3,256	27,926
FL	752,878	547,891	958,157

Wanchese, North Carolina (this section excerpted from the MAFMC's Am. 1 to the Bluefish FMP, 1998)

"Wanchese has traditionally been a fishing community with commercial fishing operations since the late 1800s. Many of the current residents of Wanchese are descendants of people who settled here in the late 1600s and early 1700s." Many of the fishers are small, independent owner operators. "Informants have estimated that fifty percent of the men in Wanchese are in a marine related career." Wanchese has never developed the strong tourism sector seen in nearby areas. Because of the periodic shallowness of Oregon Inlet, many of its larger trawlers stay in Hampton, Virginia or New Bedford, Massachusetts during the winter. "Wanchese is also the site of the Wanchese Seafood Industrial Park (WSIP) which was developed in the 1970s to be a major site for seafood processing activities. However, because of the uncertain nature of Oregon Inlet and the general decline in fisheries since the 1970s, very few businesses actually operate in WSIP. The catch is either sold at retail markets locally or it is packed in ice and sent to other markets. At least one of the Wanchese commercial fishing and packing operations has expanded to other ports such as Hampton, Virginia and New Bedford, Massachusetts." In recent years, some New Bedford vessels have moved south to base in Wanchese in response to shortages of groundfish and scallops in New England.

Much of Wanchese ocean fishing occurs in the winter months (November-April). However, the boats in Wanchese fish all year round. Bluefish is predominantly caught with ocean gill nets which fish up to ten miles offshore and in the area of Ocracoke to Currituck Light. Other species include weakfish, dogfish and Atlantic croaker between the first of November and the end of April. There are a half dozen fish houses and other marine-related businesses that handle species other than crabs, and a couple that handle crabs exclusively. McCay et al. (1993) reported that summer flounder (21%) was the most important species in Dare County in terms of landed value in 1991. The value of all species landed in Dare County was over $11 million in 1991. Blue crabs (hard) are second in importance (11%), followed by weakfish (9%). Other species of volume in Dare County in 1991 were bluefish (4.02%), sea basses (3.41%), dogfish (1.00%), tilefish (0.53%), scup (0.41%), butterfish (0.31%), squid (0.29%), and Atlantic mackerel (0.12%).

Generally, the boats that are owned by local companies are operated by hired captains. However, these boats may be operated by a relative in some instances. Independent boats are usually owner-operated, with family members often serving as crew. "The crew on these vessels are mostly local; 75-80% are from within the area. All are paid with some variation of a share system." The crews are mostly 18 to 40 years of age; captains are usually older, with some over 65. Most crew members are white, though there are some black fishers including black captains. Sometimes, members of a family will own boats and fish houses. In the fish houses, most of the work force are black women, except for the crab houses where Latino workers are more common."

Recreational fishers use the inshore, offshore, and sound waters around Wanchese in Dare County. Those fishing from boats do not predominantly target bluefish. Bluefish are targeted by pier and surf fishers, who are primarily local residents and residents of nearby counties. Other species targeted by pier and surf fishers are flounder, Kingfish or sea mullet, triggers, puffers, skates, rays, spot, pigfish, and pinfish.

Federally Permitted Vessels (from the 2007 bluefish specifications document)
NMFS Federal permit data indicate that a total of 3,441 commercial and 900 recreational (party/charter) bluefish permits were issued in 2005. Among these, 478 vessels had both commercial and recreational bluefish permits.

A subset of federally-permitted vessels was active in 2005. Dealer reports indicate that 669 vessels with commercial bluefish permits actually landed bluefish (19.4% of the permitted fleet); and VTR data show 233 party/charter vessels catching bluefish (25.9% of the permitted fleet).

Dealers (from the 2007 bluefish specifications document)
According to NMFS permit data, 417 dealers had Federal bluefish permits in 2005. Dealer reports, however, indicate that only 156 of these dealers (37.4%) actually bought bluefish. The distribution of permitted and active dealers by state is provided in Table 17. While employment data for these dealers are not available, dealer reports indicate that gross revenues from the purchase of bluefish in 2005 were $2.27 million.

5.3.6.3 Bycatch

5.3.7 Summer Flounder

5.3.7.1 Description of fishing practices, vessels and gear

Summer flounder support an extensive commercial fishery along the Atlantic Coast, principally from Massachusetts through North Carolina. Landings from Maine through North Carolina, have fluctuated widely over the last six decades (Table 38), increasing from slightly less than 10 million pounds per year prior to World War II to an average of around 20 million pounds during the 1950's and early 1960's. Landings consistently decreased during the 1960's to a low of 6.7 million pounds in 1969. Commercial landings increased in the mid 1970's until 1989, due to increased levels of effort in the southern winter trawl fishery (MAFMC 1993). Landings of summer flounder from Maine to North Carolina peaked in 1979 at nearly 40 million pounds (Table 38). Reported landings were 32.3 million pounds in 1988 and less than 18 million pounds in 1989, and further decreased in 1990 to about 9 million pounds, a decline of 71% from 1988 (Table 38).

In 1993, the first year that a coastwide quota was implemented, commercial landings were 12.8 million pounds, slightly in excess of the quota for that year. Commercial landings increased to 15.4 million pounds in 1995 and then dropped to 8.8 million pounds in 1997. Commercial landings were 10.7 million pounds in 1999.

From 1990 to 1999 the state of North Carolina had the highest commercial landings of summer flounder, accounting for 25% of the 1990 to 1999 mean, followed by Virginia (24%), New Jersey (17%), and Rhode Island (15%; Table 38). The states of Maine, Delaware, and Maryland, accounted for less than 1% each of the 1990 to 1999 mean. The state of New Hampshire had no summer flounder landings from 1990 to 1999.
Most commercial landings are made from otter trawl vessels (93%) and sea scallop dredges (2%), as based on 1990 to 1999 NMFS Weighout Data (Table 39). From 1990 to

1999 combined, otter trawls caught 117 million pounds of summer flounder, while sea scallop dredges caught 2.5 million pounds. Hand lines, pound nets, and unknown combined gears were the only other gear that averaged more than 1 million pounds for the time period. Small catches of summer flounder were also made with haul seines, floating traps, gillnets, pots/traps, and midwater/pair trawls (Table 39).
From 1990 to 1999, the majority of the summer flounder were landed annually by commercial fishermen using otter trawls in all states except Delaware (Table 40). Three gear types accounted for 97% of the Delaware landings, pots/traps, gillnets, and hand lines.

Due to a change in reporting requirements, the reporting of commercial landings by distance from shore is inconsistent from 1994-1998. Therefore, only 1999 landings are presented by distance from shore in this document. Earlier landings by distance from shore are presented in Amendment 10. In 1999, 73.8% of the commercial landings of summer flounder came from the EEZ (Table 12). Delaware had the lowest landings (12.5%) in the EEZ, while Virginia had the highest landings (92.3%) in the EEZ. The remainder of the states caught the majority of their landings in the EEZ (Table 12).

Approximately 37% of the commercial summer flounder landings from 1990 to 1999 were caught in January and February (Table 41). Less than 10% of the landings for this time period were caught in each month from March through December. The lowest landings occurred April through August.

Summer flounder is one of the mainstays of the sport fishery along the Atlantic coast. The use of live bait is common, but summer flounder are also taken on jigs, small spoons, and spinners. Although not as strong a fighter per pound as some other sport fishes, the summer flounder provides lively action, especially on light tackle (MAFMC 1993). From 1980 to 1989 summer flounder landings ranged from a high of 38.2 million pounds in 1980 to a low of 3.2 million pounds in 1989. Recreational landings of summer flounder in 1999, at about 8.4 million pounds, were 36% below the historical 1980-1999 average of 17.4 million pounds and only slightly below the 1990-1999 average of 8.6 million pounds (Table 42). In 1999 the recreational sector accounted for 44% of the total landings. Historically recreational summer flounder landings accounted for 61% of the average total landings from 1980-1999, and 59% of the average total landings from 1990 to 1999 (Table 42).

Recreational catch and landings have fluctuated since recreational harvest limits were implemented under Amendment 2 regulations in 1993 (Table 43). Landings increased to 8.8 million pounds in 1993 from the 1992 level of 7.15 million pounds (Table 43). From 1994 to 1999, recreational landings ranged from 5.4 million pounds (1995) to 12.5 million pounds (1998). Recreational landings in 1999 were estimated to be 8.4 million pounds. In 1980 summer flounder recreational catch was at its highest with 28.4 million fish. It declined to a low of 2.7 million fish in 1989 and has been increasing since. In 1999 summer flounder recreational catch totaled 21.4 million fish.

Summer flounder recreational data indicate that in only two of the last eight years (1994 and 1995) have recreational landings been less than the recreational harvest limits (Table 44). In 1998 and 1999, recreational landings of summer flounder were 12.5 million lb and 8.4 million lb, respectively. The summer flounder recreational landings in 1998 and 1999 were 5.07 million lb and 0.96 million lb over the recreational harvest limit for those years, respectively.
The method of estimating trips for specific species is potentially biased since MRFSS interviewers ask anglers, upon completion of their trip, which species they targeted. This approach may cause anglers to report the species they caught, regardless of the species they originally sought. Over the past 10 years, recreational trips directing for summer flounder in the Mid-Atlantic, New England, and South Atlantic Regions, have fluctuated between a low of 3.6 million trips in 1990 to a high of 5.8 million trips in 1994, the second year with a recreational harvest limit (Table 44). In 1999, there was an estimated 4.2 million trips directing for summer flounder.

From 1990 to 1999, New Jersey landed the largest percentage of catch by number (42.9%), followed by New York (18.8%), Virginia (14.8%), and North Carolina (5.8%). The remaining states all caught less than 5% each (Table 45).

MRFSS estimates from 1990 to 1999 indicate that more than 90% of the recreational summer flounder landings occurred in state waters (inland waters and ocean water <= 3 miles combined) in the North Atlantic and Mid-Atlantic subregions and in North Carolina (Table 46).

From 1990 to 1999, recreational fishermen in private/rental boats, accounted for 92.2%, 84.0%, and 75.9% of the landings in the New England Region, Mid-Atlantic Region, and North Carolina, respectively. The party/charter boat industry accounted for the second highest percent (11.6%) of recreational summer flounder landings in the Mid-Atlantic Region, as compared to only 2.4% and 0.4% of the landings in the New England Region and North Carolina (Table 47). Fishermen fishing from shore were the second highest in both the New England Region (54.9%) and North Carolina (23.7%; Table 47).

VTR data for party/charter boats is only available from 1996 and later, when the requirement for a federal permit holder to submit a vessel logbook was implemented. VTR data indicate that summer flounder contributed almost 13% of the total catch (by number) made by party/charter vessels for the 1996-1999 period (Table 48). The contribution of summer flounder to the total catch of party/charter vessels fluctuated throughout the year, ranging from less than 1% in January, February, March, April, and December to 24% in July. The largest proportion of summer flounder was caught from May through September (Table 48). Analysis of the VTR party/charter data by state indicates that the proportion of summer flounder in the total catch ranged from less than 1% in Maine, New Hampshire, Massachusetts, and Maryland to 34% in New York (Table 48).

Current status of the fishery

(Source: ASMFC 2006 FMP Review)
During the late 1980's landings declined dramatically, reaching a low of 9.3 million pounds in the commercial fishery in 1990 and 3.2 million pounds in the recreational fishery in 1989. Following this record low, the commercial landings showed an increasing trend through 1995, but have varied without trend through 2005. For the past four years commercial landings have been over 13.8 million pounds, with 2005 landings at 17.14 million pounds.

Recreational landings in 1997 were 11.9 million pounds, double the estimate for 1995). The landings continued to increase through 2000, 16.5 million pounds. In 2002 landings dropped to 8.0 million pounds, but then increase to 11.6 million pounds in 2003. Landings have since declined to 10.02 million pounds in 2005. New York, New Jersey, and Virginia dominated the recreational fishery by landings again in 2005.

Combined commercial and recreational landings were 27.16 million pounds in 2005.

Allowable gear

Summer flounder may be harvested commercially in the EEZ using trawl, longline, handline, rod and reel, pot, trap, gillnet and dredge. They may be harvested recreationally using rod and reel, handline, pot, trap and spear.

5.3.7.2 Economic and social description

Commercial fishery

Commercial landings of summer flounder have decreased approximately 75% from 37.8 million pounds in 1984 to 9.3 million pounds in 1990. Commercial landings in 1992 were 16.6 million pounds, and then decrease to 8.8 million pounds in 1997. In 1998 and 1999, commercial landings were above the 1997 landings. In 1999, commercial landings were 10.7 million pounds or 4% below the 1998 level and 15% below the 1990-1999 mean. The commercial share averaged about 60% of the combined total landings of summer flounder from 1990-1999 (Table 42). Preliminary landings data indicates that 11.2 million pounds of summer flounder were landed in 2000.

The ex-vessel value of summer flounder landings has increased from about $19 million in 1991 to a peak $28 million in 1995 (Table 69). Ex-vessel value dropped to $21.1 and $16.5 million in 1996 and 1997, respectively. The sharp decrease in summer flounder value in 1996 and 1997 from the 1995 level was the result of a sharp decline in landings of approximately 7 and 12 million pound, respectively. Between 1998 and 2000, summer flounder ex-vessel value has ranged from $18.4 to $19.8 million. Inflation adjusted prices (2000 dollars) have ranged from $1.57 to $1.96 per pound for the 1991 to 2000 period (Table 69).

The value of summer flounder landings relative to the value of total landings in 1999 and 2000 are presented in Table 70. In 2000, the contribution of summer flounder landings to the value of total landings varied for each state from 1% or less (Maine, New Hampshire, Massachusetts, Delaware, and Maryland) to about 12% in North Carolina. The overall contribution of summer flounder landings to the total ex-vessel value from Maine to North Carolina was about 1.6%.

While some states experienced small percentage changes in the contribution of summer flounder value to the value of total landings from 1999 to 2000, the aggregate contribution associated with this species from Maine to North Carolina was virtually unchanged. At $1.96/lb, the average price (all sizes) of summer flounder reached a record high in inflation adjusted (2000) dollars in 1995 (Table 69). Adjusted prices for summer flounder have ranged from $1.57 to $1.96 per pound for the 1991 to 2000 period. In 2000, highest prices were received in the northern States with Maine, Connecticut and New York as the leaders at $3.12, $2.63, and $2.47 per pound, respectively. Coastwide, the average price of summer flounder was $1.65 per pound in 2000 (Table 71).

Monthly landing and price data for flounder indicates that a supply - price relationship is observable on a monthly basis. Months with highest average ex-vessel prices tend to coincide with months of lowest landings, normally in June, July, and August (Table 72). Prices received for summer flounder originating in state waters for the 1999-2000 period were generally higher than for EEZ waters (Table 73) and tracked the seasonal supply relationship for 1991-2000 (Table 72). The 2000 coastwide average ex-vessel price per pound for jumbo was $2.07, $1.67 for large, $1.39 for medium, $1.40 for small, and $2.08 for unclassified landings (Table 74). The average price per pound for peewees was $3.86 in 2000, however, only a few hundred pounds of summer flounder belonging to this category were landed and this does not represent a typical price pattern. As a general rule, price premiums for larger flounder reflect higher yielding fillet weight.

Processing, marketing, and consumption
Almost all summer flounder are sold in fresh form. The catch is generally iced at the dock and then shipped to market. The major central wholesale market for fresh fish in the Mid-Atlantic region is the Fulton Fish Market.

The number of processing plants handling summer flounder from Maine through North Carolina has varied from 10 in 1990 to 4 in 1999. The value of the summer flounder processed by these plants has varied from $2.1 million in 1990 to over $2.5 million in 1999. In addition, 91 plants reported handling unclassified flounders in 1990 (valued at $42.3 million) and 35 plants in 1999 (valued at $30.8 million) from Maine through North Carolina. The bulk of the plants handling unclassified flounders in 1999 were located in Massachusetts (20) followed by North Carolina (5), and Maine (4). Maryland, New Jersey, Pennsylvania, Rhode Island, and Virginia had a combined total of 6 plants handling unclassified summer flounder in 1999 (NMFS Unpublished processing survey data).

Summer flounder prices per pound for each size category vary from processor to processor and from day to day for each processor. The prices react to the market supply of summer flounder, other flounders available, imports, and wholesale/retail demand. The size categories of summer flounder are likewise not fixed. In the areas where more summer flounder less than 14" are landed there, is a greater tendency to refer to smaller fish as mediums, than in areas where fewer summer flounder less than 14" are landed. The exact lengths which comprise a size category are known to vary from processor to processor and day to day. This variation in price leaves the fisherman with some sense of uncertainty in terms of what he will receive for his catch. Such uncertainty, however, is common in the fishing business.

A study conducted in New England in 1982 (Hu et al. 1983) showed that labor costs would be reduced approximately $0.05 per pound by filleting large flounder instead of small flounder. This is the result of more fillet weight per flounder and the reduced time involved in the fillet process. The species of flounder examined and the size differences were not mentioned.

Economic impact of the commercial fishery

A study by the National Fisheries Education and Research Foundation estimated sales, employment, and wage impacts for flounder harvesting, processing and distribution in the Mid-Atlantic region for 1986 (NFERF 1989). Since summer flounder comprised 84% of the total flounder landings in this region in 1986, specific estimates for summer flounder can be derived from the estimates for total flounders.

Cumulative direct impacts of the Mid-Atlantic summer flounder fishery (Table 104) amounted to 2,290 person-years of employment, $21.6 million in income, and $50.2 million in output (sales). Over 60% of the employment was generated in the food service sector. Harvesting and processing made up most of the remainder, each accounting for just under 15%. Income per person-year was highest in the harvesting and distribution sectors and lowest for processing and food service, probably related to the labor intensive nature of the two latter sectors. Value of output was high for harvesting, processing and food service, indicating the large markup in these sectors. In 2000, summer flounder contributed 1.6% of the total value of all finfish and shellfish landed from Maine to North Carolina (Table 70).

International trade

No summer flounder are imported into the US since the species occurs primarily along the US Atlantic coast. However, imports of several other species of flatfish are substitutes for summer flounder in the market place. These imports compete with and affect the price of summer flounder, winter flounder, yellowtail flounder, and other domestic flatfish species (Wang 1984).

Flat fish imports (excluding halibut) for all product forms decreased from 68.2 million pounds in 1995 to 35.0 million if 2000. However, the value of those imports increased from $139.0 in 1995 to $147.4 in 2000 (NMFS trade data).

Imports of summer flounder have slightly increased for the 1995 to 2000 period. The quantity of summer flounder (all product forms) that entered the US increased from 9.4 million pounds ($42.4 million) in 1995 to 9.7 million pounds ($44.3 million) in 2000. By product type, “frozen fillets” contributed to the bulk of the imports in 2000 with over

52% of the total poundage and 63% of the total value, followed by “whole fresh” (29%, 12%), “fresh fillets” (11%, 17%), “frozen fillet blocks >4.5 kg” (6%, 7%), and “whole frozen” (2%, 1%). Canada and Argentina contributed with the bulk of the summer flounder shipped into the US in 2000. Canada contributed with 50% of the total volume and 37% of the total value of all summer flounder that entered the US last year, and Argentina contributed with 27% of the total volume and 36% of the total value.

The value of imported flatfish products can vary widely depending on the species, whether fresh or frozen, overall quality, and the level of value added through filleting, etc. Belgium and the Netherlands in particular specialize in high value species and products. The average value of Belgium’s and Netherlands' flatfish exports to the US was $10.65/lb and 6.83/lb in 2000, versus Pakistan $1.01/lb, and $4.21 per lb. for all countries combined. The value of summer flounder that enters the US also varies by product form. The average value of summer flounder (all product forms) that entered the country in 2000 was $4.56/lb. In 2000, the most valuable summer flounder product form was “fresh fillets” at $7.23/lb, followed by “frozen fillets” ($5.56/lb), “frozen fillet blocks >4.5 kg” ($5.11/lb), “whole frozen” ($2.02/lb), and “whole fresh” $1.88/lb.

Total US commercial production flounders was estimated at 331 million pounds in 1999, with an average ex-vessel value of $0.27/lb (Fisheries of the USA, 2000). Slightly more than 3.2% (10.6 million pounds) of this domestic harvest was made up of summer flounder, with an average price of $1.83/lb: more than six times the nation's average. When compared with just the more valuable Atlantic coast flounders (winter, summer, and yellow tail flounders), summer flounder comprised 35% of the 1999 landings and 44% of the value.

Japan continues to be the most important export market for summer flounder. Exports of summer flounder are difficult to determine as summer flounder gets lumped under a variety of export codes and it is impossible to identify in the U.S. export data (Ross pers. comm.). However, export of US summer flounder to Japan has been reported to vary from approximately 800 to 1,800 mt in 1993-1997 (Asakawa pers. comm.). Fresh whole U.S. fluke or summer flounder is generally exported to Japan for raw (sashimi) consumption. Fresh U.S. summer flounder is used as a substitute for Japanese "hirame" (bastard halibut – *Paralichthys olivaceus*), and normally imported whole fresh and sold through seafood auction markets to restaurants. They are usually consumed raw for sashimi or sushi toppings in Japan. While U.S. summer flounder is well established in some major action markets, daily prices may fluctuate depending on the total quantity of domestic and imported hirame (including U.S. summer flounder) delivered to auction on a given day. Depending on quality, auction prices for fresh U.S. summer flounder may vary from around 1,000 to 3,000 yen/kilo ($3.13 to 9.40/lb at 145 yen/$ 1.00) depending on size, quality and market conditions (Asakawa pers. comm.). Frozen summer flounder may not be considered to be of the same quality, and is unlikely to become substitute for unfrozen summer flounder. Nevertheless, properly handled frozen summer flounder may receive wholesale prices of 400-900 yen/kilo ($1.73-3.90/lb) or higher (Asakawa pers. comm.). The recent economic crisis in Japan could potentially hamper exports of seafood commodities to that country. Furthermore, future devaluation of the yen would result in reduced revenues for exporters of summer flounder to Japan.

Activity at the port level indicate that 54% of the total fluke commercial landings occurred in seven ports: Point Judith, Rhode Island; Cape May and Point Pleasant, New Jersey; Newport News and Hampton, Virginia; and Wanchese and Beaufort, North Carolina. The contribution of summer flounder to ports with 10% or more summer flounder dependence (value) is presented in Table 90. Of the seven ports accounting for the bulk of the summer flounder landings in 1999, only Beaufort (18.95%), Wanchese (13.26%), and Hampton (10.87%) had 10% or more revenue dependence on summer flounder (Table 90).

Recreational fishery

Recreational fishermen caught over 24 million summer flounder in 2000, the highest annual level of the past decade (Table 105). Landings in 2000 were also substantially higher than the ten year average in terms of numbers (7.5 million fish) and weight (15.8 million pounds). However, recreational fishermen released a slightly lower proportion of summer flounder alive (31%) than the 10 year average of 32%.

In 2000, over 90% of the summer flounder landed by weight in the North and Mid-Atlantic were caught in state waters (Table 106). Landings by North and Mid-Atlantic fishermen fishing in state waters have consistently exceeded EEZ landings throughout the past decade, accounting for over 93% of total landings, on average, during the past 10 years.

The participation of summer flounder anglers by region and mode indicates that from 1991 to 2000, 8% of the summer flounder (by number) were caught from party or charter vessels (Table 107). Anglers' expenditures aboard party and charter boats benefits the party and charter industry as well as other businesses in the coastal communities.
In addition to party and charter vessels, 10% of the summer flounder were caught from shore, and 82% from private/rental boats (Table 107). Furthermore, private and rental boat fishermen also accounted for over 80% of the summer flounder landings (by number) and over 80% of the summer flounder released alive, on average, during the past decade. Ownership of a private vessel involves sizable investment and maintenance costs, thus contributing greatly to measures of economic impact. Private vessels are also used for non-fishing purposes; and are used to fish for many different species. Expenditure and cost data must be prorated for summer flounder trips to account for multipurpose use.

Anglers fishing in New Jersey were responsible for over 45% of the average annual total summer flounder landings from Maine to North Carolina during the past decade (Table 108). Recreational landings in New Jersey, New York, and Virginia accounted for 76% of the total annual landings (by number) during this time period.

NMFS estimated that in 2000, a total of 33.228 million day trips were taken by marine recreational anglers along the Atlantic coast from Maine to North Carolina (Personal communication from NMFS, Fisheries Statistics and Economics Division). An estimated

16.7% of these anglers indicated that they preferred or sought summer flounder as the primary target species. That is, an estimated 5.56 million angler trips (all modes) were nominally directed at summer flounder from Maine to North Carolina in 2000.

Economic impact of the recreational fishery

Anglers' expenditures generate and sustain employment and personal income in the production and marketing of fishing-related goods and services. In 1998, saltwater anglers from Maine to Virginia spent an estimated $1.136 billion on trip-related goods and services (Steinback and Gentner 2001). Trip-related good and services included expenditures on private transportation, public transportation, food, lodging, boat fuel, party/charter fees, access/boat launching fees, equipment rental, bait, and ice.

Unfortunately, estimates of trip expenditures specifically associated with summer flounder were not provided in the study. However, if average trip expenditures are assumed to be constant across all fishing trips, an estimate of the expenditures associated with summer flounder can be determined by multiplying the proportion of total trips that targeted summer flounder (16.7%) by the total estimated trip expenditures from the Steinback and Gentner study ($1.136 billion). According to this procedure, anglers fishing for summer flounder from Maine to Virginia spent an estimated $200.412 million on trip-related goods and services in 2000.1 Apart from trip-related expenditures, anglers also purchase fishing equipment and other durable items that are used for many trips (i.e, rods, reels, clothing, boats, etc.).

Although some of these items may be purchased with the intent of targeting/catching specific species, the fact that these items can be used for multiple trips creates difficulty when attempting to associate durable expenditures with particular species. Therefore, only trip-related expenditures were used in this assessment.

The summer flounder expenditure estimate can be used to reveal how anglers' expenditures affect economic activity such as sales, income, and employment from Maine to Virginia. During the course of a fishing trip, summer flounder anglers purchase a variety of goods and services, spending money on transportation, food, boat fuel, lodging, etc. The sales, employment, and income generated from these transactions are known as the direct effects of anglers' purchases.
Indirect and induced effects also occur because businesses providing these goods and services also must purchase goods and services and hire employees, which in turn, generate more sales, income, and employment. These ripple effects (i.e., multiplier effects) continue until the amount remaining in a local economy in negligible. A variety of analytical approaches are available for determining these impacts, such as input-output modeling. Unfortunately, a model of this kind was not available. Nonetheless, the total sales impacts can be approximated by assuming a multiplier of 1.5 to 2.0 for the Northeast Region. Given the large geographical area of the Northeast Region, it is likely that the sales multiplier falls within those values. As such, the total estimated sales generated from anglers that targeted summer flounder in 2000 was likely to be between $300.618 million ($200.412 million * 1.5) and $400.824 million ($200.412 million * 2.0) from Maine to Virginia. A similar procedure could be used to calculate the total personal

income and employment generated from summer flounder anglers' expenditures, but since these multiplier values have been quite variable in past studies, no estimates were provided here.

Value of the fishery to anglers

The value that anglers place on the recreational fishing experience can be divided into actual expenditures and non-monetary benefits associated with satisfaction (consumer surplus). Anglers incur expenses for fishing (purchase of gear, bait, boats, fuel, etc.), but do not pay for the fish they catch or for the enjoyment of many other attributes of the fishing experience (socializing with friends, contact with nature, etc.). Despite the obvious value of these attributes of the experience to anglers, no direct expenditures are made for them, hence the term "non-monetary" benefits.

Behavioral models that examine travel expenditures, catch rates, accessibility of fishing sites, and a variety of other factors affecting angler enjoyment can be used to estimate the "non-monetary" benefits associated with recreational fishing trips. Unfortunately, a model of this kind does not exist for summer flounder. Data constraints often preclude researchers from designing species-specific behavioral models. However, a recent study by Hicks, et. al. (1999) estimated the value of access across states in the Northeast region (that is, what people are willing to pay for the opportunity to go marine recreational fishing in a particular state in the Northeast) and the marginal value of catching fish (that is, what people are willing to pay to catch an additional fish). Table 117 shows, on average, the amount anglers in the Northeast states (except for North Carolina which was not included in the study) are willing to pay for a one-day fishing trip. The magnitude of the values in Table 117 reflect both the relative fishing quality of a state and the ability of anglers to choose substitute sites. The willingness to pay is generally larger for larger states, since anglers residing in those states may need to travel significant distances to visit alternative sites. Several factors need to be considered when examining the values in Table 117.

First, note that Virginia has relatively high willingness to pay estimates given its relative size and fishing quality characteristics. In this study, Virginia defines the southern geographic boundary for a person's choice set, a definition that is arbitrary in nature. For example, an angler in southern Virginia is likely to have a choice set that contains sites in North Carolina. The regional focus of the study ignores these potential substitutes and therefore the valuation estimates may be biased upward (Hicks, et. al. 1999). Second, the values cannot be added across states since they are contingent upon all of the other states being available to the angler. If it was desirable to know the willingness to pay for a fishing trip within Maryland and Virginia, for example, the welfare measure would need to be recalculated while simultaneously closing the states of Maryland and Virginia.

Assuming the average willingness to pay values shown in Table 117 are representative of trips that targeted summer flounder, these values can be multiplied by the number of trips that targeted summer flounder by state (from the MRFSS data) to derive welfare values for summer flounder.

Table 118 shows the aggregate estimated willingness to pay by state for anglers that targeted summer flounder in 2000 (i.e., the value of the opportunity to go recreational fishing for summer flounder). New York, New Jersey, and Virginia were the states with the highest estimated willingness to pay for summer flounder day trips. Once again, note that the values cannot be added across states since values are calculated contingent upon all of the other states being available to the angler.

In the Hicks et. al. (1999) study the researchers also estimated welfare measures for a one fish change in catch rates for 4 different species groups by state. One of the species groups was "flat fish," of which summer flounder is a component. Table 119 shows their estimate of the welfare change associated with a one fish increase in the catch rate of all flat fish by state. For example, in Massachusetts, it was estimated that all anglers would be willing to pay $5.03 (the 1994 value adjusted to its 2000 equivalent) extra per trip for a one fish increase in the expected catch rate of all flat fish. The drawback to this type of aggregation scheme is that the estimates relate to the marginal value of the entire set of species within the flat fish category, rather than for a particular species within the grouping. As such, it is not possible to estimate the marginal willingness to pay for a one fish increase in the expected catch rate of summer flounder from the information provided in Table 119.

However, it is possible to calculate the aggregate willingness to pay for a 1 fish increase in the catch rate of flat fish across all anglers. Assuming that anglers will not adjust their trip taking behavior when flat fish catch rates at all sites increase by one fish, the estimated total aggregate willingness to pay for a one fish increase in the catch rate of flat fish in 2000 was $154.843 million (total trips (33.228 million) x average per trip value ($4.66)). This is an estimate of the total estimated welfare gain (or loss) to fishermen of a one fish change in the average per trip catch rate of all flat fish. Although it is unclear how much of this welfare measure would be attributable to summer flounder, the results show that flat fish in general, in the Northeast, are an extremely valuable resource.

Although not addressed here, recreational fishing participants and non-participants may also hold additional intrinsic value out of a desire to be altruistic to friends and relatives who fish or to bequeath a fishery resource to future generations. A properly constructed valuation assessment would include both use and intrinsic values in the estimation of total net economic value. Currently, however, there have been no attempts to determine the altruistic value (i.e, non-use value) of summer flounder in the Northeast.

For-hire recreational fishery

5.3.7.3 Bycatch

5.3.8 Horseshoe Crab

5.3.8.1 Description of fishing practices, vessels and gear

(excerpt from the Maryland DNR webpage: http://www.dnr.state.md.us/education/horseshoecrab/fhistory.html)

A commercial fishery for horseshoe crabs has existed since the 19th century. Early on, horseshoe crabs were harvested primarily for fertilizer and animal feed. Typically, crabs were collected by hand on beaches during the spawning season or by pound nets. Huge numbers were collected during the spawning season as the crabs became concentrated on mid-Atlantic beaches. In fact, between the 1870's and 1920's, annual harvests in the Delaware Bay averaged over one million crabs.

This fishery eventually declined for several reasons. First, competition from chemical fertilizers developed starting in the 1930s. Second, the horseshoe crab population declined. And lastly, the public complained about the odor caused by large numbers of dead horseshoe crabs processed at fertilizer and animal feed factories. In the 1950s to the 1980s, reported commercial harvests were almost non-existent. However, no mandatory reporting requirements existed for horseshoe crabs during this period. Commercial harvesting of the crabs continued throughout this time period but not reported. These harvests appear to have been localized and limited because horseshoe crab populations steadily recovered.

Since the 1980s several new fisheries have developed for horseshoe crabs. Horseshoe crabs are harvested as bait to catch American eel (*Anguilla rostrata*), channel whelk (*Busycotypus canaliculatus*) and knobbed whelk (*Busycon carica*) in Maryland and the rest of the mid-Atlantic region. Increased demand in these fisheries led to a dramatic increase in the horseshoe crab harvest during the 1990s and led to coast-wide management of horseshoe crabs.

In the American eel fishery unique chemical odors emitted by egg-laden female horseshoe crabs strongly attract the eels to an eel pot. It is because of this strong attraction that eels prefer female horseshoe crabs to other types of bait. The eel pot fishery only uses female horseshoe crabs as bait. Male crabs do not emit the same chemical odors as the females and are not used. To catch the whelk, the horseshoe crab is used as bait, divided into quarters, placed in a conch trap and placed offshore on the bottom. Whelks smell the horseshoe crab bait and enter the trap to feed. Periodically, the waterman will check each trap and harvest the whelks he finds. This fishery uses both male and female crabs as bait to catch whelk. The fishery for whelk grew out of increasing overseas demand for this mollusk. Starting in the 1990s, expansion of the whelk fishery led to dramatic increases in horseshoe crab harvests. The whelk harvest goes primarily to regional processing plants or is directly exported to European food markets.

(excerpt for the ASMFC's species profile factsheet for horseshoe crab):
Horseshoe crabs are also collected by the biomedical industry to support the production of Limulus Amoebocyte Lysate (LAL), a clotting agent that aids in the detection of human pathogens in patients, drugs, and intravenous devices. No other procedure has the same accuracy as the LAL test. The current estimate of medical usage is between 250,000 and 300,000 horseshoe crabs per year on the Atlantic coast. While crabs are bled and

released live generally within 72 hours of capture, up to 15 percent do not survive the procedure.

Current status of the fishery

(from the 2007 ASMFC FMP Review)

Bait Fishery

Reported coastwide bait landings in 2006 remained below the quota established under Addendum III and IV (Table 1, Figure 1). Bait landings increased for the third consecutive year, but also remained below one million crabs for the third consecutive year.

An alternative bait/gear workshop conducted under the auspices of ASMFC in 1999 introduced the concept of using bait savings devices (bait bags) in whelk (conch) pots. Free bait bags were distributed to whelk potters in the Mid Atlantic and southern New England regions through a state, federal, and NGO partnership. National Marine Fisheries Service funded the acquisition of the bait bags. The Ecological Research and Development Group (ERDG), Delaware, Maryland, New Jersey, Virginia, New York, Connecticut, Rhode Island and Massachusetts assisted in the distribution of the bags. The reductions in reported bait landings in excess of the 25% reductions required under Addendum I were largely attributed to the success of this program, with the widespread use of the devices by the commercial fishery. Massachusetts fishermen have been using bait cups in conch traps with success. The cups use about a 10th of a crab and can be fished for 2-3 days the relatively cold waters.

Reported coastwide landings since 1998 showed more male than female horseshoe crabs were annually harvested; though, a large proportion of the reported landings in 1998 and 1999 were unclassified. Unclassified landings accounted for less than 12% of the reported landings since 2000. The American eel pot fishery prefers egg-laden female horseshoe crabs as bait, while the whelk (conch) pot fishery is less dependent on females. The hand, trawl and dredge fisheries accounted for over 90% of the 2006 reported commercial horseshoe crab bait landings by gear type. This is consistent with the distribution of landings by gear since 1998. Although the hand fishery accounted for most of the coastwide harvest and was typically the most prominent method of take in most states, the trawl and dredge fisheries accounted for over 45% of the reported landings by gear in 2006. The dredge fishery accounted for 52% of the Delaware landings and 82% of the Virginia landings. The trawl fishery accounted for over 99% of Maryland’s horseshoe crab bait landings.

The dominance of the hand fishery was reflected in the seasonal distribution of landings. Most of the coastwide harvest since 1998 came during May and June as crabs come ashore to spawn and, thus, were readily available to the fishery. There is typically a secondary mode I monthly landings during the late summer or fall. This secondary peak coincides with an increased demand for horseshoe crabs in the conch pot fishery.

Biomedical Fishery

The horseshoe crab is an important resource for research and manufacture of materials used for human health. There are four companies along the Atlantic Coast that process horseshoe crab blood for use in manufacturing Limulus Amoebocyte Lysate (LAL): Associates of Cape Cod, Massachusetts; Cambrex Bioscience, Maryland; Wako Chemicals, Virginia; and Endosafe, South Carolina. There is one company that bleeds horseshoe crabs but does not manufacture LAL: Limuli Labs, New Jersey. Addendum III requires states where horseshoe crabs are collected for biomedical use to collect and report harvest data and characterize mortality.

The Plan Review Team annually calculates total coastwide harvest and estimates mortality. It was reported that 367,914 crabs (including crabs harvested as bait) coastwide were brought to biomedical companies for bleeding in 2006 (see table below). A total of 58,625 crabs were harvested as bait and counted against state quotas. These crabs were not included in the mortality estimates below. It was reported for 2006 that 309,289 crabs were harvested for biomedical purposes only. Crabs were rejected prior to bleeding because of mortality, minor injuries, and slow movement. Based on state reports, approximately 1.5% of crabs harvested and brought to bleeding facilities were rejected because of death or serious injury. The PRT estimates a mortality of 4,639 crabs prior to bleeding.

Table 5.3.8-1. Number of crabs harvested for biomedical purposes.

Year	*2004*	*2005*	*2006*
Number of crabs brought to biomedical facilities (bait and biomedical crabs)	343,126	323,149	367,914
Number of biomedical-only crabs harvested (not counted against state bait quotas)	292,760	283,720	309,289
Estimated mortality of biomedical-only crabs prior to bleeding	4,391	4,256	4,639
Number of biomedical-only crabs bled	275,194	270,496	296,958
Estimated mortality of biomedical-only crabs during or after bleeding	41,279	40,574	44,543
Total estimated mortality on biomedical crabs not counted against state bait quotas	45,670	44,830	49,182

The highest estimate of crab mortality from the bleeding process in the literature is 15% (Thompson 1998). Using the number of biomedical-only crabs and the estimated mortality rate during or after the bleeding process, the PRT calculated an estimated mortality of 44,543 crabs. The total coastwide mortality estimate of crabs not counted against state quotas is 49,182 crabs for 2006.

The 1998 FMP establishes a mortality threshold of 57,500 crabs, where if exceeded the Board is required to consider action. The PRT recommends that the Board not consider action at this time but that it continues to monitor biomedical use of crabs closely. It appears that use of horseshoe crabs has increased slightly since the original FMP was approved. However, more crabs that were harvested for bait were bled in biomedical facilities in 2006, thereby keeping mortality under the threshold. While monitoring of biomedical harvest and use of crabs has improved under Addendum III to the FMP, inconsistencies remain in reporting among the states. The PRT plans to work with the states that report biomedical landings to continue to standardize reporting.

Allowable gear

5.3.8.2 Economic and social description

Commercial Fishery

Between the 1850s and the 1920s, over 1 million horseshoe crabs were harvested annually for fertilizer and livestock feed (Shuster, 1982; Shuster and Botton, 1985). Reported harvests in the 1870s were 4 million horseshoe crabs annually, and 1.5 to 1.8 million horseshoe crabs annually between 1880s and 1920s (Finn et al., 1991). Shuster (1960) reports that in the late 1920s and early 1930s 4 to 5 million crabs were harvested annually. Shuster (1960) reports over 1 million crabs were harvested during the 1940s and 500,000 to 250,000 horseshoe crabs were harvested in the 1950s. By the 1960s, only 42,000 horseshoe crabs were reported to be harvested annually (Finn et al., 1991).

Early harvest records are suspect due to under-reporting. The period of time between 1950 and 1960 is considered the nadir of horseshoe crab abundance. The substantial commercial-scale harvesting of horseshoe crabs ceased in the 1960s (Shuster, 1996).

Bait Fishery

Currently, horseshoe crabs are commercially harvested for use as American eel, conch (or whelk), and catfish bait along certain portions of the Atlantic coast. The horseshoe crab fishery is unique in that crabs can be easily harvested during their spawning season and can be caught with a minimal financial expense. The eel fishery is highly dependent on sustained populations of horseshoe crabs and prefers female horseshoe crabs with eggs.

The conch fishery also is dependent on horseshoe crabs, but uses both male and female horseshoe crabs. Commercial landings data for horseshoe crabs (i.e., metric tons, pounds, and price) are collected by the NMFS by state, year, and gear type. Commercial landings data may include harvest for both the bait and biomedical fisheries.

However, the NMFS data are relatively incomplete and disjunct. For example, in several years that NMFS reports no landings in states such as Delaware, state biologists report that landings did occur (Michels, pers. comm., 1997). In 1994 and 1995, the NMFS reported Maryland's harvest at 232,000 and 117,000 pounds, respectively. Based on State landing records, actual Maryland harvest was approximately 1 million pounds during these years (O'Connell, pers. comm., 1998). In many cases, horseshoe crabs are harvested and used directly by eel fishers, whelk fishers, or catfish fishers without going through a dealer (where NMFS gets much of its information) or arrangements are made for harvesters to sell directly to such fisheries without going to dealers. Since such private sales are not reported, NMFS fishery statistics underestimate the catch. Based on NMFS data, commercial harvest from the northeastern Atlantic coast has ranged between 10,000 pounds (in 1969) to over 5.0 million pounds (in 1996) (NMFS, 1998).

Since 1988, commercial landings have averaged 1,436,808 pounds. Botton and Ropes (1987b) estimated the total number of horseshoe crabs harvested by comparing the total number of pounds landed with the average weight of an adult horseshoe crab, which is approximately 4 pounds. However, the NMFS used a different conversion factor to estimate the number of pounds landed (e.g., 2.6 pounds per crab). The total average horseshoe crab catch (animals/year) for the Atlantic Coast (assuming an adult horseshoe crab is 4 pounds) has increased from 476,515 in 1993 to 1,288,408 in 1996 (NMFS, 1998). This increase is similar to increases reported by Michels (unpublished data, 1997) for the Delaware Bay harvest, which ranged from 330,333 in 1993 to 896,540 in 1996. However, Michels (unpublished data, 1997) did not include the Maryland harvest (which can be substantial). These statistics provide further evidence that the NMFS data represent an underestimate of actual harvest. Regardless of the data set used, all data show a significant increase in harvest between 1990 and 1996.

The SAS and the PRP concluded that commercial landings data show a substantial increase in reported harvest during the 1990s (Atlantic States Marine Fisheries Commission, 1998a; 1998b). This increase could be, in part, a function of increased harvest reporting efficiency. The states of Delaware, Maryland, New Jersey, and New York represent the largest harvest of horseshoe crabs recently. Estimates in Delaware, Maryland, New Jersey, New York, and Rhode Island indicate a rapid increase in fishery growth, based primarily on use as bait for the American eel and whelk fisheries and the shift in pressure from declining traditional fisheries (Michels, unpublished data, 1997; NMFS, 1998; Thompson, 1998). However, the States of Connecticut, Massachusetts, North Carolina, and Virginia indicate declines in current harvest compared with harvest in the late 1970s and early 1980s (NMFS, 1998).

Based on reported landings in New Jersey alone, horseshoe crab harvests have increased in the last three years from approximately 250,000 in 1993 to over 600,800 in 1996. The Delaware Division of Fish and Wildlife (1997) reports increases in landings between 1990 (under 250,000 pounds) and 1997 (over 1,500,000 pounds). The Delaware Division of Fish and Wildlife (1997) also reports increases in effort as represented by issuance of beach collection permits, which increased from 18 in 1991 to 131 in 1997.

However, prior to 1991 little or no reporting occurred within the Delaware Bay. Thus, the increase in horseshoe crab harvest during the 1990s may be partly related to mandatory reporting requirements. Primary harvest was identified in Rhode Island, New Jersey, Delaware, Maryland, and Virginia. Little to no harvesting of horseshoe crabs was reported in Maine, New Hampshire, or Connecticut (Botton and Ropes, 1987b).

The Chesapeake Bay in Maryland and Virginia likely has a substantial harvest, but without quantitative studies, the catch remains under-reported. Maryland has been responsible for 23 to 78 percent of the total commercial catch of horseshoe crabs from the northeastern Atlantic coast since 1980 (NMFS, 1998). Maryland averaged 357,000 pounds between 1981 and 1991 from a small directed ocean fishery and bycatch from the clam fishery. Since 1992, harvest has increased significantly in Maryland with 2.6 million pounds landed in 1996. Maryland's fishery is primarily an offshore trawl fishery; more than 95 percent of the harvest occurs from July through November. In 1996, 96 percent of Maryland's harvest was from waters outside of 1 mile (52 percent from State waters [1-3 miles] and 44 percent from federal waters [3+ miles]), 3 percent from the coastal bays, and <1 percent from the Chesapeake Bay (O'Connell, pers. comm., 1998).

In Virginia, horseshoe crab harvest averaged 190,000 pounds between 1980 and 1988. With a ban on trawling in state waters since 1989, horseshoe crab landings have decreased considerably, averaging 22,000 pounds (Butowski, 1994) and only increasing to 86,294 pounds in 1996 (NMFS, 1998). Demand has increased in Virginia as indicated by whelk landings, which have increased from 75,000 pounds in 1994 to 750,000 pounds in 1995 (Petrocci, 1997).

Reported dockside value from the northeastern Atlantic coast has ranged between $289 (1967) and $1,541,260 (1996). Fishery statistics (Table 5.3.8-2) for the period 1970 through 1997 indicate a variable fishery. As previously identified, fishery statistics probably underestimate the catch of horseshoe crabs, because the sale of crabs for bait is often arranged between private individuals (i.e., unreported in NMFS landing statistics) rather than through centralized dealers (Botton and Ropes 1987b).

In 1997, the majority (85 percent) of horseshoe crabs in Delaware were landed by hand harvest, while dredge harvest made up approximately 15 percent (Delaware Division of Fish and Wildlife, 1997). Between 1991 and 1996 the majority of the horseshoe crabs were landed by hand-harvest (63 percent) compared to dredging (37 percent) (Delaware Division of Fish and Wildlife, 1997), except for 1991 when the dredge harvest dominated the catch (56 percent). The increased harvest noted in Delaware mirrored increases in the number of hand-collection permits issued (Delaware Division of Fish and Wildlife, 1997). NMFS data compiled by Delaware Division of Fish and Wildlife (1997) identified that among the northeastern and mid-Atlantic States, Maryland, New Jersey, and

Delaware harvest the majority of horseshoe crabs (36, 31, and 14 percent, respectively). The shrimp trawl fishery in the South Atlantic Bight may contribute to horseshoe crab mortality via bycatch (Thompson, 1998), but the amount of bycatch harvest remains unreported. The amount of horseshoe crab bycatch has become very small, since the use of turtle excluder devices became mandatory in the shrimp trawl fishery (Cupka, pers. comm., 1998).

Table 5.3.8-2. Atlantic states landings for horseshoe crab for the period 1970 - 1997. Source: National Marine Fisheries Service (1998). Note: National Marine Fisheries Service data is an underestimate of the true coastwide harvest due to the lack of mandatory reporting in all states. Note: All dollars are 1992 dollars, adjusted by the implicit price deflator (GDP). All life stages are included.

ATLANTIC STATES LANDINGS (MAINE - FLORIDA)

Year	Pounds	Value (in $1000s)
1970	15,900	7.79
1971	11,900	3.01
1972	42,000	2.63
1973	88,700	5.54
1974	16,700	6.90
1975	62,800	18.90
1976	2,043,100	63.96
1977	473,000	16.58
1978	728,500	45.59
1979	1,215,630	148.24
1980	566,447	79.02
1981	326,695	55.97
1982	510,060	44.95
1983	440,959	35.83
1984	152,392	15.36
1985	522,199	41.46
1986	507,814	47.82
1987	462,663	67.82
1988	636,252	71.23
1989	1,087,912	131.72
1990	908,130	101.81
1991	1,089,045	121.50
1992	1,000,619	109.71
1993	1,906,059	207.22
1994	1,401,656	228.60
1995	2,547,987	378.99
1996	5,156,126	1541.26
1997	6,146,487	1228.56

Biomedical Fishery

Scientists have used horseshoe crabs in eye research, surgical sutures wound dressing development, and detection of bacterial endotoxins in drugs and intravenous devices (Hall, 1992). Limulus Amoebocyte Lysate (LAL), a clotting agent in horseshoe crab blood, has made it possible to detect human pathogens such as spinal meningitis and gonorrhea in patients, drugs, and all intravenous devices. In 1964, researchers discovered that horseshoe crab blood coagulates in the presence of minute quantities of gram-negative bacterial endotoxin and the LAL industry was initiated. By 1979, the U.S. Food and Drug Administration (FDA) issued draft guidelines for the use of LAL as an end-product pyrogen test for endotoxin in medical devices and injectable drugs. The LAL test is currently the worldwide standard for screening medical equipment for bacterial contamination; any drug produced by a pharmaceutical company must pass an LAL screening. No other known procedure has the same accuracy as the LAL test. If LAL became unavailable, it could take years to find a universally accepted replacement. To obtain LAL, manufacturing companies catch primarily adult horseshoe crabs, collect a portion of their blood, and then release them alive.

In 1989, the FDA reported that 130,000 horseshoe crabs were used in the biomedical industry. The current estimate of medical usage is between 200,000 and 250,000 horseshoe crabs per year on the Atlantic Coast (Swan, pers. comm., 1998; McCormick, pers. comm., 1998). The FDA mandates conservation by requiring the return of horseshoe crabs to the environment. Most labs return bled crabs to their habitat within 72 hours of capture, but may or may not release crabs at the collection site (Botton, 1995).

Approximately 10 percent of the crabs do not survive the bleeding procedure, which comprises a source of mortality that is not included in the commercial catch statistics (Rudloe,1983). Based on a tagging and controlled mortality study, Thompson (1998) reported similar post-processing mortality of horseshoe crabs (10 to 15 percent). Mortality due to the bleeding procedure may be lower (e.g., 0 to 4 percent), depending on the biomedical facility (Swan, pers. comm., 1998), but the mortality associated with collection, shipping, and handling remains unknown. This mortality is minimal compared to that from the commercial bait fishery.

In South Carolina, live horseshoe crabs may be taken only for use in LAL production, with animals returned to natural habitat after bleeding. Landings in South Carolina by hand-harvest and trawl have increased since the late 1980s. The annual reported harvest in South Carolina has increased over 300 percent since reporting requirements were established in 1991 (Thompson, 1998). Presumably, this increase in harvest was driven by the biomedical industry’s demand for more horseshoe crabs.

Horseshoe crabs are used also to make chitin filament for suturing (Hall, 1992). Since the mid-1950s medical researchers have known that chitin-coated suture material enhanced healing time by 35-50 percent. Currently, horseshoe crabs are harvested on a limited basis to manufacture chitin-coated suture material and chitin wound dressings (Hall, 1992). Horseshoe crab blood is also beneficial in cancer research; the LAL could lead to controlled cancer therapy. Endotoxins and other substances in horseshoe crab blood may have the potential for diagnosing leukemia.

Social environment

(excerpt from Horsheshoecrab.org)

Horseshoe crabs are the primary bait for the American eel and conch fisheries in many mid-Atlantic States. In Maryland, the estimated value of the horseshoe crab fishery in 1996 for 10 horseshoe crab harvesters was $398,596 (Maryland Department of Natural Resources, 1998). Also in 1996, one Maryland seafood dealer, supplying horseshoe crabs to 20 American eel and 25 conch harvesters, estimated that the value of horseshoe crabs for these fisheries was $151,200. Horseshoe crab prices vary and are reported to be between $0.65 to $0.75 per animal (Maryland Department of Natural Resources, 1998).

In 1997, American eel and conch harvesters in Delaware used an average of 4,714 and 20,502 horseshoe crabs per season per harvester, respectively. In New Jersey, American eel and conch harvesters used an average of 4,005 and 22,654 horseshoe crabs per season per harvester, respectively (Munson, 1998). Many conch and American eel harvesters in New Jersey and Delaware harvest their own bait, supplying 18 to 65 percent of their bait needs (Munson, 1998). While only nine percent of the fishing income (of respondents in the Delaware Bay Watermen's study) is attributable to the direct sale of horseshoe crabs, an average of 58 percent of the eel and conch fishing income depends on using horseshoe crabs as bait (Munson, 1998). American eel harvesters in the Delaware Bay area report that approximately 21 percent of their total fishing income is attributable to eeling, while conch harvesters report that an average of 53 percent of their total fishing income depends on the conch fishery (Munson, 1998). In 1996, the commercial harvest of horseshoe crabs was estimated to be a $1.5 million industry.

Horseshoe crabs are vital to medical research and the pharmaceutical products industry. The worldwide market for LAL is currently estimated to be approximately $50 million per year. This estimate is based on bleeding 250,000 horseshoe crabs per year, generating approximately $200 in revenue per crab for the biomedical industry. The biomedical industry either directly collects horseshoe crabs on spawning beaches or purchases horseshoe crabs for as much as $3.00 per crab. The biomedical industry pays approximately $375,000 per year for horseshoe crabs based on an estimate of 250,000 horseshoe crabs harvested at an average price of $1.50 per crab.

Eco-tourism is critical to the economies of many states, including New Jersey and Delaware, and it depends on the abundance and health of the ecosystems within the region. In 1988, over 90,000 "birders" spent $5.5 million in Cape May, New Jersey (Kerlinger and Weidner, 1991) to watch the interaction between spawning horseshoe crabs and migrating shorebirds. In 1996, approximately 606,000 people in New Jersey and Delaware took trips away from their residence (traveling more than one mile) for the primary purpose of watching wildlife. Of these people, 409,000 individuals specifically stated that they were watching shorebirds (U.S. Bureau of Census and USFWS, 1998).

In 1996, New Jersey and Delaware wildlife watchers spent between nine and 12 days per year (on average) away from home (traveling more than one mile) watching wildlife (U.S. Bureau of Census and USFWS, 1998). In New Jersey and Delaware, total expenditures, including food, lodging, transportation, and equipment in 1996 for the primary purpose of wildlife watching was $639,992,000 (USFWS, 1998). The type of wildlife watched was not identified in this survey. The 1996 regional economic impact resulting from expenditures by wildlife watchers in New Jersey and Delaware was the creation of 15,127 jobs and the generation of a total household income of $399 million (USFWS, 1998).

5.3.8.3 Bycatch

Little is known about bycatch in the horseshoe crab trawl fishery. Although bycatch monitoring programs have been developed for many fisheries (NOAA 2003), to date no studies have attempted to identify or quantify bycatch in the horseshoe crab trawl fishery. The gear used in the horseshoe crab trawl fishery is much different than that used in other fisheries; the benthic gear is equipped with heavy ground gear to effectively catch horseshoe crabs. Therefore, monitoring programs developed for other fisheries may not accurately portray bycatch in the horseshoe crab trawl fishery.

In 2001, a benthic trawl survey was developed and initiated by the Horseshoe Crab Research Center (HCRC) at Virginia Tech (Hata and Berkson 2004). Species composition data were collected aboard the HCRC trawl survey in the fall of 2005 and 2006 to identify species that are susceptible to the trawl gear used in the horseshoe crab trawl fishery (Graham et al., in review). Sites between the eastern tip of Long Island, New York, USA (71° 50'W and 41° 04'N) and the southern tip of the Delmarva Peninsula, Virginia, USA (75° 55'W and 37° 05'N) were sampled using the trawl gear that is commonly used in the commercial fishery (n = 156 sites) (Graham et al., in review).

Over two fall seasons, 76 different taxa were identified as susceptible to the trawl gear (n = 60 taxa in 2005, n = 69 taxa in 2006), including 47 finfish species from 33 families (Table 5.3.8-3) (Graham et al., in review). The majority of biomass was comprised of skates (49%) and horseshoe crabs (33%) (Graham et al., in review). Catch per unit effort was greatest for little/winter skate (*Leucoraja* spp.), horseshoe crab, and clearnose skate (*Raja eglanteria*) (Graham et al., in review). Clearnose skate, horseshoe crab, summer flounder (*Paralichthys dentatus*), spider crab (*Libinia* spp.), and windowpane flounder (*Scophthalmus aquosus*) were most commonly caught throughout the study area (Graham et al., in review). Of the 76 taxa caught, some taxa may be especially sensitive to removal as bycatch (Table 5.3.8-4) (Graham et al., in review). Some species that were caught have low population sizes and life history characteristics do not allow quick recovery of their populations (Graham et al., in review). Other species are currently unmanaged, possibly allowing populations to decline without detection (Graham et al., in review). The majority of species have potential to exhibit heavy harvest elsewhere, as most support commercial and recreational fisheries (Graham et al., in review). It is important to quantify bycatch of all species in the horseshoe crab trawl fishery so management strategies can be adapted accordingly (Graham et al., in review).

Species composition among sites differed based on location and bottom water temperature, suggesting that these variables can be used to predict potential bycatch species during other seasons (Graham et al., in review). Species composition shifted at Atlantic City, New Jersey with species composition at northern sites (i.e., sites north of Atlantic City) being much different than at southern sites (i.e., sites south of Atlantic City, New Jersey) (Table 5.3.8-3(Graham et al., in review). Species caught during the HCRC trawl survey were also common to their preferred temperature ranges; therefore, researchers may be able to use species' preferred temperature ranges in conjunction with water temperature data to determine which bycatch species will be caught throughout the year (Graham et al., in review).

This study provides crucial information about bycatch in the horseshoe crab trawl fishery; however, it is important to point out the differences between collection methods of the HCRC trawl survey and the commercial fishery. The HCRC trawl survey sites were randomly selected (based on the methods of Hata and Berkson, 2004), whereas commercial fishers often target sites that are high in horseshoe crab abundance. HCRC survey sites were also only sampled in the fall, while commercial fishing has potential to occur year round depending on current regulations. Also, HCRC survey sites were only towed for fifteen minutes, unlike commercial tows which may last for much longer (i.e., > 1 hour). Due to these differences between the HCRC survey and the commercial fishery, data should be collected aboard commercial fishing vessels to confirm these results and further identify and quantify bycatch in the horseshoe crab trawl fishery. Lastly, it is important to emphasize that commercial fishers use trawl gear to collect horseshoe crabs for bait and biomedical companies. Many times, biomedical companies are given more lenient harvest regulations because horseshoe crabs are returned to the water after they are bled, and experience relatively low mortality. Although mortality of horseshoe crabs is relatively low, harvest methods still have potential to catch many individuals as bycatch and regulations should be set accordingly to minimize bycatch.

Table 5.3.8-3. (from Graham et al., in review). Catch per unit effort (CPUE) and percent occurrence for all taxa caught during the Horseshoe Crab Research Center trawl survey (2005 and 2006).

		Catch per Unit Effort (ind/km)		Percent occurrence	
Fishes (Common name)	Scientific name	Southern sites	Northern sites	Southern sites	Northern sites
Atlantic angel shark	*Squatina dumeril*	0.18	0.00	7.8	0.0
Atlantic croaker	*Micropogonias undulatus*	11.16	0.05	42.2	3.0
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	0.01	0.00	1.1	0.0
Atlantic sturgeon	*Acipenser oxyrinchus*	0.03	0.15	3.3	4.5
Atlantic thread herring	*Opisthonema oglinum*	0.01	0.00	1.1	0.0
Black drum	*Pogonias cromis*	0.03	0.00	3.3	0.0
Black sea bass	*Centopristis striata*	0.03	0.07	3.3	9.1
Bluefish	*Pomatomus saltatrix*	0.05	0.14	3.3	16.7
Bullnose/Southern eagle ray	*Myliobatis freminvillei/goodei*	0.56	0.00	28.9	0.0
Butterfish	*Peprilus triacanthus*	0.51	0.13	7.8	10.6
Clearnose skate	*Raja eglanteria*	40.68	1.92	95.6	78.8
Cobia	*Rachycentron canadum*	0.02	0.00	1.1	0.0
Conger eel	*Conger oceanicus*	0.02	0.00	1.1	0.0
Cownose ray	*Rhinoptera bonasus*	0.40	0.02	10.0	1.5
Dusky shark	*Carcharhinus obscurus*	0.02	0.00	2.2	0.0
Fourspot flounder	*Paralichthys oblongus*	0.00	0.01	0.0	1.5
Gray triggerfish	*Balistes capriscus*	0.00	0.01	0.0	1.5
Hogchoker	*Trinectes maculatus*	0.01	0.00	1.1	0.0
Little/Winter Skate	*Leucoraja erinacea/ocellata*	26.15	213.82	31.1	100.0
Monkfish	*Lophiodes americanus*	0.00	0.01	0.0	1.5

Northern Puffer	*Sphoeroides maculatus*	0.05	0.08	4.4	10.6
Northern searobin	*Prionotus carolinus*	0.51	0.53	15.6	25.8
Northern stargazer	*Astroscopus guttatus*	0.17	0.02	7.8	3.0
Pigfish	*Orthopristis chrysoptera*	0.02	0.00	1.1	0.0
Red drum	*Sciaenops ocellatus*	0.01	0.00	1.1	0.0
Red hake	*Urophycis chuss*	0.00	0.10	0.0	6.1
Scup	*Stenotomus chrysops*	0.58	1.25	15.6	37.9
Seahorse	*Hippocampus spp.*	0.00	0.03	0.0	3.0
Sheepshead	*Archosargus probatocephalus*	0.02	0.00	2.2	0.0
Silver hake	*Merluccius bilinearis*	0.00	0.14	0.0	4.5
Smallmouth flounder	*Etropus microstomus*	0.00	0.01	0.0	1.5
Smooth butterfly ray	*Gymnura micrura*	0.63	0.00	20.0	0.0
Smooth dogfish	*Mustelus canis*	0.23	0.30	6.7	25.8
Southern kingfish	*Menticirrhus americanus*	0.41	0.00	20.0	0.0
Southern stingray	*Dasyatis americanus*	1.88	0.00	40.0	0.0
Spiny butterfly ray	*Gymnura altavela*	0.20	0.00	14.4	0.0
Spiny dogfish	*Squalus acanthias*	0.21	0.73	7.8	21.2
Spot	*Leiostomus xanthurus*	0.94	0.00	30.0	0.0
Spotted hake	*Urophycis regia*	0.00	0.01	0.0	1.5
Striped bass	*Morone saxatilis*	0.06	0.20	3.3	9.1
Striped burrfish	*Chilomycterus schoepfii*	0.12	0.00	10.0	0.0
Striped searobin	*Prionotus evolans*	0.50	4.33	16.7	74.2
Summer flounder	*Paralichthys dentatus*	2.72	3.46	62.2	65.2
Weakfish	*Cynoscion regalis*	0.47	0.04	16.7	6.1
Windowpane flounder	*Scophthalmus aquosus*	3.65	5.59	47.8	92.4
Winter flounder	*Pseudopleuronectes americanus*	0.00	0.34	0.0	18.2
Witch flounder	*Glyptocephalus cynoglossus*	0.00	0.02	0.0	1.5
Invertebrates					
American lobster	*Homarus americanus*	0.02	0.09	2.2	6.1
Asteriid sea star	*Asteriid* spp.	11.54	25.80	27.8	66.7
Blue crab	*Callinectes sapidus*	1.90	0.34	34.4	16.7
Blue mussel	*Mytilus edulis*	0.00	0.47	0.0	4.5
Channeled whelk	*Busycotypus canaliculatus*	5.29	0.00	78.9	0.0
Deep-sea scallop	*Placopecten magellanicus*	0.22	4.96	0.0	16.7
Green sea urchin	*Strongylocentrotus droebachiensis*	0.00	0.01	0.0	1.5
Hairy sea cucumber	*Sclerodactyla* spp.	1.24	0.00	5.0	0.0
Hermit crab	*Pagurus* spp.	1.27	4.09	32.2	69.7
Horseshoe crab	*Limulus polyphemus*	87.61	7.52	93.3	60.6
Jellyfish (unknown)	Phylum Cnidaria	0.06	0.20	3.3	10.6
Jonah crab	*Cancer borealis*	0.08	2.39	3.3	16.7
Knobbed whelk	*Busycon carica*	11.85	0.00	77.8	0.0
Lady crab	*Ovalipes ocellatus*	0.12	0.05	7.8	6.1
Lesser blue crab	*Callinectes similis*	0.02	0.00	2.2	0.0
Lightning whelk	*Busycon contrarium*	0.04	0.00	3.3	0.0
Long-finned squid	*Loligo pealei*	0.42	0.31	14.4	19.7
Margined sea star	*Astropecten* spp.	0.00	1.14	0.0	4.5
Moon snail	*Polinices heros*	0.04	1.19	2.2	36.4
Mud crab	*Panopeus* spp.	0.01	0.00	1.1	0.0

Octopus	Order Octopoda	0.01	0.01	1.1	1.5
Purple sea urchin	*Arbacia punctulata*	1.13	0.71	5.6	7.6
Quahog	*Mercenaria mercenaria*	0.00	0.02	0.0	1.5
Rock crab	*Cancer spp.*	0.38	1.42	25.6	57.6
Sand dollar	*Echinarachnius parma*	0.18	0.25	1.1	15.2
Sea anemone	Phylum Cnidaria	0.02	0.00	1.1	0.0
Sea mouse	*Aphrodita aculeata*	0.01	0.13	0.0	7.6
Spider crab	*Libinia* spp.	3.62	4.52	65.6	59.1
Surf clam	*Spisula solidissima*	0.05	1.55	4.4	47.0

Table 5.3.8-4. (from Graham et al., in review). A measure of occurrence and abundance (Occur; Abund) during the HCRC trawl survey, resilience, and fishery, management, and conversation (IUCN Listing) statuses are listed for each species caught as bycatch during the Horseshoe Crab Research Center (HCRC) trawl survey (2005 and 2006). Information could not be found for species that were caught but are not listed.

Fishes	Occur; Abund[a]	Resilience[b]	Fishery status worldwide[c]	Mgmt status[d]	IUCN listing[e]
Atlantic angel shark	R; VL	Low	Closed (U.S.)	Mng[3]	DD
Atlantic croaker	C; L	Medium	Comm/Rec	Mng[2,6]	None
Atlantic sturgeon	R; VL	Very Low	Comm/Rec; Closed (U.S.)	Mng; Moratorium[8]	NT
Black drum	R; VL	Medium	Comm/Rec	Mng[5]	None
Black sea bass	U; VL	Medium	Comm/Rec	Mng[2,6]; OF'ing = Unknown	None
Bluefish	U; VL	Medium	Comm/Rec	Mng[2,6]	None
Bullnose ray	U; L	Very Low	Comm	No info	None
Butterfish	U; VL	High	Comm/Rec	Mng[8]; OF'ing = Unknown	None
Clearnose skate	A; H	Low	Comm	Mng[8]	None
Cownose ray	U; VL	Low	Comm; None (U.S.)	n/a	NT
Dusky shark	R; VL	Very Low	Comm; Closed (U.S.)[9]	Mng; "Species of concern"[10]	NT
Little skate	A; H	Low	Comm	Mng[8]	None
Northern Puffer	U; VL	High	No info	Umng	None
Northern searobin	U; VL	Medium	Comm	No info	None
Northern stargazer	U; VL	Medium	Rec	No info	None
Red hake	R; VL	Medium	Comm/Rec	Mng[8]	None
Scup	C; VL	Medium	Comm/Rec	Mng[2]; OF'ing = Unknown	None
Silver hake	R; VL	Medium	Comm	Mng[8]	None
Smooth butterfly ray	U; L	Very Low	Comm; None (U.S.)	n/a	DD
Smooth dogfish	U; L	Low	Comm/Rec	Unmng	NT
Southern eagle ray	U; L	Very Low	Comm	No info	None
Southern kingfish	U; VL	Medium	Comm/Rec	Mng[4]	None

Southern stingray	C; M	Very Low	Comm/Rec	n/a	DD
Spiny butterfly ray	U; L	Very Low	Comm/Rec	No info	None
Spiny dogfish	U; L	Very Low	Comm	Mng[8]	VUL
Spot	U; VL	High	Comm	Mng[2] Of'ed; Of'ing = Unknown	None
Striped bass	U; VL	Low	Comm/Rec	Mng[6,8]; OF'ing \= Unknown	None
Striped burrfish	U; VL	No info	Rec	No info	None
Striped searobin	C; L	Medium	Comm/Rec	No info	None
Summer flounder	A; M	Medium	Comm/Rec	Mng[6,8]; Of'ing = Occurring	None
Weakfish	U; VL	High	Comm	Mng[8]	None
Windowpane flounder	A; L	Medium	Comm	Mng[8]	None
Winter flounder	U; VL	Medium	Comm/Rec	Mng[8]	None
Winter skate	A; H	Low	Comm	Mng[8]; OF'ing = Occurring	None

Invertebrates	Occur; Abund[a]	Resilience[b]	Fishery status[c]	Mgmt status[d]	IUCN listing[e]
American lobster	R; VL	Unknown[1]	Comm/Rec	Mng[2]	None
Blue crab	C; VL	High[1]	Comm/Rec	Mng[6]	None
Blue mussel	R; VL	No info	Comm[7]	Mng[7]	None
Deep-sea scallop	U; L	Medium1	Comm	Mng[8]	None
Jonah crab	U; VL	Unknown5	Fished[5]	Umng[5]	None
Knobbed whelk	C; M	No info	Comm/Rec[5]	Mng[11]	None
Long-finned squid	U; VL	High1	Comm	Mng[8]	
Spider crab	A; VL	No info	No info	No info	None
Long-finned squid	U; VL	High1	Comm[7]	Mng[8]	None
Surf clam	C; VL	No info	Comm[7]	Mng[8]	None

a. Occurrence (Occur; percent of tows in which species was present): Abundant (A) > 50%, Common (C) = 21-50%, Uncommon (U) = 6-20%, Rare (R) < 5% of tows; Abundance (Abund; percent of total biomass): High (H) > 10%, Medium (M) = 2-10%, Low (L) = 1%, Very low (VL) < 1% of biomass (Data from present study); b. Population doubling time; High < 15 months, Medium = 1.4-4.4 years, Low = 4.5-14 years, Very low > 14 years (FishBase 2007 unless noted otherwise); c. Fishery status; Commercial fishery (Com), Recreational fishery (Rec) (FishBase 2007 unless noted otherwise); d. Management status of species: Managed (Mng), Unmanaged (Umng), Overfished (OF'ed), Overfishing (OF'ing); e. IUCN Listing: Vulnerable (VUL) = facing high risk of extinction in the wild, Near threatened (NT) = close to qualifying for threatened category in the future, Data deficient (DD) = appropriate data are lacking (IUCN 2006). Footnotes: 1. BOI 2005; 2. ASMFC 2007; 3. Fishbase 2007; 4. GA DNR 2007; 5. MBA 2007; 6. MD DNR 2007; 7. ME DMR 2007; 8. NEFSC 2007; 9. NMFS 2007a; 10. NMFS 2007b; 11. VA MRC 2007.

5.3.9 Highly Migratory Pelagics

5.3.9.1 Description of fishing practices, vessels and gear

Pelagic longline fishery

The U.S. pelagic longline fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, and bigeye tuna in various areas and seasons. Secondary target species include dolphin, albacore tuna, pelagic sharks (including mako, thresher, and porbeagle sharks), as well as several species of large coastal sharks. Although this gear can be modified (e.g., depth of set, hook type, etc) to target swordfish, tunas, or sharks, it is generally a multi-species fishery. These vessel operators are opportunistic, switching gear style and making subtle changes to target the best available economic opportunity of each individual trip. Pelagic longline gear sometimes attracts and hooks non-target finfish with little or no commercial value, as well as species that cannot be retained by commercial fishermen due to regulations, such as billfish. Pelagic longlines may also interact with protected species such as marine mammals, sea turtles, and seabirds. Thus, this gear has been classified as a Category I fishery with respect to the Marine Mammal Protection Act. Any species (or undersized catch of permitted species) that cannot be landed due to fishery regulations is required to be released, whether dead or alive. Pelagic longline gear is composed of several parts (see Figure 5.3.9-1) (NMFS, 1999).

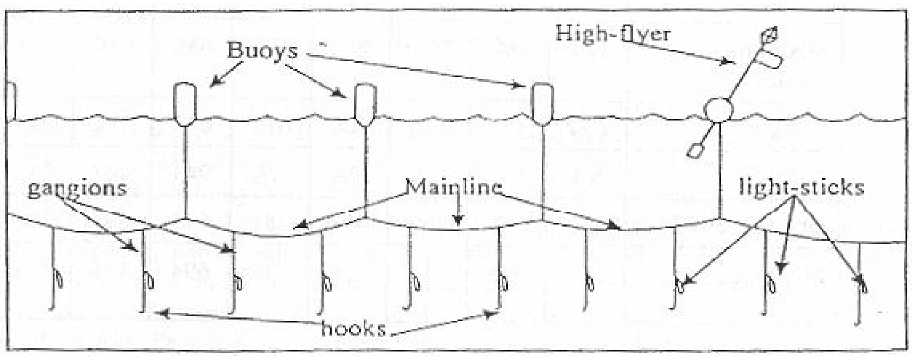


Figure 5.3.9-1. Typical U.S. Pelagic Longline Gear. Source: Arocha, 1996 Note: As of April 1, 2001, (66 FR 17370) a vessel is considered to have pelagic longline gear on board when a power-operated longline hauler, a mainline, floats capable of supporting the mainline, and leaders (gangions) with hooks are on board.

The primary fishing line, or mainline of the longline system, can vary from five to 40 miles in length, with approximately 20 to 30 hooks per mile. The depth of the mainline is determined by ocean currents and the length of the floatline, which connects the mainline to several buoys, and periodic markers which can have radar reflectors or radio beacons attached.

Each individual hook is connected by a leader, or gangion, to the mainline. Lightsticks, which contain chemicals that emit a glowing light, are often used, particularly when targeting swordfish. When attached to the hook and suspended at a certain depth, lightsticks attract baitfish, which may, in turn, attract pelagic predators (NMFS, 1999).

When targeting swordfish, pelagic longline gear is generally deployed at sunset and hauled at sunrise to take advantage of swordfish nocturnal near-surface feeding habits (NMFS, 1999). In general, longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. Except for vessels of the distant water fleet, which undertake extended trips, fishing vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface. The number of hooks per set varies with line configuration and target species (Table 5.3.9-1) (NMFS, 1999). The pelagic longline gear components may also be deployed as a trolling gear to target surface feeding tunas. Under this configuration, the mainline and gangions are elevated and actively trolled so that the baits fish on or above the water's surface. This style of fishing is often referred to as "green-stick fishing," and reports indicate that it can be extremely efficient compared to conventional fishing techniques.

Table 5.3.9-1. Average Number of Hooks per Pelagic Longline Set, 1999-2004. Source: Data reported in pelagic longline logbook.

Target Species	1999	2000	2001	2002	2003	2004
Swordfish	521	550	625	695	712	701
Bigeye Tuna	768	454	671	755	967	400
Yellowfin Tuna	741	772	731	715	723	696
Mix of tuna species	NA	638	719	767	764	779
Shark	613	621	571	640	970	1,046
Dolphin	NA	943	447	542	692	1,033
Other species	781	504	318	300	865	270
Mix of species	738	694	754	756	750	777

Figure 5.3.9-2 illustrates basic differences between swordfish (shallow) sets and tuna (deep)longline sets. Swordfish sets are buoyed to the surface, have few hooks between floats, and are relatively shallow. This same type of gear arrangement is used for mixed target sets. Tuna sets use a different type of float placed much further apart. Compared with swordfish sets, tuna sets have more hooks between the floats and the hooks are set much deeper in the water column. It is believed that because of the difference in fishing depth, tuna sets hook fewer turtles than the swordfish sets. In addition, tuna sets use bait only, while swordfish fishing uses a combination of bait and lightsticks. Compared with vessels targeting swordfish or mixed species, vessels specifically targeting tuna are typically smaller and fish different grounds.

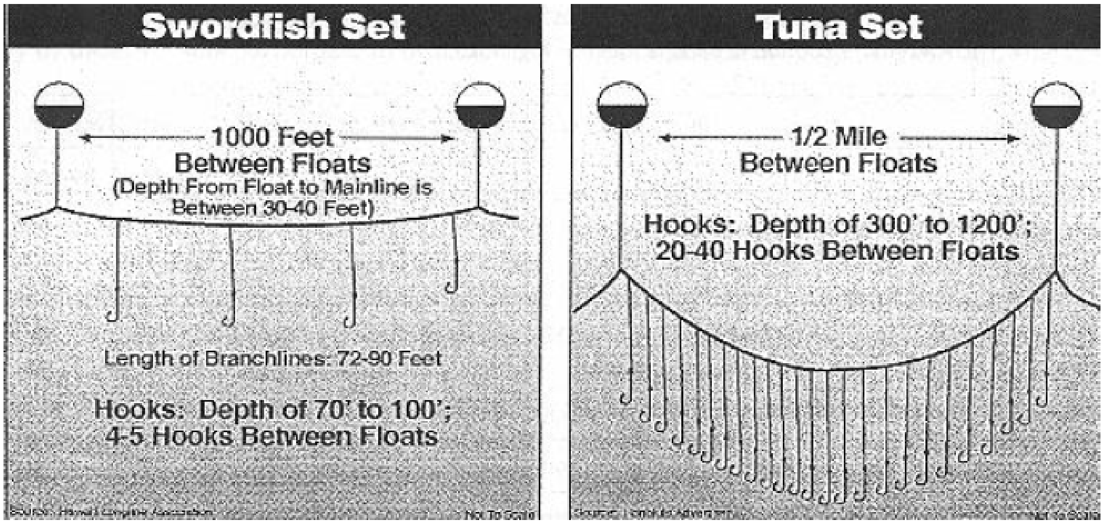


Figure 5.3.9-2 . Different Pelagic Longline Gear Deployment Techniques. Source: Hawaii Longline Association and Honolulu Advertiser. NOTE: This figure is only included to show basic differences in pelagic longline gear configuration and to illustrate that this gear may be altered to target different species.

<u>The South Atlantic – Florida East Coast to Cape Hatteras Swordfish Fishery</u>
Historically, South Atlantic pelagic longline vessels targeted swordfish year-round, although yellowfin tuna and dolphin fish were other important marketable components of the catch. In 2001 (65 FR 47214, August 1, 2000), the Florida East Coast closed area (year-round closure) and the Charleston Bump closed area (February through April closure) became effective.

Prior to these closures, smaller vessels used to fish short trips from the Florida Straits north to the bend in the Gulf Stream off Charleston, South Carolina (Charleston Bump). Midsized and larger vessels migrate seasonally on longer trips from the Yucatan Peninsula throughout the West Indies and Caribbean Sea, and some trips range as far north as the Mid-Atlantic coast of the United States to target bigeye tuna and swordfish during the late summer and fall. Fishing trips in this fishery average nine sets over 12 days. Home ports (including seasonal ports) for this fishery include Georgetown, South Carolina; Charleston, South Carolina; Fort Pierce, Florida; Pompano Beach, Florida; and Key West, Florida. This sector of the fishery consists of small to mid-size vessels, which typically sell fresh swordfish to local high-quality markets (NMFS, 1999).

<u>Management of the U.S. Pelagic Longline Fishery</u>
The U.S. Atlantic pelagic longline fishery is restricted by a limited swordfish quota, divided between the North and South Atlantic (separated at 5°N. Lat). Other regulations include minimum sizes for swordfish, yellowfin, bigeye, and bluefin tuna, limited access permitting, bluefin tuna catch requirements, shark quotas, protected species incidental take limits, reporting requirements (including logbooks), and gear and bait requirements. Current billfish regulations prohibit the retention of billfish by pelagic longline vessels, or the sale of billfish from the Atlantic Ocean. As a result, all billfish hooked on pelagic

longlines must be discarded, and are considered bycatch. This is a heavily managed gear type and, as such, is strictly monitored.

Because it is difficult for pelagic longline fishermen to avoid undersized fish in some areas, NMFS has closed areas in the Gulf of Mexico and along the east coast. The intent of these closures is to decrease bycatch in the pelagic longline fishery by closing those areas with the highest rates of bycatch. There are also time/area closures for pelagic longline fishermen designed to reduce the incidental catch of bluefin tuna and sea turtles. In order to enforce time/area closures and to monitor the fishery, NMFS requires all pelagic longline vessels to report positions on an approved vessel monitoring system (VMS).

In June 2004, NMFS conditionally re-opened the Northeast Distant Statistical Reporting Area (NED)to pelagic longline fishing. NMFS limited vessels with pelagic longline gear onboard in that area, at all times, to possessing onboard and/or using only 18/0 or larger circle hooks with an offset not to exceed ten degrees. Only whole mackerel and squid baits may be possessed and or utilized with allowable hooks. In August of 2004, NMFS limited vessels with pelagic longline gear onboard, at all times, in all areas open to pelagic longline fishing, excluding the NED, to possessing onboard and/or using only 16/0 or larger non-offset circle hooks and/or 18/0 or larger circle hooks with an offset not to exceed ten degrees. Only whole finfish and squid baits may be possessed and/or utilized with allowable hooks. All pelagic longline vessels must possess and use sea turtle handling and release gear in compliance with NMFS careful release protocols.

Permits

The 1999 FMP established six different limited access permit types: (1) directed swordfish, (2) incidental swordfish, (3) swordfish handgear, (4) directed shark, (5) incidental shark, and (6) tuna longline. To reduce bycatch in the pelagic longline fishery, these permits were designed so that the swordfish directed and incidental permits are valid only if the permit holder also holds both a tuna longline and a shark permit.

Similarly, the tuna longline permit is valid only if the permit holder also holds both a swordfish (directed or incidental, not handgear) and a shark permit. This allows limited retention of species that might otherwise have been discarded.

As of February 1, 2006, approximately 214 tuna longline limited access permits had been issued. In addition, approximately 191 directed swordfish limited access permits, 86 incidental swordfish limited access permits, 240 directed shark limited access permits, and 312 incidental shark limited access permits had been issued. Vessels with limited access swordfish and shark permits do not necessarily use pelagic longline gear, but these are the only permits that allow for the use of pelagic longline gear in HMS fisheries.

Monitoring and Reporting

Pelagic longline fishermen and the dealers who purchase HMS from them are subject to reporting requirements. NMFS has extended dealer reporting requirements to all swordfish importers as well as dealers who buy domestic swordfish from the Atlantic.

These data are used to evaluate the impacts of harvesting on the stock and the impacts of regulations on affected entities.

Commercial HMS fisheries are monitored through a combination of vessel logbooks, dealer reports, port sampling, cooperative agreements with states, and scientific observer coverage. Logbooks contain information on fishing vessel activity, including dates of trips, number of sets, area fished, number of fish, and other marine species caught, released, and retained. In some cases, social and economic data such as volume and cost of fishing inputs are also required.

Recent Catch and Landings

U.S. pelagic longline catch (including bycatch, incidental catch, and target catch) is largely related to these vessel and gear characteristics, but is summarized for the whole fishery in Table 5.3.9-2. U.S. pelagic longline landings of Atlantic tunas and swordfish for 1999 – 2004 are summarized in Table 5.3.9-3. Additional information related to landings can be found in Section 3.4.6 of the Consolidated Atlantic Highly Migratory Species Fishery Management Plan.

From May 1992 through December 2000, the Pelagic Observer Program (POP) recorded a total of 4,612 elasmobranchs (15 percent of the total catch) caught off the southeastern U.S. coast in fisheries targeting tunas and swordfish (Beerkircher et al., 2004). Of the 22 elasmobranch species observed, silky sharks were numerically dominant (31.4 percent of the elasmobranch catch), with silky, dusky, night, blue, tiger, scalloped hammerhead, and unidentified sharks making up the majority (84.6 percent) (Beerkircher et al., 2004).

Table 5.3.9-2. Reported Catch of Species Caught by U.S. Atlantic Pelagic Longlines, in Number of Fish, for 1999-2004. Source: Pelagic Longline Logbook Data.

Species	1999	2000	2001	2002	2003	2004
Swordfish Kept	67,120	62,978	47,560	49,320	51,835	46,440
Swordfish Discarded	20,558	17,074	13,993	13,035	11,829	10,675
Blue Marlin Discarded	1,253	1,443	635	1,175	595	712
White Marlin Discarded	1,969	1,261	848	1,438	809	1,053
Sailfish Discarded	1,407	1,091	356	379	277	424
Spearfish Discarded	151	78	137	148	108	172
Bluefin Tuna Kept	263	235	177	178	273	475
Bluefin Tuna Discarded	604	737	348	585	881	1,031
Bigeye, Albacore, Yellowfin, Skipjack Tunas Kept	114,438	94,136	80,466	79,917	63,321	76,962
Pelagic Sharks Kept	2,894	3,065	3,460	2,987	3,037	3,440
Pelagic Sharks Discarded	28,967	28,046	23,813	22,828	21,705	25,355
Large Coastal Sharks Kept	6,382	7,896	6,478	4,077	5,326	2,292
Large Coastal Sharks Discarded	5,442	6,973	4,836	3,815	4,813	5,230
Dolphin Kept	31,536	29,125	27,586	30,384	29,372	38,769
Wahoo Kept	5,136	4,193	3,068	4,188	3,919	4,633
Turtles Discarded	631	271	424	465	399	369
Number of Hooks (X 1,000)	*7,902*	*7,976*	*7,564*	*7,150*	*7,008*	*7,276*

Table 5.3.9-3. Reported Landings in the U.S. Atlantic Pelagic Longline Fishery (in mt ww) for 1999-2004. Source: NMFS, 2004a; NMFS, 2005.

Species	1999	2000	2001	2002	2003	2004
Yellowfin Tuna	3,374	2,901	2,201	2,573	2,154	2,489
Skipjack Tuna	2.0	1.8	4.3	2.5	4.2	0.7
Bigeye Tuna	929.1	531.9	682.4	535.8	284.9	308.7
Bluefin Tuna	73.5	66.1	37.5	49.9	81.4	96.1
Albacore Tuna	194.5	147.3	193.8	155	110.9	117.4
Swordfish N.*	3,362.4	3,315.8	2,483	2,598.8	2,772.1	2,551
Swordfish S.*	185.2	143.8	43.2	199.9	20.9	15.7

* Includes landings and estimated discards from scientific observer and logbook sampling programs.

Purse seine fishery

Purse seine gear consists of a floated and weighted encircling net that is closed by means of a drawstring; know as a purseline, threaded through rings attached to the bottom of the net.

The efficiency of this gear can be enhanced by the assistance of spotter planes used to locate schools of tuna. Once a school is spotted, the vessel, with the aid of a smaller skiff, intercepts and uses the large net to encircle it. Once encircled, the purseline is pulled, closing the bottom of the net and preventing escape. The net is hauled back onboard using a powerblock, and the tunas are removed and placed onboard the larger vessel.

Vessels using purse seine nets have participated in the U.S. Atlantic tuna fishery continuously since the 1950s; although a number of purse seine vessels did target and land bluefin tuna off the coast of Gloucester, MA as early as the 1930s. In 1958, continued commercial purse seining effort for Atlantic tunas began with a single vessel in Cape Cod Bay and expanded rapidly into the region between Cape Hatteras and Cape Cod during the early 1960s. The purse seine fishery between Cape Hatteras and Cape Cod was directed mainly at small and medium bluefin tuna, yellowfin tuna, and at skipjack tuna, primarily for the canning industry. North of Cape Cod, purse seining was directed at giant BLUEFIN TUNA. High catches of juvenile BLUEFIN TUNA were sustained throughout the 1960s and into the early 1970s. These high catch rates by U.S. purse seine vessels are believed to have played a role in the decline in abundance during subsequent years. Currently these purse seine vessels focus their effort on giant bluefin tuna, versus other tunas, due to the international market that developed for giant bluefin tuna in the late 1970s. These fresh caught bluefin tuna are primarily flown directly to Japan for processing into sushi or sashimi. By the late 1980s, high ex-vessel prices and the increased importance of the Japanese market had increased effort on all size classes of bluefin tuna. In 1992, NMFS responded by banning the sale of school, large school, and small medium bluefin tuna (27 inches to less than 73 inches curved fork length).

A limited entry system with non-transferable individual vessel quotas (IVQs) for purse seining was established in 1982, effectively excluding any new entrants into this category. Equal baseline quotas of bluefin tuna are assigned to individual vessels by regulation; the IVQ system is possible given the small pool of ownership in this sector of the fishery. Currently, only five vessels comprise the Atlantic tuna purse seine fleet and in 1996 the quotas were made transferable among the five vessels.

Vessels that are participating in the Atlantic tunas purse seine fishery are required to target the larger size class bluefin tuna, more specifically the giant sized class (81 inches or larger) and are granted a tolerance limit of 15 percent by weight, of the total amount of giant bluefin tuna landed during a season. These vessels may commence fishing starting on July 15 of each year and may continue through December 31, provided the vessel has not fully attained its IVQ. Over the last few years, the purse seine category has not fully harvested its allocated quota. This can be attributed to a number of different reasons outside of the industry's or NMFS' control, such as lack of availability or schools being comprised of mixed size classes. NMFS has issued several Exempted Fishing Permits (EFPs) to this sector of the fishery and will continue to assess current regulations and their impact on providing reasonable opportunities to harvest available quota.

Recent Catch and Landings

Table 5.3.9-4 shows purse seine landings of Atlantic tunas from 1999 through 2004. Purse seine landings typically make up approximately 20 percent of the total annual U.S. landings of bluefin tuna (about 25 percent of total commercial landings), but account for only a small percentage, if any, of the landings of other HMS. In the 1980s and early 1990s, purse seine landings of yellowfin tuna were often over several hundred metric tons. Over 4,000 mt ww of yellowfin tuna were recorded landed in 1985. In recent years, via informal agreements with other sectors of the tuna industry, the purse seine fleet has opted not to direct any effort on HMS other than bluefin tuna.

Table 5.3.9-4. Domestic Atlantic Tuna Landings for the Purse Seine Fishery: 1999-2004 (mt ww). Northwest Atlantic Fishing Area. Source: U.S. National Report to ICCAT: 2005.

Species	1999	2000	2001	2002	2003	2004
Bluefin Tuna	247.9	275.2	195.9	207.7	265.4	31.8
Yellowfin Tuna	0	0	0	0	0	0
Skipjack Tuna	0	0	0	0	0	0

Commercial handgear fishery

Commercial handgears, including handline, harpoon, rod and reel, and bandit gear are often used to fish for Atlantic HMS by fishermen on private vessels, charter vessels, and headboat vessels. Rod and reel gear may be deployed from a vessel that is at anchor, drifting, or underway (i.e., trolling). In general, trolling consists of dragging baits or lures through, on top of, or even above the water's surface. While trolling, vessels often use outriggers, kites, or green-sticks to assist in spreading out or elevating baits or lures and to prevent fishing lines from tangling. Operations, frequency and duration of trips, and distance ventured offshore vary widely. Most of the vessels are greater than seven meters in length and are privately owned by individual fishermen.

The handgear fisheries are typically most active during the summer and fall, although in the South Atlantic and Gulf of Mexico fishing occurs during the winter months. Fishing usually takes place between eight and 200 km from shore and for those vessels using bait, the baitfish typically includes herring, mackerel, whiting, mullet, menhaden, ballyhoo, butterfish, and squid.

The commercial handgear fishery for bluefin tuna occurs mainly in New England, and more recently off the coast of southern Atlantic states, such as Virginia, North Carolina and South Carolina, with vessels targeting large medium and giant bluefin tuna. The

majority of U.S. commercial handgear fishing activities for bigeye, albacore, yellowfin, and skipjack tunas take place in the northwest Atlantic. Beyond these general patterns, the availability of Atlantic tunas at a specific location and time is highly dependent on environmental variables that fluctuate from year to year.
Currently the U.S. Atlantic tuna commercial handgear fisheries are managed through an open access vessel permit program. Vessels that wish to sell their Atlantic tunas must obtain a commercial handgear permit in one of the following categories: General (rod and reel, harpoon, handline, bandit gear), Harpoon (harpoon only), or Charter/Headboat (rod and reel and handline).

These vessels may also need permits from the states they operate out of in order to land and sell their catch. All commercial permit holders are encouraged to check with their local state fish/natural resource management office regarding these requirements.

Permitted vessels are also required to sell their Atlantic tunas to federally permitted Atlantic tuna dealers. As the Atlantic tunas dealer permits are issued by the Northeast Region Permit Office, vessel owner/operators are encouraged to contact the permitting office directly, either by phone at (978) 281-9438 or via the web at http://www.nero.noaa.gov/ro/doc/vesdata1.htm, to obtain a list of permitted dealers in their area.

Vessels that are permitted in the General and Charter/Headboat categories commercially fish under the General category rules and regulations. For instance, regarding bluefin tuna, vessels that possess either of the two permits mentioned above have the ability to retain a daily bag limit of zero to three bluefin tuna, measuring 73 inches or greater curved fork length per vessel per day while the General category bluefin tuna fishery is open. The General category bluefin tuna fishery opens on June 1 of each year and remains open until January 31 of the subsequent year, or until the quota is filled. Vessel owner/operators should check with the agency via websites (www.hmspermits.gov) or telephone information lines (1-888-872-8862) to verify the bluefin tuna retention limit on any given day. The General category bluefin tuna quota is approximately 47 percent of the U.S. quota and equates to a base line allocation of approximately 690 mt.

Vessels that are permitted in the Harpoon category fish under the Harpoon category rules and regulations. For instance, regarding bluefin tuna, vessels have the ability to keep two bluefin measuring 73 inches to less than 81 inches curved fork length per vessel trip per day while the fishery is open. There is no limit on the number of bluefin tuna that measure longer than 81 inches curved fork length, as long as the Harpoon category season is open. The Harpoon category season also opens on June 1 of each year and remains open until November 15, or until the quota is filled. The Harpoon category bluefin tuna quota is approximately 3.9 percent of the U.S. quota and equates to a base line allocation of approximately 57 mt.

U.S. commercial swordfish fishing in the Atlantic Ocean is reported to have begun in the early 1800s as a harpoon fishery off the coast of New England. This fishery traditionally consisted of harpoon vessels operating out of Rhode Island and Massachusetts where they took extended trips for swordfish north and east of the Hudson Canyon and particularly off Georges Bank, and could land as many as 20 to 25 large swordfish over a ten-day period. These fish primarily consisted of large fish that finned on the surface and were available to the harpoon gear, some weighing as much as 600 lbs dw, but averaging about 225 to 300 lbs dw at the turn of the century. Because of the limited effort directed towards large fish, the stock was sufficient to support a sustainable seasonal swordfish fishery for more than 150 years. Most swordfish caught in the United States in the early 1900s were harvested with harpoons; harpoon landings declined from the 1940s through the 1960s. Due to a decreased availability of the large swordfish in the northeast this fishery has essentially ceased to exist. However, a recently emerging swordfish handgear fishery, both commercial and recreational, has appeared to develop off the east coast of Florida. This fishery is essentially prosecuted at night with rod and reel or handline gear. Some vessels participating in this fishery are currently utilizing individual handlines attached to free-floating buoys. This fishery has been operating under the current regulations, which require that handlines be restricted to no more than two hooks and be released and retrieved by hand. The current regulations do not limit the number of individual handlines/buoys that may be possessed or deployed.

Currently the U.S. commercial swordfish fishery is managed through limited access vessel permits. Vessels that possess a limited access handgear permit must abide by the minimum size limits for swordfish (i.e., 29 inches form cleithrum to caudal keel; 47 inches lower jaw fork length; or 33 lbs dressed weight) and seasonal retention limits. When the directed swordfish fishery is open, permitted handgear vessel do not have a possession limit. However, during a directed fishery closure, permitted handgear vessels may land two swordfish per trip, provided these two fish were not taken with harpoon gear. Fishermen with a commercial handgear swordfish permit are required to report fishing activities in an approved logbook within 48 hours of each day's fishing activities for multi-day trips, or before offloading for one-day trips, and submit the logbook within seven days of offloading.

The shark commercial handgear fishery plays a very minor role in contributing to the overall shark landing statistics. For further information regarding the shark fishery refer to Section 3.4.5. Economic and social aspects of all the domestic handgear fisheries are described later in this document (Section 3.5 and Chapter 9.0 respectively).

<u>Recent Catch and Landings</u>
The proportion of domestic HMS landings harvested with handgear varies by species, with Atlantic tunas comprising the majority of commercial landings. Commercial handgear landings of all Atlantic HMS (other than sharks) in the United States are shown in Table 5.3.9-5.

In 2004, bluefin tuna commercial handgear landings accounted for approximately 42 percent of the total U.S. bluefin tuna landings, and almost 75 percent of commercial bluefin tuna landings. Also in 2004, four percent of the total yellowfin catch, or nine percent of the commercial yellowfin catch, was attributable to commercial handgear. Commercial handgear landings of skipjack tuna accounted for approximately ten percent of total skipjack landings, or about 30 percent of commercial skipjack landings. For albacore, commercial handgear landings accounted for approximately one percent of total albacore landings, or about six percent of commercial albacore landings. Commercial handgear landings of bigeye tuna accounted for approximately one percent of total bigeye landings and one percent of total commercial bigeye landings. Updated tables of landings for the commercial handgear fisheries by gear and by area for 1999 – 2004 are presented in the following tables.

Table 5.3.9-5. Domestic Landings for the Commercial Handgear Fishery, by Species and Gear, for 1999-2004 (mt ww). Source: U.S. National Report to ICCAT: 2005

Species	Gear	1999	2000	2001	2002	2003	2004
Bluefin Tuna	Rod and Reel	643.6	590.9	889.7	878.5	529.2	331.4
	Handline	15.5	3.2	9.0	4.5	2.6	1.3
	Harpoon	115.8	184.2	102.1	55.6	75.5	41.2
	TOTAL	**774.9**	**778.3**	**1,000.8**	**938.6**	**607.3**	**373.9**
Bigeye Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	12.3	5.7	33.7	14.4	6.3	3.1
	TOTAL	**12.3**	**5.7**	**33.7**	**14.4**	**6.3**	**3.1**
Albacore Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	4.4	7.9	3.9	6.6	3.4	5.6
	TOTAL	**4.4**	**7.9**	**3.9**	**6.6**	**3.4**	**5.6**
Yellowfin Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	220.0	284.0	300.0	244.0	216.0	234.0
	TOTAL	**220.0**	**284.0**	**300.0**	**244.0**	**216.0**	**234.0**
Skipjack Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	6.4	9.7	10.5	12.7	9.4	10.4
	TOTAL	**6.4**	**9.7**	**10.5**	**12.7**	**9.4**	**10.4**
Swordfish	Handline	5.0	8.9	8.9	11.7	20.6	20.0
	Harpoon	0.0	0.6	7.4	2.8	0.0	0.5
	TOTAL	**5.0**	**9.5**	**16.3**	**14.5**	**20.6**	**20.5**

Table 5.3.9-6. Domestic Landings for the Commercial Handgear Fishery by Species and Region for 1999- 2004 (mt ww). Source: U.S. National Report to ICCAT: 2005

Species	Region	1999	2000	2001	2002	2003	2004
Bluefin Tuna	NW Atl	774.4	778.3	1,000.8	938.3	607.3	373.9
Bigeye Tuna	NW Atl	11.9	4.1	33.2	13.8	6.0	3.0
	GOM	0.2	0.1	0.5	0.6	0.3	0.1
	Caribbean	0.2	1.5	0.0	0.0	0.0	0.0
Albacore Tuna	NW Atl	0.6	2.9	1.7	3.9	1.4	5.4
	GOM	≤ .05	0.0	0.0	0.0	≤ .05	0.0
	Caribbean	3.8	5.0	2.2	2.7	2.0	2.1
Yellowfin Tuna	NW Atl	192.0	235.7	242.5	137.0	148.0	208.0
	GOM	12.7	28.6	43.4	100.0	59.0	19.0
	Caribbean	14.5	19.4	14.3	7.0	9.0	7.0
Skipjack Tuna	NW Atl	0.2	0.2	0.2	0.2	0.2	0.6
	GOM	0.4	0.7	0.0	0.0	0.0	0.2
	Caribbean	5.8	8.8	10.3	12.5	9.2	9.6
Swordfish	NW Atl	5.0	8.3	16.0	11.6	10.8	18.9
	GOM	≤ .05	1.2	0.3	2.9	9.8	1.6

Bottom longline

In 1993, NMFS implemented the FMP for Sharks of the Atlantic Ocean, which established three management units: large coastal sharks (LCS), small coastal sharks (SCS), and pelagic sharks. At that time, NMFS identified LCS as overfished, and implemented commercial quotas for LCS and established recreational harvest limits for all sharks. In 2003, NMFS amended the measures enacted in the 1999 FMP based on the 2002 LCS and SCS stock assessments, litigation, and public comments. Implementing regulations for Amendment 1 to the 1999 FMP were published on December 24, 2003 (68 FR 74746). Management measures enacted in the amendment included: re-aggregating the large coastal shark complex, using maximum sustainable yield (MSY) as a basis for setting commercial quotas, eliminating the commercial minimum size restrictions, establishing three regional commercial quotas (Gulf of Mexico, South Atlantic, and North Atlantic) for LCS and SCS management units, implementing trimester commercial fishing seasons effective January 1, 2005, imposing gear restrictions to reduce bycatch, and a time/area closure off the coast of North Carolina effective January 1, 2005.

As a result of using MSY to establish quotas, and implementing a new rebuilding plan, the overall annual landings quota for LCS in 2004 was established at 1,017 metric tons (mt) dressed weight (dw). The overall annual landings quota for SCS was established at 454 mt dw and the pelagic, blue, and porbeagle shark quotas were established at 488 mt dw, 273 mt dw, and 92 mt dw, respectively.

The regional quotas which were established in Amendment 1 to the 1999 HMS FMP for LCS and SCS were intended to improve overall management of the stocks by tailoring quotas to specific regions based on landings information. These quotas were based upon average historical landings (1999 – 2001) from the canvass and quota monitoring databases. The canvass database provides a near-census of the landings at major dealers in the southeast United States (including state landings) and the quota monitoring database collects information from dealers in the South Atlantic and Gulf of Mexico.

On November 30, 2004, NMFS issued a final rule (69 FR 69537), which established, among other things, new regional quotas based on updated landings information from 1999 –2003. This final rule did not change the overall quotas for LCS, SCS, and pelagic sharks established in Amendment 1 to the 1999 HMS FMP, but did revise the percentages allocated to each of the regions. The updated information was based on several different databases, including the canvass and quota monitoring databases, the Northeast Commercial Fisheries Database (CFDBS), and the snapper grouper logbook.

The new regional quotas and trimester seasons for the commercial Atlantic shark fishery became effective January 1, 2005. Commercial shark fishing effort is generally concentrated in the southeastern United States and Gulf of Mexico (Cortes and Neer, 2002). During 1997 – 2003, 92 – 98 percent of LCS, 38 – 49 percent of pelagic sharks, and nearly all SCS (80 – 100 percent) came from the southeast region (Cortes, pers. comm.). McHugh and Murray (1997) found in a survey of shark fishery participants that the largest concentration of bottom longline fishing vessels is found along the central Gulf coast of Florida, with the John's Pass - Madeira Beach area considered the center of directed shark fishing activities. Consistent with other HMS fisheries, some shark fishery participants move from their homeports to other fishing areas as the seasons change and fish stocks move.

The Atlantic bottom longline fishery targets both LCS and SCS. Bottom longline is the primary commercial gear employed in the LCS and SCS fisheries in all regions. Gear characteristics vary by region, but in general, an approximately ten-mile long bottom longline, containing about 600 hooks, is fished overnight. Skates, sharks, or various finfishes are used as bait. The gear typically consists of a heavy monofilament mainline with lighter weight monofilament gangions. Some fishermen may occasionally use a flexible 1/16 inch wire rope as gangion material or as a short leader above the hook.

Recent Catch and Landings Data

The following section provides information on shark landings as reported in the shark bottom longline observer program. For recent catch and landings data for the shark fishery as a whole, which includes landings from bottom longline and other gears combined, please refer to Section 3.4.7.

In January 2002, the observer coverage requirements in the shark bottom longline fishery changed from voluntary to mandatory participation if selected. NMFS selects approximately 40 - 50 vessels for observer coverage during each season. Vessels are randomly selected if they have a directed shark limited access permit, have reported landings from sharks during the previous year, and have not been selected for observer coverage during each of the three previous seasons.

The U.S. Atlantic commercial shark bottom longline fishery has been monitored by the University of Florida and Florida Museum of Natural History, Commercial Shark Fishery Observer Program (CSFOP) since 1994. In June 2005, responsibility for the observer program was transferred to the Southeast Fisheries Science Center's Panama City Laboratory. The observer program trains and places the observers aboard vessels in the directed shark bottom longline fishery in the Atlantic and Gulf of Mexico to collect data on the commercial shark fishery and thus improve overall management strategies for the fishery. Observers provide baseline characterization information, by region, on catch rates, species composition, catch disposition, relative abundance, and size composition within species for the large coastal and small coastal shark bottom longline fisheries.

During 2003, six observers logged 263 sea days on shark fishing trips aboard 20 vessels in the Atlantic from North Carolina to Florida and in the eastern Gulf of Mexico off Florida. The number of trips taken on each vessel ranged from one to five and the number of sea days each observer logged ranged from nine to 35. Observers documented the catches and fishing effort on approximately 150 longline sets that fished 103,351 hooks.

During 2004, five observers logged 196 sea days on 56 shark fishing trips aboard 11 vessels. Observers documented the catches and fishing effort during 120 longline sets that fished 90,980 hooks.

Data from the shark observer program between 2000 and 2002 show that LCS comprised 66.2 percent of the total catch (Burgess and Morgan, 2002). During 2003, LCS comprised 68.4 percent of the total catch, and in 2004 LCS comprised 66.7 percent of the total catch. Sandbar sharks dominated the observed catches with 30.6 percent of total LCS catch in 2003 and 26.6 percent in 2004 (Table 3.52). The overall catch and disposition of species for 2004 is listed in Table 3.53. Regional differences in sandbar shark abundance were evident. For example, in the Carolina region, sandbar sharks comprised 67.4 percent of the total catch and 77.2 percent of the large coastal shark catch. In the Florida Gulf region, sandbar sharks comprised 62.0 percent of the total catch and 66.5 percent of the large coastal catch, whereas in the Florida East Coast region, sandbar sharks comprised only 17.2 percent of the total observed catch, and 37.1 percent of the large coastal shark catch (Burgess and Morgan, 2003). Blacktip sharks comprised 13.9 percent of total observed catch and 20.3 percent of the large coastal catch (Burgess and Morgan, 2002). Tiger sharks comprised 7.5 percent of the total observed catch and 11.0 percent of the large coastal shark catch. A majority of tiger sharks (71.7 percent) and nurse sharks (98.8 percent) were tagged and released.

During 2003, shark observer program data indicate that SCS comprised 28.0 percent of the total observed catch (Burgess and Morgan, 2003; Burgess and Morgan 2004). Atlantic sharpnose shark dominated the SCS catch (80.3 percent). The remainder of the small coastal catch consisted of blacknose sharks (5.5 percent), bonnethead (0.03 percent), and finetooth (0.02 percent)(Table 3.52). In previous seasons, the Atlantic sharpnose shark was the most frequently caught shark in the Florida East Coast region and accounted for 51.6 percent of the total observed catch, and 96.0 percent of the small coastal catch in that region (Burgess and Morgan, 2002).

Bottom longlining for sharks has relatively low observed bycatch rates. Historically, finfish bycatch has averaged approximately five percent in the bottom longline fishery. Finfish bycatch for the bottom longline fishery includes, but is not limited to, skates, rays, cobia, redfish, bluefish, and great barracuda. During the second semi-annual season of 2003, observer data indicate that approximately 4,320 sharks were caught compared to 432 other fish, four invertebrates, and three sea turtles (Burgess and Johns, 1999). In terms of bycatch rates, observed shark catches constitute 91 percent of the 4,759 total animals caught, with other fish comprising 10 percent, invertebrates less than .01 percent, and sea turtles less than .01 percent. For more information on bycatch see Section 3.8.

Gillnet fishery

The southeast shark gillnet fishery is comprised of several vessels based primarily out of ports in northern Florida (South Atlantic Region) that use nets typically 456 to 2,280 meters long and 6.1 to 15.2 meters deep, with stretched mesh from 12.7 to 22.9 cm. This fishery is currently prohibited in the state waters off South Carolina, Georgia, and Florida, thereby forcing some of these vessels to operate in deeper waters under Federal jurisdiction, where gillnets are less effective. The entire process (set to haulback) takes approximately 9 hours (Carlson and Baremore, 2002a).

The 2005 Directed Shark Gillnet Fishery Observer Program report described the gear and soak time deployed by drift gillnet, strike gillnet, and sink gillnet fishermen. Set duration was generally 0.3 hours and haulback averaged 2.9 hours. The average time from setting the net through completion of haulback was 10.2 hours. The most frequently used mesh size for drift gillnets was 12.7 cm. Strikenetters use the largest mesh size (22.9 cm) and the set times were 2.7 hours. Sink gillnets used to target sharks generally use 17.8 cm mesh size and were soaked for approximately 0.8 hours. This gear was also observed being deployed to target non-HMS (kingfish or Spanish mackerel); using a stretched mesh size of 7.6 cm, to comply with mesh size regulations for the Spanish mackerel fishery, and soaked for approximately 5.9 hours (Carlson and Bethea, 2006).

In the southeast shark gillnet fishery, NMFS modified the requirement to have 100 percent observer coverage at all times on March 30, 2001 (66 FR 17370), by reducing the level required to a statistically significant level outside of right whale calving season (100 percent observer coverage is still required during the right whale calving season from November 15 through March 31). This modification of observer coverage reduced administrative costs while maintaining statistically significant and adequate levels of coverage to provide reasonable estimates of sea turtle and marine mammal takes outside the right whale calving season. The level of observer coverage necessary to maintain statistical significance will be reevaluated annually and adjusted accordingly.

Additionally, in 2001, NMFS established a requirement to conduct net checks every two hours to look for and remove any protected species.

Recent Catch and Landings

The following section provides information on shark landings as reported in the shark gillnet observer program. For recent catch and landings data for the shark fishery as a whole, which includes landings from gillnet, bottom longline, and other gears combined, please refer to Section 3.4.7. A total of 24 driftnet sets were observed on five vessels from February through September, 2004. Driftnet vessels carried nets ranging in length from 547.2 – 2736 m; depths from 7.6 – 13.7 m and stretched mesh sizes from 12.7 – 22.9 cm. The most frequently used mesh size was 12.7 cm. For all observed driftnet sets, set duration averaged 0.4 hrs. Sets were made in seawater averaging 15.4 m deep.

Haulback and processing of the catch averaged 3.4 hrs. Average soak time for the driftnet (time net was first set minus time haulback began) was 10.8 hrs. The observed driftnet catch consisted of nine species of sharks. Three species of sharks made up 92.9 percent (by number) of the observed shark catch (Table 3.57). These species were the Atlantic sharpnose shark, blacknose shark, and finetooth shark. By weight, the shark catch was made up of Atlantic sharpnose shark, (55.3 percent), blacknose shark (17.1 percent), blacktip shark (10.7 percent), and finetooth shark (10.3 percent). Total observed catch composition (percent of numbers caught) was 79.0 percent sharks, 20.7 percent teleosts, 0.3 percent rays, and 0.03 percent protected species (i.e., marine mammals, sea turtles, sawfish).

Recreational fishery

Atlantic tunas, sharks, swordfish, and billfish are all targeted by domestic recreational fishermen using rod and reel gear. The recreational swordfish fishery had declined dramatically over the past twenty years, but recent information indicates that the recreational swordfish fishery is rebuilding in the Mid-Atlantic Bight, and off the east coast of Florida. Effective March 1, 2003, an HMS Angling category permit has been required to fish recreationally for any HMS managed species (Atlantic tunas, sharks, swordfish, and billfish) (67 FR 77434, December 18, 2002). Prior to March 1, 2003, the regulations only required vessels fishing recreationally for Atlantic tunas to possess an Atlantic Tunas Angling category permit.

Recreational fishing for Atlantic HMS is managed primarily through the use of minimum size limits and bag limits. Recreational tuna fishing regulations are the most complex and include a combination of minimum sizes, bag limits, limited season-based quota allotment for bluefin tuna, and reporting requirements (depending upon the particular species and vessel type).

The recreational swordfish fishery has been managed through the use of a minimum size requirement and landings requirement (swordfish may be headed and gutted but may not be cut into smaller pieces). However, regulations effective March 2003 (68 FR 711) established a recreational retention limit of one swordfish per person up to three per vessel per day. Regardless of the length of a trip, no more than the daily limit of North Atlantic swordfish can be possessed onboard a vessel.

The recreational shark fishery is managed using bag limits, minimum size requirements, and landing requirements (sharks must be landed with head and fins attached). Additionally, the possession of 19 species of sharks is prohibited.

Atlantic blue and white marlin have a combined landings limit (i.e., a maximum of 250 fish that can be landed per year); however, the primary management strategy for the recreational billfish fishery is through the use of minimum size limits. There are no recreational retention limits for Atlantic sailfish, blue marlin, and white marlin. Recreational anglers may not land longbill spearfish.

ICCAT has made several recommendations to recover billfish resources throughout the Atlantic Ocean that are discussed in detail in Section 3.1.2 of the Consolidated Atlantic Highly Migratory Species Fishery Management Plan (2006).

Recent Catch and Landings Data

The recreational landings database for HMS consists of information obtained through surveys including the Marine Recreational Fishery Statistics Survey (MRFSS), Large Pelagic Survey (LPS), Southeast Headboat Survey (HBS), Texas Headboat Survey, and Recreational Billfish Survey Tournament Data (RBS). Descriptions of these surveys, the geographic areas they include, and their limitations, are discussed in Section 2.6.2 of the 1999 FMP and Section 2.3.2 of the 1999 Billfish Amendment (REF?).

Reported domestic landings of Atlantic bluefin tuna (1983 through 1998) and BAYS tuna (1995 through 1997) were presented in Section 2.2.3 of the 1999 FMP. As landings figures for 1997 and 1998 were preliminary in the 1999 FMP, updated landings for recreational rod and reel fisheries are presented in Table 3.41 through 2004. Recreational landings of swordfish are monitored by the LPS and the MRFSS. However, because swordfish landings are considered rare events, it is difficult to extrapolate the total recreational landings from dockside intercepts.

An ad hoc committee of NMFS scientists reviewed the methodology and data used to estimate recreational landings of Atlantic HMS during 2004. The Committee was charged with reviewing the 2002 estimates of U.S. recreational landings of bluefin tuna, white marlin and blue marlin reported by NMFS to ICCAT. The committee was also charged with recommending methods to be used for the estimation of 2003 recreational fishery landings of bluefin tuna and marlin. Although the Committee discovered and corrected a few problems with the raw data from the LPS and the estimation program used to produce the estimates, the Committee concluded that the estimation methods for producing the 2002 estimates were consistent with methods used in previous years. The report of the Committee is available at: http://www.nmfs.noaa.gov/sfa/hms/Tuna/2002-2003_Bluefin-Marlin_Report-120304.pdf.

Table 5.3.9-7. Updated Domestic Landings for the Atlantic Tunas, Swordfish and Billfish Recreational Rod and Reel Fishery, 1997-2004 (mt ww)*. Sources: NMFS, 2004; NMFS, 2005. (Recreational shark landings are provided in Table 3.44 through Table 3.47). (get Word version table from HMS)

Atlantic Billfish Recreational Fishery

Due to the rare nature of billfish encounters and the difficulty of monitoring landings outside of tournament events, reports of recreational billfish landings are sparse. However, the Recreationa Billfish Survey (RBS) provides a preliminary source for analyzing recreational billfish landings. Table 5.3.9-8 documents the number of billfish landed in 1999 – 2004, as reported by the RBS.

Table 5.3.9-8. Preliminary RBS Recreational Billfish Landings in numbers of fish (calendar year). Source: NMFS Recreational Billfish Survey.

Species	1999	2000	2001	2002	2003	2004
Blue Marlin	172	117	75	84	96	110
White Marlin	36	8	22	33	20	25
Sailfish	30	18	11	14	24	9
Swordfish	-	-	0	16	48	168

In support of the sailfish assessment conducted at the 2001 SCRS billfish species group meeting, document SCRS/01/106 developed indices of abundance of sailfish from the U.S. recreational billfish tournament fishery for the period 1973 – 2000. The index of weight per 100 hours fishing was estimated from numbers of sailfish caught and reported in the logbooks submitted by tournament coordinators and NMFS observers under the RBS, as well as available size information. Document SCRS/01/138 estimated U.S. sailfish catch estimates from various recreational fishery surveys.

All recreational, non-tournament landings of billfish, including swordfish, must be reported within 24 hours of landing to NMFS by the permitted owner of the vessel landing the fish. This requirement is applicable to all permit holders, both private and charter/headboat vessels, not fishing in a tournament. In Maryland and North Carolina, vessel owners should report their billfish landings at state-operated landings stations. A landed fish means a fish that is kept and brought to shore. Due to large-scale non-compliance with the call-in requirement, the landings in Table 5.3.9-9 are considered a minimum estimate of the non-tournament landings of billfish.

Table 5.3.9-9. Number of billfish reported to NMFS via call-in system by fishing year, 2002-2005. Source: G. Fairclough, pers. comm.

Species	2002*	2003	2004	2005**
Blue Marlin	0	7	2	5
White Marlin	0	1	0	2
Sailfish	3	16	57	58
Swordfish	28	188	314	381

Based on a fishing year of June 1 – May 31.
* Reporting requirement did not go into effect until March 1, 2003
** 2005 landings as of May 16, 2006

Swordfish Recreational Fishery

The recreational swordfish fishery in the North Atlantic Ocean has been steadily expanding in recent years, probably due to increased availability of small swordfish and an increased interest in the sport. Fishermen typically fish off the east coast of Florida and off the coasts of New Jersey and New York. Fish have also occasionally been encountered on trips off Maryland and Virginia. In the past, the New York swordfish fishery occurred incidental to overnight yellowfin tuna trips. During the day, fishermen targeted tunas, while at night they fished deeper for swordfish. This appears to have evolved into a year-round directed fishery off Florida and a summer fishery off of New Jersey. The Florida fishery occurs at night with fishermen targeting swordfish using live or dead bait and additional attractants such as lightsticks, LED lights, and light bars suspended under the boat.

Historically, fishery survey strategies have not captured all landings of recreational handgear-caught swordfish. Although some handgear swordfish fishermen have commercial permits, many others land swordfish strictly for personal consumption. Therefore, NMFS published regulations to improve recreational swordfish monitoring and conservation. A trip limit of one swordfish per person, up to three per vessel, and mandatory reporting of all recreationally-landed swordfish and billfish via a toll-free call-in system became effective on March 2, 2003 (68 FR 711). Accordingly, all reported recreational swordfish landings are counted against the incidental swordfish quota.

Recreational fishing tournaments allow for the collection of a large volume of fishery-dependent data in a relatively short time period. Tournaments also provide a “snapshot” of the recreational fishery at a particular time and location. Analysis of tournament data collected over a period of years could provide valuable information regarding trends in the recreational swordfish fishery. A recent study documented recreational handgear-caught swordfish in three south Florida tournaments (J. Levesque, pers. comm.). The tournaments occurred from July through September 2002, two in Lighthouse Point and the other in Ft. Lauderdale. Data was obtained through direct at-sea observation, dockside interviews with anglers landing swordfish, and a telephone interview with a tournament organizer. A total of 156 vessels and between 468 – 624 individuals participated in the three tournaments.

Tournament caught swordfish reported to the RBS have increased in recent years. There were none reported in 2001, 16 in 2002, 48 in 2003, and 168 in 2004. While total tournament landings of swordfish are still low in terms of numbers of fish, it appears that as swordfish have recovered in the past few years, tournament landings of swordfish have increased.

<u>Shark Recreational Fishery</u>
Recreational landings of sharks are an important component of HMS fisheries. Recreational shark fishing with rod and reel is a popular sport at all social and economic levels, largely because the resource is accessible. Sharks can be caught virtually anywhere in salt water, depending upon the species. Recreational shark fisheries are oftentimes exploited in nearshore waters by private vessels and charter/headboats. However, there is also some shore-based fishing and some offshore fishing. The following tables provide a summary of landings for each of the three species groups. Amendment 1 to the 1999 Atlantic Tunas, Swordfish, and Shark FMP limited the recreational fishery to rod and reel and handline gear only.

Table 5.3.9-10. Estimates of Total Recreational Harvest of Atlantic Sharks: 1998-2004 (numbers of fish in thousands). Source: 1998-2000 (Cortés, pers. comm.); 2001-2004 (Cortés, 2005a; 2005b). Estimates for 2001-2004 do not include prohibited species.

Species Group	1998	1999	2000	2001	2002	2003	2004
LCS	169.6	92.3	131.5	127.9	76.3	86.1	66.3
Pelagic	11.8	11.1	13.3	3.8	4.7	4.3	5.1
SCS	175.1	125.7	197.8	211.6	154.6	134.7	128.5
Unclassified	8.0	6.9	11.0	22.2	5.3	18.1	27.3

Table 5.3.9-11. Recreational Harvest of Atlantic Large Coastal Sharks (LCS) by Species, in number of fish: 1998-2004. Sources: 1998-2000 (Cortés, pers. comm.); 2001-

2004 (Cortés, 2005a; 2005b). Total estimates for 2001-2004 do not include prohibited species.

LCS Species	1998	1999	2000	2001	2002	2003	2004
Basking**	0	0	0	0	0	0	0
Bignose*	0	0	0	0	0	0	71
Bigeye sand tiger**	0	0	0	0	0	0	0
Blacktip	83,045	35,585	69,668	48,757	38,237	40,442	31,197
Bull	1,663	3,150	6,116	4,151	1,893	3,344	4,885
Caribbean Reef*	74	3	122	0	741	0	692
Dusky*	4,499	5,570	2,501	5,583	1,047	2,731	0
Galapagos*	0	0	0	0	0	0	0
Hammerhead, Great	476	388	925	3,382	4	68	9
Hammerhead, Scalloped	2,052	1,367	3,433	1,087	1,061	2,816	714
Hammerhead, Smooth	375	1	2	703	2	1	0
Hammerhead, Unclassified	390	75	3,675	0	5,293	0	0
Lemon	2,161	173	2,785	5,488	3,454	4,879	5,710
Night*	133	50	24	0	0	0	0
Nurse	2,455	1,503	2,233	3,672	2,680	647	3,594
Sandbar	35,766	20,602	10,878	36,094	8,324	5,185	3,843
Sand tiger**	0	0	0	604	0	0	0
LCS Species	1998	1999	2000	2001	2002	2003	2004
Silky	5,376	3,863	5,120	3,808	1,780	1,998	502
Spinner	10,805	6,361	5,402	3,651	3,835	4,460	3,380
Tiger	1,380	153	1,480	758	170	110	1
Whale**	0	0	0	0	0	0	0
White**	0	0	0	0	0	0	0
Large Coastal Unclassified	18,979	13,444	17,102	16,211	9,535	22,086	12,466
Total:	169,62	92,288	131,466	134,045	76,294	86,036	66,301

* indicates species that were prohibited in the recreational fishery as of July 1, 1999.

Table 5.3.9-12. Recreational Harvest of Atlantic SCS by Species, in number of fish: 1998-2004. Source: 1998-2000 (Cortés, pers. comm.); 2001-2004 (Cortés, 2005a; 2005b). Total estimates for 2001-2004 do not include prohibited species.

SCS Species	1998	1999	2000	2001	2002	2003	2004
Atlantic Angel*	110	0	0	0	0	0	0
Blacknose	10,523	6,049	9,795	15,179	11,416	6,705	15,126
Bonnethead	29,147	38,835	56,142	58,511	50,903	39,863	42,354
Finetooth	139	78	1,438	6,701	2,942	1,774	581
Sharpnose, Atlantic	135,137	80,694	130,371	131,165	89,365	86,340	70,469
Sharpnose, Caribbean*	0	0	0	0	0	0	0
Smalltail*	0	4	26	26	0	0	11
Total:	175,056	125,660	197,772	211,582	154,626	134,682	128,530

* indicates species that were prohibited in the recreational fishery as of July 1, 1999.

Allowable gear

5.3.9.2 Economic and social description

Commercial fisheries

In 2003, the total commercial landings at ports in the 50 states by U.S. fishermen were 9.5 billion pounds valued at $3.3 billion. In 2004, the total commercial landings at ports in the 50 states by U.S. fishermen were 9.6 billion pounds and were valued at $3.7 billion. The overall value of landings between 2003 and 2004 had increased by nine percent. The total value of commercial HMS landings in 2004 was $43.9 million (Table 3.77). The 2004 ex-vessel price index indicated that 12 of the 17 finfish species tracked had increasing ex-vessel prices and five species had decreasing ex-vessel prices since 2003. The total edible finfish ex-vessel price index for 2004 was up eight percent from 2003.

The estimated value of the 2004 domestic production of all fishery products was $6.6 billion. This is $909 million less than the estimated value in 2003. The total import value of fishery products was $22.9 billion in 2004. This is an increase of $1.7 billion from 2003. The total import value in 1996 was $13.1 billion. The total export value of fishery products was $13.6 billion in 2004. This is an increase of $1.6 billion from 2003. The total export value in 1996 was $8.7 billion.

Consumers spent an estimated $61.9 billion for fishery products in 2004 including $42.8 billion at food service establishments, $18.9 billion in retail sales for home consumption, and $213.3 million for industrial fish products. The commercial marine fishing industry contributed $31.6 billion to the U.S. Gross National Product in 2004. In 1996, consumers spent an estimated $41.2 billion including $27.8 billion at food service establishments, $13.2 billion for home consumption, and $283.9 billion for industrial fish products. The commercial marine fishing industry contributed $21.0 billion to the U.S. Gross National Product in 1996.

<u>Ex-Vessel Prices</u>

The average ex-vessel prices per pound dressed weight (dw) for 1996 and 1999 to 2004 by area, Atlantic HMS, and major gear types are summarized in Table 5.3.9-13. The average ex-vessel prices per lb dw for 1996 and 1999 to 2004 by species and area are summarized in Table 5.3.9-14. For both of these tables, prices are reported in nominal dollars. The ex-vessel price depends on a number of factors including the quality of the fish (e.g., freshness, fat content, method of storage), the weight of the fish, the supply of fish, and consumer demand.

Table 5.3.9-13. Average ex-vessel prices per lb dw for Atlantic HMS by gear and area. Source: Dealer weighout slips from the Southeast Fisheries Science Center and Northeast Fisheries Science Center, and bluefin tuna dealer reports from the Northeast Regional Office. HND=Handline, harpoon, spears, trot lines, and trolls, PLL=Pelagic longline, BLL=Bottom longline, Net=Gillnets and pound nets, TWL=Trawls, SEN=Seines, TRP=Pots and traps, DRG=Dredge, and UNK=Unknown. Gulf of Mexico includes: TX, LA, MS, AL, and the west coast of FL. S. Atlantic includes: east coast of FL. GA, SC, and NC dealers reporting to Southeast Fisheries Science Center. Mid-Atlantic includes: NC dealers reporting to Northeast Fisheries Science Center, VA, MD, DE, NJ, NY, and CT. N. Atlantic includes: RI, MA, NH, and ME. For bluefin tuna, all NC landings are included in the Mid-Atlantic. (get Word Table from HMS)

Table 5.3.9-14. Average ex-vessel prices per lb for Atlantic HMS by area. (get Word table from HMS)

Table 5.3.9-14 and 5.3.9-15 indicate that the average ex-vessel prices for bigeye tuna have generally increased since 1996. Prices from 2003 to 2004 have increased in all four regions. The gears used also influenced the average price of bigeye tuna.

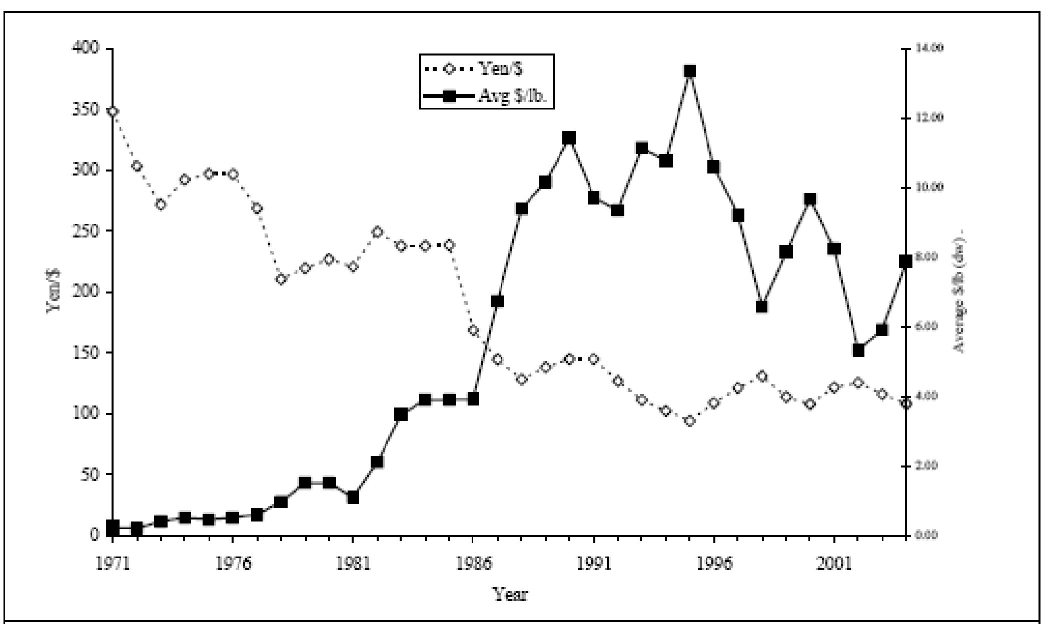


Figure 5.3.9-3. Average Annual Yen/$ Exchange Rate and Average U.S. bluefin tuna. Ex-vessel $/lb (dw) for all gears: 1971-2003. Source: Federal Reserve Bank (www.stls.frb.org) and Northeast Regional Office.

Average ex-vessel prices for bluefin tuna have generally declined since 1996. Since 2002, however, prices increased in all regions except the North Atlantic (Table 5.3.9-14, 5.3.9-15). The gear used also made a difference in the ex-vessel price (Table 5.3.9-13). In the North Atlantic and Mid-Atlantic, bluefin tuna caught with handgear had higher average prices than those caught with longline. This trend has been fairly consistent over the years between 1996 and 2004. The ex-vessel prices for bluefin tuna can be influenced by many factors, including market supply and the Japanese Yen/U.S. Dollar (¥/$) exchange rate. Figure 5.3.9-3 shows the average ¥/$ exchange rate, plotted with average ex-vessel bluefin tuna prices, from 1971 to 2003.

The average ex-vessel prices for yellowfin tuna have increased in 2004 in the Gulf of Mexico, Mid-Atlantic and North Atlantic while increasing slightly in the South Atlantic (Table 5.3.9-14). Yellowfin tuna caught with longline gear had higher average ex-vessel prices than fish caught with other gear types in 2004 (Table 5.3.9-13). The average ex-vessel price for other tunas decreased in all regions except the Gulf of Mexico in 2004 (Table 5.3.9-14). The average price of other tunas is lowest in the South Atlantic compared to other regions. The type of gear used did not appear to consistently influence the average ex-vessel prices of other tuna.

Average ex-vessel prices for swordfish increased in 2004 in all regions (Table 5.3.9-14). Swordfish caught using handline gear had higher average ex-vessel prices than other gear types, except in the Mid-Atlantic where it was trawls (Table 5.3.9-13).

The average ex-vessel price for LCS slightly decreased in the Gulf of Mexico in 2004 and North Atlantic. However, prices for LCS increased in the Mid-Atlantic and South Atlantic (Table 5.3.9-14).

The average ex-vessel prices for pelagic sharks increased in the Mid-Atlantic and North Atlantic regions in 2004 (Table 5.3.9-14), while prices decreased in Gulf of Mexico and South Atlantic. The 2004 prices for pelagic sharks are not significantly different than 1996 prices and are actually lower than 1996 when adjusting for inflation. The average ex-vessel prices for small coastal sharks (SCS) rebounded in all regions in 2004 (Table 5.3.9-14). Gear type did not consistently affect ex-vessel price of small coastal sharks in 2004 (Table 5.3.9-14).

Revenues

Table 5.3.9-14 summarizes the average annual revenues of the Atlantic HMS fishery based on average ex-vessel prices and the weight reported landed as per the U.S. National Report (NMFS 2005), the Shark Evaluation Reports, information given to ICCAT (Cortes, 2005), as well as price and weight reported to the NMFS Northeast Regional Office by Atlantic bluefin tuna dealers. These values indicate that the estimated total annual revenue of Atlantic HMS fisheries has decreased 34 percent from approximately

$66.4 million in 1996 to approximately $43.9 million in 2004. From 2003 to 2004, the tuna fishery's total revenue decreased significantly. A majority of that decrease can be attributed to reduced commercial landings of bluefin tuna and yellowfin tuna. From 2003 to 2004, the annual revenues from shark decreased by over 21 percent. In contrast, the annual revenues from swordfish from 2003 to 2004 increased by five percent after having been in decline for several years.

Table 5.3.9-15. Estimates of the total ex-vessel annual revenues of Atlantic HMS fisheries. Sources: NMFS, 1997; NMFS 2004a; Cortes, 2003; and bluefin tuna dealer reports from the Northeast Regional Office. (get Word table from HMS)

Wholesale Market

Currently, NMFS does not collect wholesale price information from dealers. However, the wholesale price of some fish species is available off the web (http://www.st.nmfs.gov/st1/market_news/index.html). The wholesale prices presented in Table 5.3.9-15 are from the annual reports of the Fulton Fish Market. As with ex-vessel prices, wholesale prices depend on a number of factors including the quality of the fish, the weight of the fish, the supply of fish, and consumer demand.

As reported by the Fulton Fish Market, Table 5.3.9-16 indicates that the average wholesale price of HMS sold in Atlantic and Gulf of Mexico states generally decreased from 1996 to 2003, except for blacktip shark. Prices have appeared to have rebounded in 2004, breaking from the declining trend. During that same period, the wholesale price of swordfish weighing over 100 pounds decreased 19 percent, swordfish weighing between 50 and 99 pounds decreased 25 percent, and swordfish cuts decreased 15 percent. The wholesale price of blacktip shark increased 27 percent from 1996 to 2003, with most of the increase occurring in 2003. The wholesale price of mako shark decreased 14 percent from 1996 to 2003, however 2003 wholesale prices were up from 2002. The wholesale price of thresher shark has decreased 22 percent from 1996 to 2003. Wholesale yellowfin tuna prices have remained relatively stable from 1996 to 2003. The yellowfin tuna wholesale price of #2 quality fish had decreased eight percent while the price of #2 cuts has increased seven percent from 1996 to 2003. Bigeye tuna wholesale prices from 1999 to 2003 have increased significantly for both high grade cuts and fish.

Table 5.3.9-16. The overall average wholesale price per lb of fresh HMS sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market. Source: NMFS, 2004.

Species	Description	1996 Price/lb	1999 Price/lb	2000 Price/lb	2001 Price/lb	2002 Price/lb	2003 Price/lb	2004 Price/lb
Blacktip	-	$1.05	$1.04	$1.04	$1.05	$1.00	$1.33	$1.08
Mako	-	$2.77	$2.74	$3.18	$3.00	$2.00	$2.37	$2.24
Thresher	-	$1.00	$0.91	$0.82	$1.25	$1.25	$0.78	$1.24
Swordfish	100# and up	$6.28	$5.26	$5.26	$5.42	$5.19	$5.08	$5.66
	50-99#	$6.02	$4.54	$4.72	$4.81	$4.59	$4.50	$5.15
	26-49#	$5.50	$3.36	$3.58	$4.05	$3.50	-	$3.25
	Cuts	$7.74	$6.55	$6.54	$6.73	$6.84	$6.55	$7.13
Yellowfin tuna	#1: BTF	$7.00	$5.97	$5.69	$5.50	$7.42	-	$6.00
	#1: Cuts	$9.38	$8.23	$8.00	$8.23	$10.67	-	$8.50
	#2: BTF	$5.00	$4.24	$4.36	$3.97	$4.92	$4.60	$4.62
	#2: Cuts	$6.52	$6.22	$6.20	$6.00	$7.29	$6.98	$7.32
	#3: BTF	-	$3.00	-	-	-	$2.50	-
	#3: Cuts	-	$4.50	-	-	-	-	$3.00
Bigeye tuna	#1: BTF	-	$4.00	-	-	-	$6.50	$7.75
	#1: Cuts	-	$5.50	-	-	-	$8.50	$11.00
	#2: BTF	-	$4.26	-	-	-	-	-
	#2: Cuts	-	$6.00	-	-	-	-	-

Note: #'s indicate quality (1 is highest, 3 is lowest); BTF is by the fish.

Recreational fisheries

Although NMFS believes that recreational fisheries have a large influence on them economies of coastal communities, NMFS has only recently been able to gather additional information on the costs and expenditures of anglers or the businesses that rely on them.

An economic survey done by the U.S. Fish and Wildlife Service2 in 2001 found that for the entire United States 9.1 million saltwater anglers (including anglers in state waters) went on approximately 72 million fishing trips and spent approximately $8.4 billion (USFWS, 2001). Expenditures included lodging, transportation to and from the coastal community, vessel fees, equipment rental, bait, auxiliary purchases (e.g., binoculars, cameras, film, foul weather clothing, etc.), and fishing licenses (USFWS, 2001). Saltwater anglers spent $4.5 billion on trip-related costs and $3.9 billion on equipment (USFWS, 2001). Approximately 76 percent of the saltwater anglers surveyed fished in their home state (USFWS, 2001). The next USFWS survey was conducted in 2006.

Specific information regarding angler expenditures for trips targeting HMS species was extracted from the recreational fishing expenditure survey add-on (1998 in the Northeast, 1999 – 2000 in the Southeast) to the National Marine Fisheries Service's Marine Recreational Fisheries Statistics Survey (MRFSS). These angler expenditure data were analyzed on a per-person per trip-day level and reported in 2003 dollars. The expenditure data include the costs of tackle, food, lodging, bait, ice, boat fuel, processing, transportation, party/charter fees, access/boat launching, and equipment rental. The overall average expenditure on HMS related trips is estimated to be $122 per person per day. Specifically, expenditures are estimated to be $686 per person per day on billfish directed trips (based on a low sample size), $85 on pelagic shark directed trips, $95 on large coastal shark directed trips, $81 on small coastal sharks, and $106 on tuna trips.

The American Sportfishing Association (ASA) also has a report listing the 2001 economic impact of sportfishing on specific states. This report states that all sportfishing (in both Federal and state waters) has an overall economic importance of $116 billion dollars (ASA, 2001). Florida, Texas, North Carolina, New York, and Alabama are among the top ten states in terms of overall economic impact for both saltwater and freshwater fishing (ASA, 2001). Florida is also one of the top states in terms of economic impact of saltwater fishing with $2.9 billion in angler expenditures, $5.4 billion in overall economic impact, $1.5 billion in salaries and wages related to fishing, and 59,418 fishing related jobs (ASA, 2001). California followed Florida with $0.8 billion in angler expenditures, $1.7 billion in overall economic impact, $0.4 billion in salaries and wages, and 15,652 jobs (ASA, 2001). Texas and New Jersey were the next highest states in terms of economic impact (ASA, 2001).

At the end of 2004, NMFS began collecting market information regarding advertised charterboat rates. This preliminary analysis of the data collected includes 99 observations of advertised rates on the internet for full day charters. Full day charters vary from six to 14 hours long with a typical trip being 10 hours. Most vessels can accommodate six passengers, but this also varies from two to 12 passengers. Table 3.79 summarizes the average charterboat rate for full day trips on vessels with HMS Charter/Headboat permits. The average price for a full day boat charter was $1,053 in 2004. Sutton et al., (1999) surveyed charterboats throughout Alabama, Mississippi, Louisiana, and Texas in 1998 and found the average charterboat base fee to be $762 for a full day trip. Holland et al. (1999) conducted a similar study on charterboats in Florida, Georgia, South Carolina, and North Carolina and found the average fee for full day trips to be $554, $562, $661, and $701, respectively. Comparing these two studies conducted in the late 1990s to the average advertised daily HMS charterboat rate in 2004, it is apparent that there has been a significant gain in charterboat rates.

Table 5.3.9-17. Average Atlantic HMS charterboat rates for day trips. Source: NMFS searches for advertised daily charter rates of HMS Charter/Headboat permit holders. (Observations=99)

State	2004 Average Daily Charter Rate
AL	$1,783
CT	$1,500
DE	$1,060
FL	$894
LA	$1,050
MA	$777
MD	$1,167
ME	$900
NC	$1,130
NJ	$1,298
NY	$1,113
RI	$917
SC	$1,300
TX	$767
VA	$825
Overall Average	**$1,053**

In 2003, Ditton and Stoll published a paper that surveyed the literature regarding what is currently known about the social and economic aspects of recreational billfish fisheries. It was estimated that 230,000 anglers in the United States spent 2,136,899 days fishing for billfish in 1991. This is approximately 3.6 percent of all saltwater anglers over age 16.

The states with the highest number of billfish anglers are Florida, California, North Carolina, Hawaii, and Texas in descending order. Billfish anglers studied in the U.S. Atlantic, Puerto Rico, and Costa Rica fished between 39 and 43 days per year.

Billfish recreational anglers tend to spend a great deal of money on trips. Ditton and Stoll (2003) report that a 1990 study of U.S. total trip costs for a typical billfish angler estimated a mean expenditure of $2,105 per trip for the Atlantic and $1,052 per trip for Puerto Rico. The aggregate economic impact of billfish fishing trips in the U.S. Atlantic is conservatively estimated to be $22.7 million annually.

In addition to the economic impact of recreational billfish angling, Ditton and Stoll (2003) report that using a contingent valuation method they estimated consumer's surplus or net economic benefit to maintain current billfish populations in the U.S. Atlantic to be $497 per billfish angler per year in the U.S. Atlantic and $480 in Puerto Rico. They also estimate that the number of annual billfish anglers in the U.S. Atlantic to be 7,915 and 1,627 in Puerto Rico. The aggregate willingness-to-pay for maintaining current billfish populations is $3.93 million in the U.S. Atlantic and 0.78 million in Puerto Rico. The aggregate direct impact of billfish expenditures is estimated to be $15.13 million for the U.S. Atlantic and $32.40 million for Puerto Rico. Thus, the total aggregate economic value of billfish angler fishing is $19.06 million per year for the U.S. Atlantic and $33.18 million per year for Puerto Rico.

Generally, HMS tournaments last from three to seven days, but lengths can range from one day to an entire fishing season. Similarly, average entry fees can range from approximately $0 to $5,000 per boat (average approximately $500/boat – $1,000/boat), depending largely upon the magnitude of the prize money that is being awarded. The entry fee would pay for a maximum of two to six anglers per team during the course of the tournament. Additional anglers can, in some tournaments, join the team at a reduced rate of between $50 and $450. The team entry fee did not appear to be directly proportional to the number of anglers per team, but rather with the amount of money available for prizes and, possibly, the species being targeted. Prizes may include citations, T-shirts, trophies, fishing tackle, automobiles, boats, or other similar items, but most often consists of cash awards. In general, it appears that billfish and tuna tournaments charge higher entry fees and award more prize money than shark and swordfish tournaments, although all species have a wide range.

Cash awards distributed in HMS tournaments can be quite substantial. Several of the largest tournaments, some of which are described below, are part of the World Billfish Series Tournament Trail whereby regional winners are invited to compete in the World Billfish Series Grand Championship for a new automobile and a bronze sculpture. Other tournament series include the International Game Fish Association (IGFA) Rolex Tournament of Champions, and the South Carolina Governor's Cup. White marlin is a top billfish species from Cape Hatteras, North Carolina to the eastern tip of Georges Bank from June through October each year. The White Marlin Open in Ocean City, Maryland, which is billed as the "world's richest fishing tournament," established a new world record payout for catching a fish when it awarded $1.32 million in 2004 to the vessel catching the largest white marlin. The 21st Annual Pirates Cove Billfish Tournament in North Carolina awarded over $1 million in prizes in 2004, with the top boat garnering over $400,000 for winning in six categories. Total prize money awarded in the Big Rock Tournament in North Carolina has exceeded $1 million since 1998.

Blue marlin, sailfish, and tunas are also often targeted in fishing tournaments, including those discussed above. In 2004, blue marlin was the HMS most frequently identified as a prize category in registered HMS tournaments. Forty-five teams participated in the 2004 Emerald Coast Blue Marlin Classic at Sandestin, Florida, with over $482,000 in cash prizes and the top boat receiving over $58,000. The 34th Annual Pensacola (Florida) International Billfish Tournament indicated that it would award over $325,000 in cash and prizes in 2004. The World Sailfish Championship in Key West, Florida has a $100,000 guaranteed first prize for 2005. In South Carolina, the Megadock Billfishing Tournament offers a $1,000,000 prize for any boat exceeding the current blue marlin state record. The 2004 Florida Billfish Masters Tournament in Miami, Florida awarded over $123,000 in prize money, with the top boat receiving over $74,000. Sixty-two boats competed in the 2003 Babylon Tuna Club Invitational in Babylon, New York for over $75,000 in cash prizes, and the Mid-Atlantic Tuna Tournament sponsored by the South Jersey Marina in Cape May, New Jersey anticipates awarding over $25,000 in prizes in 2005.

Several tournaments target sharks. Many shark tournaments occur in New England, New York, and New Jersey, although other regions hold shark tournaments as well. In 2004, the 24th Annual South Jersey Shark Tournament hosted over 200 boats and awarded over $220,000 in prize money, with an entry fee of $450 per boat. The "Mako Fever" tournament, sponsored by the Jersey Coast Shark Anglers, in 2004 awarded over $55,000 in prizes, with the first place vessel receiving $25,000. In 2004, the 18th Annual Monster Shark Tournament in Martha's Vineyard, Massachusetts was broadcast on ESPN, and featured a new fishing boat valued at over $130,000 awarded to the winner.

Swordfish tournaments have gained increased popularity in recent years, especially on the east coast of Florida, as the swordfish population has recovered. Events include the Islamorada Swordfish Tournament that began in 2004, and the Miami Swordfish Tournament that began in 2003. Both of these tournaments anticipated awarding over $30,000 in total cash and prizes, assuming that 50 boats would participate.

In addition to official prize money, many fishing tournaments may also conduct a "calcutta" whereby anglers pay from $200 to $5,000 to win more money than the advertised tournament prizes for a particular fish. Tournament participants do not have to enter calcuttas. Tournaments with calcuttas generally offer different levels depending upon the amount of money an angler is willing to put down. Calcutta prize money is distributed based on the percentage of the total amount entered into that Calcutta. Therefore, first place winner of a low level calcutta (entry fee ~$200) could win less than a last place winner in a high level calcutta (entry fee ~$1000). On the tournament websites, it was not always clear if the total amount of prizes distributed by the tournament included prize money from the calcuttas or the estimated price of any equipment. As such, the range of prizes discussed above could be a combination of fish prize money, Calcutta prize money, and equipment/trophies.

Fishing tournaments can sometimes generate a substantial amount of money for surrounding communities and local businesses. Besides the entry fee to the tournament and possibly the calcutta, anglers may also pay for marina space and gas (if they have their own vessel), vessel rental (if they do not have their own vessel), meals and awards dinners (if not covered by the entry fee), hotel, fishing equipment, travel costs to and from the tournament, camera equipment, and other miscellaneous expenses. Fisher and Ditton (1992) found that the average angler who attended a billfish tournament spent $2,147 per trip (2.59 days), and that billfish tournament anglers spent an estimated $180 million (tournament and non-tournament trips) in 1989. Ditton and Clark (1994) estimated annual expenditures for Puerto Rican billfish fishing trips (tournaments and non-tournaments) at $21.5 million. More recently, Ditton, et al., (2000) estimated that the total expenditure (direct economic impact) associated with the 1999 Pirates Cove Billfish Tournament, not including registration fees, was approximately $2,072,518.

The total expenditure (direct economic impact) associated with the 2000 Virginia Beach Red, White, and Blue Tournament was estimated at approximately $450,359 (Thailing, et al., 2001). These estimated direct expenditures do not include economic effects that may ripple through the local economy leading to a total impact exceeding that of the original purchases by anglers (i.e., the multiplier effect). Less direct, but equally important, fishing tournaments may serve to generally promote the local tourist industry in coastal communities. In a survey of participants in the 1999 Pirates Cove Billfish Tournament, Ditton, et al., (2000) found that almost 80 percent of tournament anglers were from outside of the tournament's county. For this reason, tourism bureaus, chambers of commerce, resorts, and state and local governments often sponsor fishing tournaments.

Social and cultural environment

This section consolidates all of the community profiles from previous HMS management plans or amendments and updates the community information, where possible. To ensure continuity with the 1999 HMS FMP and previous amendments, if a community was selected and described as being involved with an HMS fishery, the same community was included in this assessment. The communities profiled were originally selected due to the proportion of HMS landings, the relationship between the geographic communities and the fishing fleets, the existence of other community studies, and input from the HMS and Billfish Advisory Panels. The communities selected for detailed study are Gloucester and New Bedford, Massachusetts; Barnegat Light and Brielle, New Jersey; Wanchese, and Hatteras Township, North Carolina; Pompano Beach, Fort Pierce, Madeira Beach, Panama City Beach, and Islamorada, Florida; Boothville/Venice and Dulac, Louisiana; and Arecibo, Puerto Rico. These communities are not intended to be an exhaustive list of every HMS-related community in the United States; rather the objective is to give a broad perspective of representative areas.

The demographic profiles found in the 2006 Consolidated Atlantic Highly Migratory Species FMP have been modified to include the same baseline information for each community profiled; as a result, most of the tables include more information than portrayed in the 1999 HMS FMP and its amendments. The demographic tables still use both 1990 and 2000 Bureau of the Census data for comparative purposes. The descriptive community profiles include the same information provided by the Wilson, et al. (1998) and Kirkley (2005) analyses with some new information provided by Impact Assessment, Inc (2004) on the Gulf of Mexico communities. Unlike the Wilson, et al., (1998) study used in the 1999 HMS FMP, it was not possible to undertake field research for this assessment.

This assessment also reviewed the HMS permit databases to incorporate information about residence. This information was also used to identify additional HMS-related fishing communities that should be profiled in the future. Six GIS maps were generated to identify the communities where angler, charter/headboat, HMS dealers (tunas, shark, and swordfish combined), commercial tuna (all gear categories combined), directed and incidental shark, and swordfish (directed, incidental, and handgear combined) permit holders reside (Figure 9.1 to Figure 9.6 in the 2006 Consolidated FMP). In past community profile and social impact analyses, it was difficult to identify where recreational HMS fishermen were located because no data were available for the number of recreational fishermen, as well as recreational landings by community. Previous social impact assessments report on charter fishing operations, fishing tournaments, and related activities to identify the scope of recreational fishing for each of the communities described. The information provided by the HMS permit databases should facilitate the identification of recreational HMS communities that should be profiled in the future.

For future social impact analyses, the HMS permit databases, landings information, and HMS APs should be consulted to determine the most appropriate community profiles for HMS-related fisheries. The 2005 HMS permit data indicate that several new community profiles should be developed and some of the previously profiled communities may no longer be as significantly involved in the fishery as they were in the past (Figure 9.1 to Figure 9.6).

Wakefield, Rhode Island should be considered due to the number of commercial tuna and swordfish permit holders in the area. Montauk, New York has a large concentration of charter/headboat, commercial tuna, and HMS dealer permit holders in the community. A large number of Cape May, New Jersey residents hold an HMS angling, charter/headboat, shark and/or swordfish permits. Morehead City, North Carolina is home to a number of HMS angling, charter/headboat, and commercial tuna permit holders. Each of these towns is actively involved with more than one sector of the HMS fisheries and therefore be impacted be any changes to HMS regulations.

5.3.9.3 Bycatch

Pelagic Longline Fishery

NMFS collects data on the disposition (released alive or dead) of bycatch species from logbooks submitted by fishermen in the pelagic longline fishery. Observer reports also include disposition of the catch as well as information on hook location, trailing gear and injury status of protected species interactions. These data are used to estimate post-release mortality of sea turtles and marine mammals based on guidelines for each (Angliss and DeMaster 1998, Ryder et al. 2006).

Marine Mammals

Of the marine mammals that are hooked by U.S. pelagic longline fishermen, many are released alive, although some animals suffer serious injuries and may die after being released. The observed and estimated marine mammal interactions for 1992 – 2005 are summarized in Table 5.3.9-17 and Table 5.3.9-18. Marine mammals are caught primarily during the third and fourth quarters in the Mid-Atlantic Bight (MAB) and Northeast Coastal (NEC) areas (Table 5.3.9-18). In 2005, the majority of observed interactions were with pilot whales in the MAB area (Walsh and Garrison, 2006).

In 2000, there were 14 observed takes of marine mammals by pelagic longlines. This number has been extrapolated based on reported fishing effort to an estimated 403 mammals fleet-wide (32 common dolphin, 93 Risso's dolphin, 231 pilot whales, 19 whales, 29 pygmy sperm whales) (Yeung, 2001). In 2001 and 2002, there were 16 and 24 observed takes of marine mammals, respectively. The majority of these interactions were observed in the MAB, followed by the Northeast Distant (NED) research experiment. In 2001, there were an estimated total of 84 Risso's dolphin and 93 pilot whale interactions in the pelagic longline fishery. In 2002, there were an estimated 87 Risso's dolphin and

114 pilot whale interactions in the pelagic longline fishery. In the NED research experiment, an additional four Risso's dolphin and one northern bottlenose whale were recorded with serious injuries during 2001, as well as three Risso's dolphin, one unidentified dolphin, and one unidentified marine mammal in 2002. One striped dolphin was recorded as released alive during the NED experiment in 2001, as well as one Risso's dolphin, one common dolphin, one pilot whale, and one unidentified dolphin in 2002 (Garrison, 2003).

In 2003, there were 28 observed takes of marine mammals in the pelagic longline fishery. The majority of these interactions were observed in the MAB, followed by the NED experimental fishery, and the NEC area. This number has been extrapolated based on reported fishing effort to an estimated 300 mammals fleet wide (49 beaked whales, 16 dolphin, 30 Atlantic spotted dolphin, 46 common dolphin, 105 Risso's dolphin, 32 pilot whales, 22 minke whales). In addition, five Risso's dolphin, one striped dolphin, and one baleen whale were observed captured in the 2003 NED research experiment, with one Risso's dolphin recorded as dead (Garrison and Richards, 2004).

There were a total of 12 observed interactions with marine mammals in the pelagic longline fishery in 2004. The majority of these interactions was with pilot whales and was observed in the MAB area. During 2004, the pelagic longline fishery was estimated to have interacted with 108 pilot whales, 49 Risso's dolphins, and seven common dolphins (Garrison, 2005). In 2005, there were a total of 24 observed interactions with marine mammals in the pelagic longline fishery. The majority of these interactions was with pilot whales and was observed in the MAB area. During 2005, the pelagic longline fishery was estimated to have interacted with 294 pilot whales, 42 Risso's dolphin, six common dolphin, five bottlenose dolphin, four Atlantic spotted dolphin, one beaked whale, 13 unidentified marine mammals, three unidentified whales, and three unidentified dolphin (Walsh and Garrison, 2006). NMFS monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for appropriate action, if any, as necessary. In June 2005, NMFS convened the Pelagic Longline Take Reduction Team (PLTRT) to assess and reduce marine mammal takes, specifically pilot whales and Risso's dolphins, by the pelagic longline fishery. At the time of writing, the Pelagic Longline Take Reduction Plan (PLTRP) was expected to be finalized soon.

Table 5.3.9-18. Summary of Marine Mammal Interactions in the Pelagic Longline Fishery, 1992-1998. Source: Yeung, 1999a; Yeung, 1999b.

Year	Species	Total		Mortality		Alive	
		Obs	Est	Obs	Est	Obs	Est
1992	Risso's Dolphin	3	121	2	74	1	47
	Common Dolphin	1	24			1	24
	Dolphin	1	17			1	17
	Pilot Whale	12	420	3	105	9	319
1993	Risso's Dolphin	3	62	1	36	2	26
	Bottlenose Dolphin	2	29			2	29
	Pilot Whale	16	193	1	15	15	178
	Spotted Dolphin	1	11			1	11
1994	Atlantic Spotted Dolphin	1	17	1	17		
	Pantropical Spotted Dolphin	1	20			1	20
	Killer Whale	1	16	1	16		
	Pilot Whale	14	161	12	137	2	26
	Risso's Dolphin	7	87	7	87		
1995	Risso's Dolphin	5	101	4	85	1	16
	Unidentified Marine Mammal	1	22			1	22
	Pilot Whale	13	252	11	200	2	53
	Shortfin Pilot Whale	2	58	2	58		
1996	Risso's Dolphin	4	99	2	52	2	47
	Unidentified Marine Mammal	1	43			1	43
1997	Pilot Whale	1	29			1	29
	Short-Beaked Spinner Dolphin	1	16			1	16
1998	Beaked Whale	1	88			1	88
	Bottlenose Dolphin	2	46	1	31	1	15
	Risso's Dolphin	2	47	1	23	1	24
	Pilot Whale	1	24			1	24

Table 5.3.9-19. Summary of Marine Mammal Interactions in the Pelagic Longline Fishery, 1999-2005. Sources: Yeung, 2001; Garrison, 2003; Garrison and Richards, 2004; Garrison, 2005; Walsh and Garrison, 2006.

Year	Species	Total		Mortality		Serious Injury		Alive	
		Obs	Est	Obs	Est	Obs	Est	Obs	Est
1999	Risso's Dolphin	1	23			1	23		
	Unidentified Marine Mammal	1	14					1	14
	Pilot Whale	5	385	1	94	4	291		
2000	Common Dolphin	1	32					1	32
	Risso's Dolphin	3	93	1	41	1	23	1	29
	Pilot Whale	8	231	1	24	4	109	3	98
	Whale	1	19			1	19		
	Pygmy Sperm Whale	1	28			1	28		
2001	Risso's Dolphin	8	83.6	1	24.4	6	48.9	1	14.3
	Pilot Whale	6	92.9	1	19.8	4	50.2	1	22.7
	Striped Dolphin	1	1					1	1
	Northern Bottlenose Whale	1	1			1	1		
2002	Risso's Dolphin	10	87.2			4	11	6	59.6
	Pilot Whale	10	113.5			4	49.9	6	67.8
	Common Dolphin	1	1					1	1
	Unidentified Dolphin	2	2			1	1	1	1
	Unidentified Marine Mammal	1	1			1	1		
2003	Beaked Whale	2	48.8			1	5.3	1	43.5
	Dolphin	1	16.2			1	16.2		
	Atlantic Spotted Dolphin	1	29.8			1	29.8		
	Bottlenose Dolphin	1	2					1	2
	Common Dolphin	2	45.6					2	45.6
	Risso's Dolphin	14	109.5	1	1	3	40.1	10	68.4
	Striped Dolphin	1	1					1	1
	Pilot Whale	4	32.1			2	21.4	1	11.3
	Baleen Whale	1	1					1	1
	Minke Whale	1	22.3					1	22.3
2004	Pilot Whale	8	107.5			6	74.1	2	33.8
	Common Dolphin	1	6.8					1	6.8
	Risso's Dolphin	3	49.4			2	27.5	1	21.9
2005	Pilot Whale	18	294.4			9	211.5	9	79.5
	Risso's Dolphin	2	42.1				2.9	2	39.2
	Common Dolphin		5.7						5.7
	Bottlenose Dolphin	1	5.2					1	5.2
	Beaked Whale		1				1		
	Atlantic Spotted Dolphin	1	4.3					1	4.3
	Unidentified Marine Mammal	1	13.2			1	13.2		
	Unidentified Whale		3.4				3.4		
	Unidentified Dolphin	1	2.6					1	2.6

Sea Turtles

Currently, many sea turtles are taken in the GOM and NEC areas (Table 5.3.9-18) and most are released alive. In the past, the bycatch rate was highest in the third and fourth quarters.

Loggerhead and leatherback turtles dominate the catch of sea turtles. In general, sea turtle captures are rare, but takes appear to be clustered (Hoey and Moore, 1999).

The estimated take levels for 2000 were 1,256 loggerhead and 769 leatherback sea turtles (Yeung, 2001). The estimated sea turtle takes for regular fishing and experimental fishing effort for 2001 - 2005 are summarized in Table 5.3.9-19. The majority of leatherback interactions have occurred in the Gulf of Mexico. Loggerhead interactions are more widely distributed, however, the NEC, FEC, and Gulf of Mexico appear to be areas with high interaction levels each year.

In 2005, the pelagic longline fishery interacted with an estimated 351 leatherback sea turtles and 275 loggerhead sea turtles outside of experimental fishing operations. During 2005, the interactions with leatherback sea turtles were highest in the Gulf of Mexico (179 animals). The majority of loggerhead sea turtle interactions occurred in the NEC, MAB, CAR, SAR, and SAB areas (Walsh and Garrison, 2006). NMFS monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for appropriate action, if any, as necessary.

Table 5.3.9-20. Estimated number of leatherback and loggerhead sea turtle interactions in the U.S. Atlantic pelagic longline fishery, 2001-2005 by statistical area. Sources: Walsh and Garrison, 2006; Garrison, 2005; Garrison and Richards, 2004; Garrison 2003.

	Leatherback					Loggerhead				
Area	**2001**	**2002**	**2003**	**2004**	**2005**	**2001**	**2002**	**2003**	**2004**	**2005**
CAR	61	0	0	17	2	27	43	36	61	40
GOM	393	695	838	780	179	0	170	135	45	19
FEC	313	100	27	64	62	0	99	137	99	0
SAB	241	93	75	164	7	39	22	52	194	34
MAB	139	70	94	184	11	43	94	18	92	54
NEC	30	5	76	33	6	117	147	241	150	67
NED	32	0	0	98	63	72	0	0	52	20
SAR	0	0	0	18	20	0	0	70	41	38
NCA	1	0	2	0	0	13	0	39	0	3
TUN	0	0	0	0	0	0	0	0	0	0
TUS	0	0	0	0	0	0	0	0	0	0
Total	1208	962	1113	1359	351	312	575	728	734	275
NED exp'tal fishery (2001-03)	77	158	79	--	--	142	100	92	--	--
Exp'tal fishery (2004-05)	--	--	--	3	17	--	--	--	0	8
Total	1285	1120	1192	1362	368	454	675	820	734	283

As a result of the increased sea turtle interactions in 2001 and 2002, NMFS reinitiated consultation for the pelagic longline fishery and completed a new BiOp on June 1, 2004. The June 2004 BiOp concluded that long-term continued operation of the Atlantic pelagic longline fishery is not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles, but is likely to jeopardize the continued existence of leatherback sea turtles. The BiOp included a reasonable and prudent alternative (RPA) and an incidental take statement (ITS) for the combined years 2004 – 2006, and for each subsequent three-year period (NMFS, 2004b).

A final rule published in July 2004 (69 FR 40734) prohibited the possession of "J"-style hooks in the pelagic longline fishery and required the possession and use of specific sea turtle release and disentanglement gears, handling and release protocols, as well as requiring the use of specific circle hooks and baits.

NED Research Experiment

Consistent with the conservation recommendation of an earlier, 2001 BiOp, NMFS initiated a research experiment in the Northeast Distant (NED) area in consultation and cooperation with the domestic pelagic longline fleet. The goal was to develop and evaluate the efficacy of new technologies and changes in fishing practices to reduce sea turtle interactions. In 2001, the experiment attempted to evaluate the effect of gangions placed two gangion lengths from floatlines, the effect of blue-dyed bait on target catch and sea turtle interactions, and the effectiveness of dipnets, line clippers, and dehooking devices. Eight vessels participated, making 186 sets, between August and November.

During the course of the research experiment, 142 loggerhead and 77 leatherback sea turtles were incidentally captured and no turtles were released dead. The data gathered during the 2001 experiment were analyzed to determine if the tested measures reduced the incidental capture of sea turtles by a statistically significant amount. The blue-dyed bait parameter decreased the catch of loggerheads by 9.5 percent and increased the catch of leatherbacks by 45 percent. Neither value is statistically significant. In examining the gangion placement provision, the treatment sections of the gear (with gangions placed 20 fathoms from floatlines) did not result in a statistically significant reduction in the number of loggerhead and leatherback sea turtle interactions than the control sections of the gear (with a gangion located under a floatline). The treatment section of the gear recorded an insignificant increase in the number of leatherback interactions. Following an examination of the data, NMFS discovered that the measures had no significant effect upon the catch of sea turtles (Watson et al., 2003).

Dipnets and line clippers were examined for general effectiveness. The dipnets were found to be adequate in boating loggerhead sea turtles. Several line clippers were tested, with the La Force line clipper having the best performance. Several types of dehooking devices were tested, with the work on these devices continuing in the 2002 and 2003 NED research experiment.

In the summer and fall of 2002, NMFS conducted the second year of the research experiment. The use of circle and "J"-hooks, whole mackerel bait, squid bait, and shortened daylight soak time were tested to examine their effectiveness in reducing the capture of sea turtles. The data indicate there were 501 sets made by 13 vessels with 100 percent observer coverage. During the course of the experiment, 100 loggerhead and 158 leatherback sea turtles were captured and 11 were tagged with satellite tags. In addition to the sea turtles, the vessels interacted with one unidentified marine mammal, one unidentified dolphin, one common dolphin, one longfin pilot whale, and four Risso's dolphins; all were released alive (Watson et al., 2003).

In 2003, the research experiment tested a number of treatments to verify the results of the 2002 experiment in addition to testing additional treatments. Data indicate that there were 539 sets made by 11 vessels with 100 percent observer coverage. During the course of the experiment, one olive ridley, 92 loggerhead, and 79 leatherback sea turtles were captured; all were released alive (Foster et al., 2004; Watson et al., 2004). In addition to the sea turtles, the vessels interacted with one striped dolphin, one baleen whale, and five Risso’s dolphin resulting in one mortality (Garrison and Richards, 2004).

From 2001 through 2003, NMFS worked with the commercial fishing industry to develop new pelagic longline fishing technology to reduce interaction rates and bycatch mortality of threatened and endangered sea turtles. The cooperative gear technology research investigated line configurations, setting and retrieving procedures, hook types, hook sizes, bait types, and release and disentanglement gears. Ultimately, specific hook designs and bait types were found to be the most effective measures for reducing sea turtle interactions. Large circle hooks and mackerel baits were found to substantially reduce sea turtle interactions over the use of the industry standard “J”-hooks and squid baits. The gears developed to remove hooks and line from hooked and entangled sea turtles are anticipated to reduce post-hooking mortality associated with those interactions not avoided. Since the conclusion of the NED research experiment, NMFS has continued to investigate pelagic longline bycatch mitigation techniques in the Gulf of Mexico, Atlantic Ocean and the Caribbean Sea.

Additionally, NMFS held a series of voluntary workshops for U.S. pelagic longline fishermen providing outreach and training in sea turtle handling and release techniques. NMFS believes that the transfer of this information to other fishing countries will result in significant reductions in interaction rates and post-release mortalities of threatened and endangered sea turtles throughout their ranges.

Seabirds

Gannets, gulls, greater shearwaters, and storm petrels are occasionally hooked by Atlantic pelagic longlines. These species and all other seabirds are protected under the Migratory Bird Treaty Act. Seabird populations are often slow to recover from excess mortality as a consequence of their low reproductive potential (one egg per year and late sexual maturation). The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line. The line then sinks and the birds are subsequently drowned.

The United States has developed a National Plan of Action in response to the Food and Agriculture Organization of the United Nations (FAO) International Plan of Action to reduce the incidental takes of seabirds (www.nmfs.gov.gov/NPOA-S.html). Although Atlantic pelagic longline interactions will be considered in the plan, NMFS has not identified a need to implement gear modifications to reduce seabird takes by Atlantic pelagic longlines. Takes of seabirds have been minimal in the fishery, most likely due to the setting of longlines at night and/or fishing in areas where birds are largely absent. Observer data from 1992 through 2005 indicate that seabird bycatch is relatively low in the U.S. Atlantic pelagic longline fishery (Table 5.3.9-20). Since 1992, a total of 129 seabird interactions have been observed, with 95 observed killed (73.6 percent). In 2005, a total of four seabirds were observed taken.

Observed bycatch has ranged from one to 18 seabirds observed dead per year and zero to 15 seabirds observed released alive per year from 1992 through 2003. Half of the seabirds observed were not identified to species (n = 59). Of the seabirds identified, gulls represent the largest group (n = 35), followed by greater shearwaters (n = 23), and northern gannets (n = 8) (Table 5.3.9-21). Greater shearwaters experienced the highest mortality (96.2 percent), followed by gulls (80 percent), and unidentified seabirds (67.8 percent). Northern gannets had the lowest mortality rate (12.5 percent).

Preliminary estimates of expanded seabird bycatch and bycatch rates from 1995 – 2004, varied by year and species with no apparent pattern. The estimated number of all seabirds caught and discarded dead ranged from zero to 468 per year, while live discards ranged from zero to 292 per year. The annual bycatch rate of birds discarded dead ranged from zero to 0.0486 birds per 1,000 hooks, while live discards ranged from zero to 0.0303 birds per 1,000 hooks.

Table 5.3.9-21. Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery, 1992-2005. Source: NMFS, 2004a; NMFS PLL fishery observer program (POP) data.

Year	Month [1]	Area	Type of Bird	Number observed	Status
1992	10	MAB	GULL	4	dead
1992	10	MAB	SHEARWATER GREATER	2	dead
1993	2	SAB	GANNET NORTHERN	2	alive
1993	2	MAB	GANNET NORTHERN	2	alive
1993	2	MAB	GULL BLACK BACKED	1	alive
1993	2	MAB	GULL BLACK BACKED	3	dead
1993	11	MAB	GULL	1	alive
1994	6	MAB	SHEARWATER GREATER	3	dead
1994	8	MAB	SHEARWATER GREATER	1	dead
1994	11	MAB	GULL	4	dead
1994	12	MAB	GULL HERRING	7	dead
1995	7	MAB	SEA BIRD	5	dead
1995	8	GOM	SEA BIRD	1	dead
1995	10	MAB	STORM PETREL	1	dead
1995	11	NEC	GANNET NORTHERN	2	alive
1995	11	NEC	GULL	1	alive
1997	6	SAB	SEA BIRD	11	dead
1997	7	MAB	SEA BIRD	1	dead
1997	7	NEC	SEA BIRD	15	alive
1997	7	NEC	SEA BIRD	6	dead
1998	2	MAB	SEA BIRD	7	dead
1998	7	NEC	SEA BIRD	1	dead
1999	6	SAB	SEA BIRD	1	dead
2000	6	SAB	GULL LAUGHING	1	alive
2000	11	NEC	GANNET NORTHERN	1	dead
2001	6	NEC	SHEARWATER GREATER	7	dead
2001	7	NEC	SHEARWATER GREATER	1	dead
2002	7	NEC	SEABIRD	1	dead
2002	8	NED	SHEARWATER GREATER	1	dead
2002	8	NED	SEABIRD	1	dead
2002	9	NED	SHEARWATER GREATER	3	dead
2002	9	NED	SEABIRD	3	alive
2002	9	NED	SHEARWATER SPP	1	dead
2002	10	NED	GANNET NORTHERN	1	alive

Year	Month [1]	Area	Type of Bird	Number observed	Status
2002	10	NED	SHEARWATER SPP	1	dead
2002	10	NED	SEABIRD	2	dead
2002	10	MAB	GULL	3	alive
2002	10	MAB	GULL	1	dead
2002	11	MAB	GULL	3	dead
2003	1	GOM	SEABIRD	1	alive
2003	8	NED	SEABIRD	1	dead
2003	9	MAB	SEABIRD	1	dead
2004	1	MAB	GULL	5	dead
2004	3	MAB	GREATER SHEARWATER	1	alive
2004	3	MAB	GREATER SHEARWATER	4	dead
2004	4	NED	SEABIRD	1	dead
2005	1	SAB	HERRING GULL	1	dead
2005	1	SAB	SHEARWATER	1	dead
2005	3 [2]	NEC	GREATER SHEARWATER	1	alive
2005	3 [2]	NEC	GREATER SHEARWATER	1	dead

1 Beginning in 2004, reports based on Quarters not month.
2 Experimental fishery takes.

Table 5.3.9-22. Status of Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery, 1992-2005. Source: NMFS PLL fishery observer program (POP) data.

Species	Release Status		Total	Percent Dead
	Dead	Alive		
GULLS (incl. Blackback, Herring, Laughing, and unid. gulls)	28	7	34	80%
UNIDENTIFIED SEABIRD	40	19	59	67.8%
GREATER SHEARWATER	22	1	23	95.6%
SHEARWATER SPP	3	0	3	100%
NORTHERN GANNET	1	7	8	12.5%
STORM PETREL	1	0	1	100%
TOTAL ALL SEABIRDS	95	34	129	73.6%

Finfish

In the U.S. pelagic longline fishery, fish are discarded for a variety reasons. Swordfish, yellowfin tuna, and bigeye tuna may be discarded because they are undersized or unmarketable (e.g., shark bitten). Blue sharks, as well as other species, are discarded because of a limited markets (resulting in low prices) and perishability of the product. Large coastal sharks are discarded during times when the shark season is closed. Bluefin tuna may be discarded because target catch requirements for other species have not been met. Also, all billfish are required to be released. In the past, swordfish have been discarded when the swordfish season was closed.

Reported catch from 1999 – 2004 for the U.S. pelagic longline fishery (including reported bycatch, incidental catch, and target catch) is summarized in Table 5.3.9-2**.** Additional U.S. landings and discard data are available in the 2005 U.S. National Report to ICCAT (NMFS, 2005).

At this time, direct use of observer data with pooling for estimating dead discards in this fishery represents the best scientific information available for use in stock assessments. Direct use of observer data has been employed for a number of years to estimate dead discards in Atlantic and Pacific longline fisheries, including billfish, sharks, and undersized swordfish. Furthermore, the data have been used for scientific analyses by both ICCAT and the Inter- American Tropical Tuna Commission (IATTC) for a number of years.

Bycatch mortality of marlins, swordfish, and bluefin tuna from all fishing nations may significantly reduce the ability of these populations to rebuild, and it remains an important management issue. In order to minimize bycatch and bycatch mortality in the domestic pelagic longline fishery, NMFS implemented regulations to close areas to this gear type (Figure 5.3.9-4) and has banned the use of live bait by pelagic longline vessels in the Gulf of Mexico.

As part of the bluefin tuna rebuilding program, ICCAT recommends an allowance for dead discards. The U.S. annual dead discard allowance is approximately 68 mt ww. The estimate for the 2004 calendar year was used as a proxy to calculate the amount to be added to, or subtracted from, the U.S. bluefin tuna landings quota for 2005. The 2004 calendar year preliminary estimate of U.S. dead discards, as reported per the longline discards calculated from logbook tallies, adjusted as warranted when observer counts in quarterly/geographic stratum exceeded logbook reports, totaled 72 mt ww. Estimates of dead discards from other gear types and fishing sectors that do not use the pelagic longline vessel logbook are unavailable at this time, and thus, are not included in this calculation. As U.S. fishing activity is estimated to have exceeded the approximate 68 mt ww dead discard allowance by approximately 4.0 mt, the ICCAT recommendation and U.S. regulations state that the United States must account for this excess. Therefore, NMFS shall subtract the amount in excess (approximately 4.0 mt) from the amount of bluefin tuna that can be landed in the subsequent fishing year by those categories accounting for the dead discards.

The 2005 calendar year preliminary dead discard estimate is not yet available. The 2004 calendar year preliminary dead discard estimate, as reported in pelagic longline vessel logbooks and published in 2005 Final Initial Quota Specifications (70 FR 33033, June 7, 2005), totaled 71.8 mt ww. This preliminary estimate has been revised using the longline discards calculated from logbook tallies, adjusted as warranted when observer counts in stratum exceeded logbook reports. The revised 2004 calendar year dead discard estimate is 72.0 mt ww.

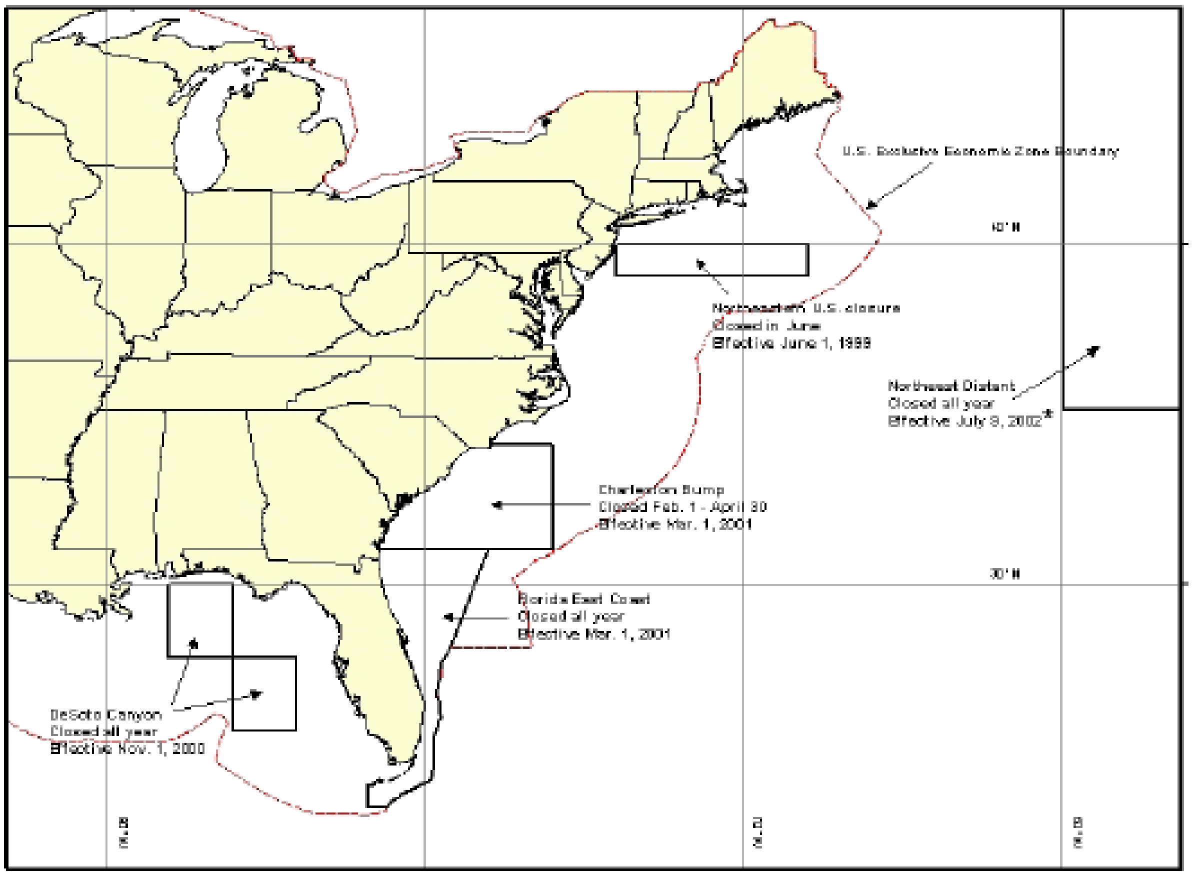


Figure 5.3.9-4. Areas Closed to Pelagic Longline Fishing by U.S. Flagged Vessels

Purse Seine Fishery

NMFS has limited observer data on the bluefin tuna purse seine fishery. There are no recorded instances of non-tuna finfish, other than minimal numbers of blue sharks, caught in tuna purse seines. Anecdotal evidence indicates that if fish are discarded, they are easily released out of the net with minimal bycatch mortality.

Commercial Handgear Fishery

Vessels targeting bluefin tuna with harpoon gear have not been selected for observer coverage since the deliberate fishing nature of the gear is such that bycatch is expected to be low. Therefore, there are no recorded instances of non-target finfish caught with harpoons and NMFS cannot quantify the bycatch of undersized bluefin tuna in this fishery. Bycatch in the swordfish harpoon fishery is virtually if not totally, non-existent. Since bycatch approaches zero in this fishery, it follows that bycatch mortality is near zero. Disposition of bycatch reported in logbooks is used to estimate mortality of bycatch in the hook and line handgear fisheries.

Bottom longline fishery

Under the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361 et seq.) the Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities), and the shark bottom longline as Category III (remote likelihood or no known serious injuries or mortalities) (July 20, 2004, 69 FR 43338). On October 29, 2003, NMFS issued a biological opinion (BiOp) pursuant to the Endangered Species Act (ESA) regarding Atlantic shark fisheries. This BiOp concluded that the level of anticipated take in the Atlantic shark fishery resulting from measures implemented in Amendment 1 to the 1999 FMP (68 FR 74746), were not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles, the endangered smalltooth sawfish, or the threatened loggerhead sea turtle. Furthermore, it concluded that the actions in the rule were not likely to adversely affect marine mammals. As a result of this conclusion, NMFS (NMFS, 2003) anticipates that the continued operation of the shark bottom longline fishery will result in a five year total incidental take of the following numbers of sea turtles: Leatherback – 172; loggerhead – 1,370; a total of 30 in any combination of hawksbill, green, and Kemp's ridley sea turtles. NMFS also anticipates a five year take of 261 smalltooth sawfish, of which no lethal takes are expected. If the actual calculated incidental captures or mortalities exceed the incidental take statement, a formal consultation for that gear type must be re-initiated immediately. More information is available in Amendment 1 to the 1999 FMP and the October 2003 BiOp and is not repeated here.

Loggerhead Sea Turtles

In the bottom longline fishery, a total of 65 sea turtles were observed caught from 1994 through 2006 (Table 5.3.9-25, 5.3.9-26). Seasonal variation indicates that most of the sea turtles were caught early in the year. Of the 65 observed sea turtles, 50 were loggerhead sea turtles, of which 26 were released alive. Another nine loggerheads were released in an unknown condition and eight were released dead. Based on extrapolation of observer data in Amendment 1 to the 1999 FMP, it was estimated that a total of 2,003 loggerhead sea turtles were taken in the shark bottom longline fishery from 1994 through 2002 (NMFS, 2003a). An additional 503 unidentified sea turtles were estimated to have been taken. On average, 222 loggerhead sea turtles and 56 unidentified sea turtles were estimated to have been taken annually during this time period in the shark bottom longline fishery.

Leatherback Sea Turtles

Of the 65 observed sea turtle interactions in the bottom longline fishery from 1994 – 2006, six were leatherback sea turtles of which one was dead and three were released with their condition unknown (Table 5.3.9-25, 5.3.9-26). Based on extrapolation of observer data done for Amendment 1 to the FMP, it was estimated that 269 leatherback sea turtles were taken in the shark bottom longline fishery from 1994 through 2002 (NMFS, 2003a). On average, 30 leatherback sea turtle interactions occurred each year in the shark bottom longline fishery during this period. This analysis only estimates takes without discriminating between live and dead releases. Of the observed leatherback takes, approximately 25 percent were lethal.

Applying the observed mortality rate of 25 percent to the total leatherback takes and an additional 42 percent post-release mortality estimate due to hook ingestion to the remaining, results in an estimated total number of leatherbacks killed as a result of the interaction with bottom longline gear at 17 per year. The leatherback mortality is very conservative because it is known that leatherbacks rarely ingest or bite hooks, but are usually foul hooked on their flippers or carapaces, reducing the likelihood of post-hooking release mortality. However, leatherback-specific data for this fishery is not available and therefore the most conservative estimate is used.

Smalltooth Sawfish
As of April 1, 2003, NMFS listed smalltooth sawfish as an endangered species (68 FR 15674) under the ESA. After reviewing the best scientific and commercial information, the status review team determined that the continued existence of the U.S. Distinct Population Segment of smalltooth sawfish was in danger of extinction throughout all or a significant portion of its range from a combination of the following four listing factors: the present or threatened destruction, modification, or curtailment of habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence. NMFS is working on designating critical habitat for smalltooth sawfish.

Sawfish have been observed caught (12 known interactions, 11 released alive, one released in unknown condition) in shark bottom longline fisheries from 1994 through 2006 (Morgan pers. comm., Burgess and Morgan, 2004; Carlson). Based on these observations, expanded sawfish take estimates for 1994 – 2002 were developed for the shark bottom longline fishery (NMFS, 2003a). A total of 466 sawfish were estimated to have been taken in this fishery from 1994 – 2002, resulting in an average of 52 per year. All but one of the observed sawfish was released alive.

Marine Mammals
Four delphinids have been observed caught and released alive between 1994 and 2004 (G. Burgess, pers. comm.). Bycatch estimates for the shark bottom longline fishery have not been extrapolated for marine mammals.

Seabirds
Bycatch of seabirds in the shark bottom longline fishery has been virtually non-existent. A single pelican has been observed killed from 1994 through 2005. The pelican was caught in January 1995 off the Florida Gulf Coast (between 25° 18.68 N, 81° 35.47 W and 25° 19.11 N, 81° 23.83 W) (G. Burgess, University of Florida, pers. comm., 2001). No expanded estimates of seabird bycatch or catch rates are available for the bottom longline fishery.

Table 5.3.9-23. Species composition of observed bottom longline catch during 2003. Source: Burgess and Morgan, 2004.

Species	Total Number Caught	% Total Catch	% Management Category
Dusky shark	108	1.22	1.78
Silky shark	105	1.18	1.73
Lemon shark	60	0.68	0.99
Great hammerhead	55	0.62	0.91
Bignose shark	8	0.09	0.13
Night shark	8	0.09	0.13
White shark	3	0.03	0.05
Caribbean shark	1	0.01	0.02
Total	6072	68.41	100
Small Coastal Sharks			
Atlantic sharpnose shark	1996	22.49	80.32
Blacknose shark	484	5.45	19.48
Bonnethead	3	0.03	0.12
Finetooth	2	0.02	0.08
Total	2485	28.00	100.00
Pelagic Sharks			
Sevengill	5	0.06	45.45
Shortfin mako	2	0.02	18.18
Bigeye sixgill	2	0.02	18.18
Bigeye thresher shark	1	0.01	9.09
Sixgill shark	1	0.01	9.09
Total	11	0.12	100.00
Dogfish/Other Sharks			
Smooth dogfish	298	3.36	
Unidentified sharks	10	0.113	
Species	**Total Number Caught**	**% Total Catch**	**% Management Category**
Large Coastal Sharks			
Sandbar shark	2719	30.63	44.78
Blacktip shark	1232	13.88	20.29
Tiger shark	665	7.49	10.95
Spinner shark	309	3.48	5.09
Scalloped hammerhead	259	2.92	4.27
Bull shark	257	2.90	4.23
Nurse shark	175	1.97	2.88
Sand tiger	108	1.22	1.78

Table 5.3.9-24. Species composition of observed bottom longline catch during 2004.

Species	Total Number Caught	% Total Catch	% Management Category
Dusky shark	54	0.7	1.0
Night shark	42	0.5	0.8
Lemon shark	17	0.2	0.3
Sandtiger shark	12	0.1	0.2
Bignose shark	5	0.1	0.1
Total	5415	66.7	100
Small Coastal Sharks			
Atlantic sharpnose shark	2231	27.5	85.8
Blacknose shark	353	4.3	13.6
Bonnetheat shark	10	0.1	0.4
Finetooth shark	5	0.1	0.2
Total	2599	32.0	100
Pelagic Sharks			
Sevengill shark	2	0.02	25.0
Sixgill shark	1	0.01	12.5
Shortfin mako shark	3	0.01	37.5
Bigeye thresher shark	2	0.02	25.0
Total	8	0.1	100
Dogfish Sharks			
Smooth dogfish	85	1.0	97.7
Spiny dogfish	2	0.02	2.3
Total	87	1.1	100
Other Sharks			
Unidentified	5	0.1	71.4
Carcharhinus sp.	2	0.02	28.6
Total	7	0.1	100

Species	Total Number Caught	% Total Catch	% Management Category
Large Coastal Sharks			
Sandbar shark	2157	26.6	39.8
Blacktip shark	1107	13.6	20.4
Tiger shark	972	12.0	18.0
Nurse shark	440	5.4	8.1
Silky shark	254	3.1	4.7
Scalloped hammerhead	155	1.9	2.9
Bull shark	108	1.3	2.0
Great hammerhead	92	1.1	1.7

Table 5.3.9-25. Total number of Observed Sea Turtle Interactions by Species by Month for Years 1994-2006 in the Shark Bottom Longline Fishery. Source: Shark Bottom Longline Observer Program.

Month	Leatherback Sea Turtle	Loggerhead Sea Turtle	Other Sea Turtles	Total
Jan	1	12	1	14
Feb	3	10	6	19
Mar		7		7
Apr		4		4
May	1			1
Jun				
July		11		11
Aug		3		3
Sept	1	2	1	4
Oct		1	1	2
Nov				
Dec				
Total	6	50	9	65

Table 5.3.9-26. Total number of Observed Sea Turtle Interactions by Year for Years 1994-2006 in the Shark Bottom Longline Fishery. Source: Shark Bottom Longline Observer Program. Letters in parentheses indicate whether the sea turtle was released alive (A), dead (D), or in an unknown (U) condition.

Year	Leatherback Sea Turtle	Loggerhead Sea Turtle	Other Sea Turtle	Total
1994	1 (1U)	5 (5U)	6 (6U)	12
1995		4 (3A, 1D)		4
1996	1 (1U)	6 (3A, 2D, 1U)		7
1997	1 (1U)	5 (3A, 2U)		6
1998		2 (1A, 1D)	1 (1A)	3
1999		2 (2A)		2
2001	1 (1D)	2 (2A)		3
2002		5 (3A, 1D, 1U)		5
2003		7 (6A, 1D)	1 (1U)	8
2004		5 (3A, 2D)		5
2005	2 (1A, 1D)	4 (1A, 3D)	1 (1U)	7
2006		2 (1D, 1U)		3
Total	6	50	9	65

Gillnet fishery

On September 23, 2002, NMFS implemented a restricted area to reduce bycatch of right whales from November 15 through March 31 (67 FR 59471). In this area, only gillnets used in a strikenet fashion can operate during times when right whales are present.

Operation in this area at that time requires 100 percent observer coverage. Vessels fishing in a strikenet fashion used nets 364.8 meters long, 30.4 meters deep, and with mesh size 22.9 cm. Observed catch in the strikenet fishery consisted of 6 species of sharks (96.7 percent of total number caught) and seven species of teleosts and rays (3.3 percent of total number caught). No marine mammals or sea turtles were observed caught. The blacktip shark made up 97.5 percent of the number of sharks caught, and 86 percent of the overall catch. Bycatch included crevalle jack, red drum, and great barracuda (Table 5.3.9-27).

There were 23 species of teleosts, two species of rays, and one species of marine mammal observed caught during the driftnet season (Table 5.3.9-29). Four species of teleosts and rays made up 90.8 percent by number of the overall non-shark species in observed strikenet catches. These species were little tunny (45.6 percent); king mackerel (23.3 percent); great barracuda (11.8 percent); and red drum (10.2 percent). For incidental driftnet catch species, the highest proportion discarded dead (with observed catch greater than 10 specimens) was Atlantic sailfish, (100.0 percent), king mackerel (78.3 percent), and cobia (28.7 percent). Red drum had the highest discard proportion alive (98.1 percent) (Carlson and Baremore, 2003). Observed driftnet sets caught 23 species of teleosts and rays and no sea turtles or marine mammals. Only the great barracuda were retained, with all remaining bycatch discarded alive (Carlson, 2002).

Outside of right whale calving season, observed drift gillnet catch consisted of 26 species of teleosts and rays and one species of marine mammal, which was discarded dead. Five species of teleosts and one species of ray made up 90.6 percent by number of the overall non-shark catch. Little tunny (44.1 percent), king mackerel (20.8 percent), great barracuda (12.5 percent), Atlantic moonfish (9.4 percent), and cobia (3.8 percent) dominated the bycatch (Carlson and Baremore, 2002). During drift gillnet fishing, the highest proportion of species discarded dead (for species with greater than 10 individuals) was for tarpon, crevalle jack, king mackerel, and red drum. Cownose rays and red drum had the highest proportion of discarded alive with 78.1 percent and 50.0 percent, respectively (Carlson and Baremore, 2002).

On January 22, 2006, a dead right whale was spotted offshore of Jacksonville Beach, Florida. The survey team identified the whale as a right whale calf, and photos indicated the calf as having one large wound along the midline and smaller lesions around the base of its tail. The right whale calf was located at 30°14.4' N. Lat., 81° 4.2'' W. Long., which was approximately 1nautical mile outside of the designated right whale critical habitat, but within the Southeast U.S. Restricted Area. NMFS determined that both the entanglement and death of the whale occurred within the Southeast U.S. Restricted Area, and all available evidence suggested the entanglement and injury of the whale by gillnet gear ultimately led to the death of the animal.

On February 16, 2006, NMFS published a temporary rule (71 FR 8223) to prohibit, through March 31, 2006, any vessel from fishing with any gillnet gear in the Atlantic Ocean waters between 32°00' N. Lat. (near Savannah, GA) and 27°51' N. Lat. (near Sebastian Inlet, FL) and extending from the shore eastward out to 80°00' W. long under the authority of the Atlantic Large Whale Take Reduction Plan (ALWTRP) (50 CFR 229.32 (g)) and the Endangered Species Act. NMFS took this action based on its determination that a right whale mortality was the result of an entanglement by gillnet gear within the Southeast U.S. Restricted Area.

The regulations at 50 CFR 229.32(g)(1) also require NMFS to close the Southeast U.S. Restricted Area for the rest of the time period, and for the time period November 15 through March 31 in each subsequent year, unless NMFS revises the restricted period or unless other measures are implemented. NMFS plans to seek assistance and recommendations from the ALWTRT at their next meeting in order to evaluate whether permanent closures within the Southeast U.S. Restricted Area are necessary.

Loggerhead Sea Turtles
Loggerhead sea turtles are rarely caught in the shark gillnet fishery. During the 1999 right whale calving season, no loggerhead sea turtles were observed caught in this fishery (Carlson and Lee, 1999), and no loggerheads were observed caught with strikenets during the 2000 – 2002 right whale calving seasons (Carlson 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a). However, three loggerhead sea turtles were observed caught with drift gillnets during right whale calving season, one each year from 2000 to 2002 (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a; Garrison, 2003). In 2004 there were no observed sea turtle interactions in either the strikenet or drift gillnet fisheries.

No loggerhead sea turtles were caught outside of the right whale calving season in 2002 (Carlson and Baremore, 2002b), and no loggerhead turtles were observed caught during or after the right whale calving season in 2003 or 2004 in the directed shark gillnet fishery (Carlson and Baremore 2003; Carlson, pers. comm). In 2005 five loggerheads were observed caught, and in 2006 three loggerheads were observed caught (Table 5.3.9-30). All but two were released alive. One loggerhead sea turtle mortality was reported in abandoned fishing gear in January 2004, and was not considered part of normal fishing operations.

Leatherback Sea Turtles
In the shark gillnet fishery, leatherback sea turtles are sporadically caught. During the 1999 right whale calving season, two leatherback sea turtles were caught in this fishery, and both were released alive (Carlson and Lee, 1999). No leatherback sea turtles were observed caught with strikenets during the 2000 – 2002 right whale calving seasons (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a). Leatherback sea turtles have been observed caught in shark drift gillnets including 14 in 2001 and two in 2002 (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a; Garrison, 2003). NMFS temporarily closed the shark gillnet fishery (strikenetting was allowed) from March 9 to April 9, 2001, due to the increased number of leatherback interactions that year (66 FR 15045, March 15, 2001). From 2003 – 2004, no leatherback sea turtles were observed caught in gillnets fished in strikenet or driftnet methods (Carlson and Baremore 2003; Carlson, pers. comm.).

Smalltooth Sawfish

To date there has been only one observed catch of a smalltooth sawfish in shark gillnet fisheries (Table 5.3.9-25, 5.3.9-26). The sawfish was taken on June 25, 2003, in a gillnet off southeast Florida and was released alive (Carlson and Baremore, 2003). The set was characteristic of a typical drift gillnet set, with gear extending 30 to 40 feet deep in 50 to 60 feet of water. Prior to this event it was speculated that the depth at which drift gillnets are set above the sea floor may preclude smalltooth sawfish from being caught. Although sometimes described as a lethargic demersal species, smalltooth sawfish feed mostly on schooling fish, thus they would occur higher in the water column during feeding activity. In fact, smalltooth sawfish and Atlantic sharks may be attracted to the same schools of fish, potentially making smalltooth sawfish quite vulnerable if present in the area fished. The previous absence of smalltooth sawfish incidental capture records is more likely attributed to the relatively low effort in this fishery and the rarity of smalltooth sawfish, especially in Federal waters. These factors may result in little overlap of the species with the gear. The sawfish was cut from the net and released alive with no visible injuries. This indicates that smalltooth sawfish can be removed safely if entangled gear is sacrificed.

Given the high rate of observer coverage in the shark gillnet fishery, NMFS believes that smalltooth sawfish takes in this fishery are very rare. The fact that there were no smalltooth sawfish caught during 2001 when 100 percent of the fishing effort was observed indicates that smalltooth sawfish takes (observed or total) most likely do not occur on an annual basis. Based on this information, the 2003 BiOp estimated that one incidental capture of a sawfish (released alive) over the next five years, will occur as a result of the use of gillnets in this fishery (NMFS, 2003a).

Marine Mammals

Observed takes of marine mammals in the Southeast Atlantic shark gillnet fishery during 1999 – 2004, totaled 12 bottlenose dolphins and four spotted dolphins. Extrapolated observations from these data suggest serious injury and mortality of 25 bottlenose dolphin and one Atlantic spotted dolphin in the shark gillnet fishery from 1999 through 2002 (Garrison, 2003).

Table 5.3.9-27. Total Strikenet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2003. Source: Carlson and Baremore, 2003.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacktip shark	6,401	97.5	.6	1.9
Blacknose shark	343	100.0	0	0
Crevalle jack	215	96.2	3.3	.5
Red Drum	18	0	100	0
Great barracuda	13	92.3	0	7.7
Manta ray	10	0	100	0
Bull shark	8	75	12.5	12.5
Permit	8	50	37.5	12.5
Nurse shark	1	0	100	0
Spinner shark	1	100	0	0
Finetooth shark	1	100	0	0
Cobia	1	100	0	0
Atlantic bonito	1	0	0	100
Total	**7,021**			

Table 5.3.9-28. Total Shark Catch by Species and Species Disposition in Order of Decreasing Abundance for all Observed Driftnet Sets, 2003. Source: Carlson and Baremore, 2003.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose	6,917	99.8	0	.2
Blacknose	799	100	0	0
Finetooth	620	100	0	0
Blacktip	375	45	24	31
Bonnethead	168	100	0	0
Scalloped Hammerhead	62	3.2	0	96.8
Spinner	20	5	0	95
Great Hammerhead	6	100	0	0
Lemon	1	0	100	0
Total	**8,968**			

Table 5.3.9-29. Total bycatch in NMFS observed drift gillnet sets in order of decreasing abundance and species disposition for all observed trips, 2003. Source: Carlson, 2003.

Species	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)
Little tunny	1169	92.6	0	7.4
King mackerel	596	21.5	.2	78.3
Barracuda	300	100	0	0
Red drum	262	0	98.1	1.9
Cobia	80	70	1.3	28.7
Blackfin tuna	36	100	0	0
Atlantic sailfish	30	0	0	100
Cownose ray	22	0	59.1	40.9
Spanish mackerel	11	100	0	0
Remora	9	0	33.4	66.6
Crevalle jack	8	0	0	100
Blue runner	8	87.5	0	12.5
Tarpon	5	0	0	100
Manta ray	5	0	100	0
Dolphin	5	100	0	0
Tripletail	4	100	0	0
Spotted eagle ray	2	0	100	0
Blue marlin	2	0	0	100
Balloonfish	2	0	0	100
Wahoo	1	100	0	0
Pompano	1	100	0	0
Rainbow runner	1	100	0	0
Black drum	1	0	100	0
Bluefish	1	0	0	100

Table 5.3.9-30. Total number of Observed Sea Turtle Interactions by Year from 2000-2006 in the Shark Gillnet Fishery. Source: Directed Shark Gillnet Observer Program. Letters in parentheses indicate whether the sea turtle was released alive (A), dead (D), or unknown (U).

Year	Leatherback Sea Turtle	Loggerhead Sea Turtle	Total
2000		1 (U)	1
2001		1 (U)	1
2002		1 (U)	1
2003			0
2004			0
2005	1(A)	5 (4A, 1D)	6
2006		3 (2A, 1D)	3
Total	1	11	12

Table 5.3.9-31. Protected Species Interactions in Drift Gillnet Sets During the Directed Shark Gillnet Fishery for All Observed Trips, 2003. Source: Carlson, 2003.

Species	Total Number Caught	Released Alive	Discarded Dead	Released Condition Unknown or Comatose
Bottlenose dolphin	2	0	1	1
Smalltooth sawfish	1	1	0	0

Recreational fishery

Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen value the experience of fishing and may not be targeting a particular pelagic species. Recreational "marlin" or "tuna" trips may yield dolphin, tunas, wahoo, and other species, both undersized and legal sized. Bluefin tuna trips may yield undersized bluefin, or a seasonal closure may prevent landing of a bluefin tuna above a minimum or maximum size. In some cases, therefore, rod and reel catch may be discarded. The Magnuson-Stevens Act (16 USC 1802 (2)) stipulates that bycatch does not include fish under recreational catch-and-release.

The 1999 Billfish Amendment established a catch-and-release fishery management program for the recreational Atlantic billfish fishery. As a result of this program, all Atlantic billfish that are released alive, regardless of size, are not considered bycatch. NMFS believes that establishing a catch-and-release fishery in this situation will further solidify the existing catch-and-release ethic of recreational billfish fishermen, and thereby increase release rates of billfish caught in this fishery. Current billfish release rates range from 89 to 99 percent. The recreational white shark fishery is by regulation a catch-and-release fishery only and white sharks are not considered bycatch.

Bycatch can result in death or injury to discarded fish. Therefore, bycatch mortality should be incorporated into fish stock assessments, and into the evaluation of management measures. Rod and reel discard estimates from Virginia to Maine during June – October could be monitored through the expansion of survey data derived from the LPS (dockside and telephone surveys). However, the actual numbers of fish discarded for many species are so low that presenting the data by area could be misleading, particularly if the estimates are expanded for unreported effort in the future. The number of kept and released fish reported or observed through the LPS dockside intercepts for 1997 – 2004 is presented in Table 3.48.

Discard mortality

Post-release mortality studies have been conducted on few HMS at this time. Immediate mortality in recreational hook and line-caught juvenile bluefin tuna can be high (29.2 percent) due to injuries or predation (Belle, 1997). This is thought to be a conservative estimate because scientific personnel in the study were professionally trained and had extensive experience in fish handling techniques designed to reduce mortality. Mortality often occurs ten minutes or longer after the fish is released under normal circumstances. Injuries may not be readily apparent to the angler and seemingly minor capture injuries may be related to substantial internal injuries. Forty percent of sampled tuna that died during that study did not have injuries that would be apparent to the angler in the boat. Skomal and Chase (1996) provided evidence that the stress of rod and reel angling did not cause immediate post-release mortality in larger bluefin tuna (50 to 150 kg). However, they did document metabolic and pH disturbances in bluefin tuna sampled off Cape Hatteras, NC. The physiological consequences of angling stress are poorly understood for several species of large pelagic fishes (Skomal and Chase, 1996).

A study by Graves et al. (2002), investigated short-term (five days) post-release mortality of Atlantic blue marlin using pop-up satellite tag technology. A total of nine recreationally caught blue marlin were tagged and released during July and August of 1999. All hooks employed in the study were "J" hooks. The attached tags were programmed to detach from the fish after five days and to record direct temperature and inclination of the buoyant tag to determine if the fish were actively swimming after being released. After detachment, the tags floated to the surface and began transmitting recorded position, temperature and inclination data to satellites of the ArgosTM system. Three different lines of evidence provided by the tags (movement, water temperature, and tag inclination) suggested that at least eight of the nine blue marlin survived for five days after being tagged and released. One of the tags did not transmit any data which precluded the derivation of a conclusion regarding the tagged marlin's survival.

The study was continued in 2003 to evaluate post release survival and habitat use of white marlin using pop-up satellite archival tags (PSATs) caught and released from four locations in the western North Atlantic recreational fishery (Horodysky and Graves, 2005). Forty-one tags were attached to white marlin caught using dead baits rigged on straight shank ("J") hooks (n = 21) or circle hooks (n = 20) offshore of the U.S. Mid-Atlantic, the Dominican Republic, Mexico, and Venezuela. Survival was significantly higher ($p<0.01$) for white marlin caught on circle hooks (100 percent) relative to those caught on straight-shank ("J") hooks (65 percent). These results, along with previous studies on circle hook performance, suggest that a change in hook type can significantly increase the survival of white marlin released from recreational fishing gear. Data from these short term deployments also suggest that white marlin strongly associate with warm, near surface waters. However, based on the frequency, persistence, and patterns of vertical movements, white marlin appear to direct a considerable proportion of foraging effort well below surface waters, a behavior that may account for relatively high catch rates of white marlin on some pelagic longline sets. NMFS continues to support studies on recreational post-release mortality and intends to account for this source of mortality when additional information becomes available.

Outreach programs to address bycatch were included in the 1999 FMP and the Billfish Amendment. These programs have not yet been implemented, but the preparation of program designs is currently in progress. One of the key elements in the outreach program will be to provide information that leads to an improvement in post-release survival from both commercial and recreational gear. Additionally, an outreach program to encourage the use of circle hooks to increase post-release survival within HMS fisheries was introduced in a proposed rule published in 2001 (66 FR 66386, December 26, 2001). The final rule to promote the voluntary use of circle hooks published in 2003 (68 FR 711, January 7, 2003). Initial implementation of the outreach program began in 2004 with workshops conducted on the proper handling and release of sea turtles.

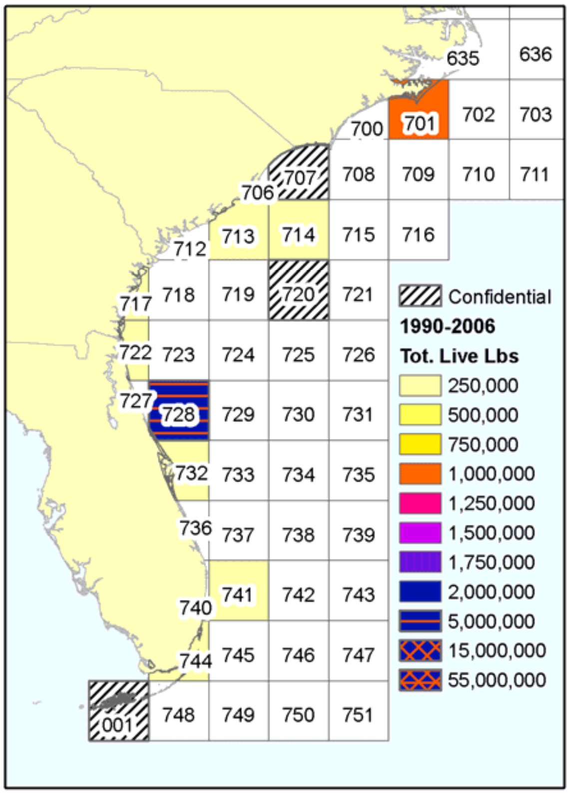
5.4 ACCSP Logbook Catches for South Atlantic Species 1990-2006

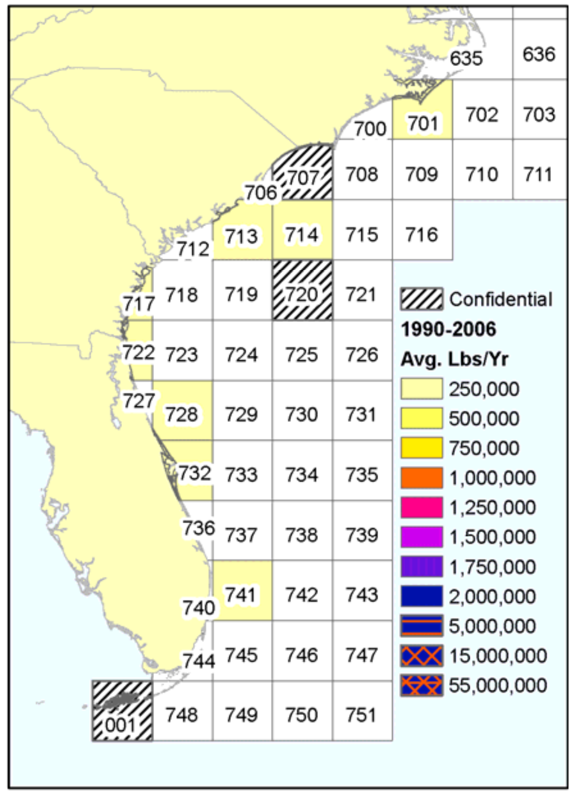
Common Name	**Species Name**
Almaco Jack	Seriola rivoliana
Atlantic Spadefish	Chaetodipterus faber
Banded Rudderfish	Seriola zonata
Bank Sea Bass	Centropristis ocyurus
Bar Jack	Caranx ruber
Bigeye Tuna	Thunnus obesus
Blackfin Snappper	Lutjanus buccanella
Black Grouper	Mycteroperca bonaci
Black Margate	Anisotremus surinamensis
Black Sea Bass	Centropristis striata
Black Snapper	Apsilus dentatus
Bluefin Tuna	Thunnus thynnus
Bluefish	Pomatomus saltatrix
Blueline Tilefish	Caulolatilus microps
Bluetripe Grunt	Haemulon sciurus
Blue Runner	Caranx crysos
Blue Marlin	Makaira nigricans
Blue Stripe Grunt	Haemulon sciurus
Brown Shrimp	Farfantepenaeus aztecus
Cero	Scomberomorus regalis
Cobia	Rachycentron canadum
Coney	Epinephelus fulvus
Cottonwick	Haemulon melanurum
Crevale Jack	Caranx hippos
Croaker	Micropogonias undulatus
Cubera Snapper	Lutjanus cyanopterus
Dog Snapper	Lutjanus jocu
Common Dolphin	Coryphaena hippurus
Pompano Dolphin	
French Grunt	Haemulon flavolineatum
Gag Grouper	Mycteroperca microlepis
Golden Crab	Chaceon fenneri
Golden Tilefish	Lopholatilus chamaeleonticeps
Goliath Grouper	Epinephelus itajara
Grass Porgy	Calamus arctifrons
Graysby	Epinephelus cruentatus
Gray Snapper	Lutjanus griseus
Gray Triggerfish	Balistes capriscus
Greater Amberjack	Seriola dumerili
Hogfish	Lachnolaimus maximus
Jolthead Porgy	Calamus bajonado
King Mackerel	Scomberomorus cavalla

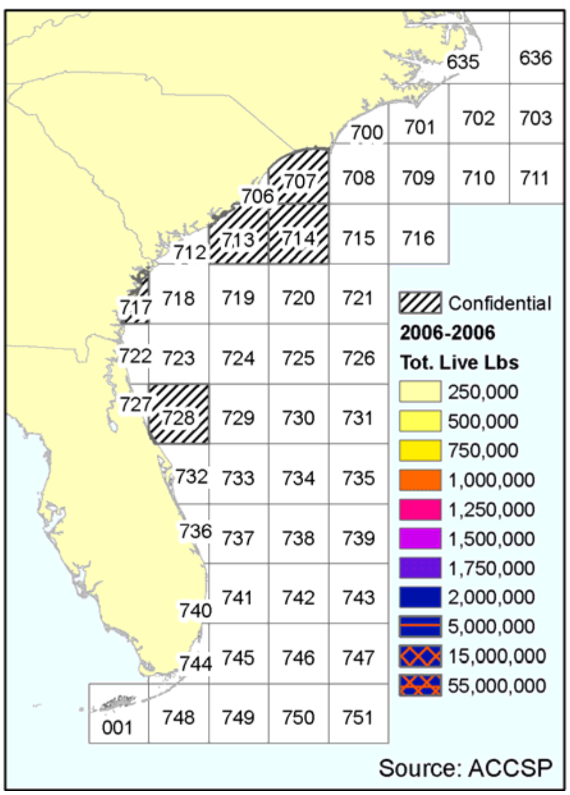
Knobbed Porgy	Calamus nodosus
Lane Snapper	Lutjanus synagris
Lesser Amberjack	Seriola fasciata
Little Tunny	Euthynnus alletteratus
Longspine Porgy	Stenotomus caprinus
Mahogany Snapper	Lutjanus mahogoni
Margate	Haemulon album
Menhaden	Brevoortia tyrannus
Misty Grouper	Epinephelus mystacinus
Mutton Snapper	Lutjanus analis
Nassau Grouper	Epinephelus striatus
Ocean Triggerfish	Canthidermis sufflamen
Pink Shrimp	Farfantepenaeus duorarum
Porkfish	Anisotremus virginicus
Puddingwife	Halichoeres radiatus
Queen Snapper	Etelis oculatus
Queen Triggerfish	Balistes vetula
Red Drum	Sciaenops ocellatus
Red Grouper	Epinephelus morio
Red Hind	Epinephelus guttatus
Red Porgy	Pagrus pagrus
Red Snapper	Lutjanus campechanus
Rock Hind	Epinephelus adscensionis
Rock Sea Bass	Centropristis philadelphica
Rock Shrimp	Sicyonia brevirostris
Royal Red Shrimp	Pleoticus robustus
Sailfish	Istiophorus platypterus
Sailors choice	Haemulon parrai
Sand Tilefish	Malacanthus plumieri
Saucereye Porgy	Calamus calamus
Scamp	Mycteroperca phenax
Schoolmaster	Lutjanus apodus
Scup	Stenotomus chrysops
Sharks (Several species)	
Sheepshead	Archosargus probatocephalus
Silk Snapper	Lutjanus vivanus
Smallmouth Grunt	Haemulon chrysargyreum
Snowy Grouper	Epinephelus niveatus
Spadefish	Chaetodipterus faber
Spanish Grunt	Haemulon macrostomum
Spanish Mackerel	Scomberomorus maculatus
Speckled Hind	Epinephelus drummondhayi
Spiny Lobster	Panulirus argus
Spot	Leiostomus xanthurus
Swordfish	Xiphias gladius
Tiger Grouper	Mycteroperca tigris

Tomtate	Haemulon aurolineatum
Vermilion Snapper	Rhomboplites aurorubens
Wahoo	Acanthocybium solanderi
Warsaw Grouper	Epinephelus nigritus
Weakfish	Cynoscion regalis
Whiteboned Porgy	Calamus leucosteus
White Grunt	Haemulon plumieri
White Shrimp	Litopenaeus setiferus
White Marlin	Tetrapturus albidus
Wreckfish	Polyprion americanus
Yellow Jack	Caranx bartholomaei
Yellowfin Tuna	Thunnus albacares
Yellowedge Grouper	Epinephelus flavolimbatus
Yellowfin Grouper	Mycteroperca venenosa
Yellowmouth Grouper	Mycteroperca interstilitialis
Yellowtail Snapper	Ocyrus chrysurus

5.4.1 Commercial Catches

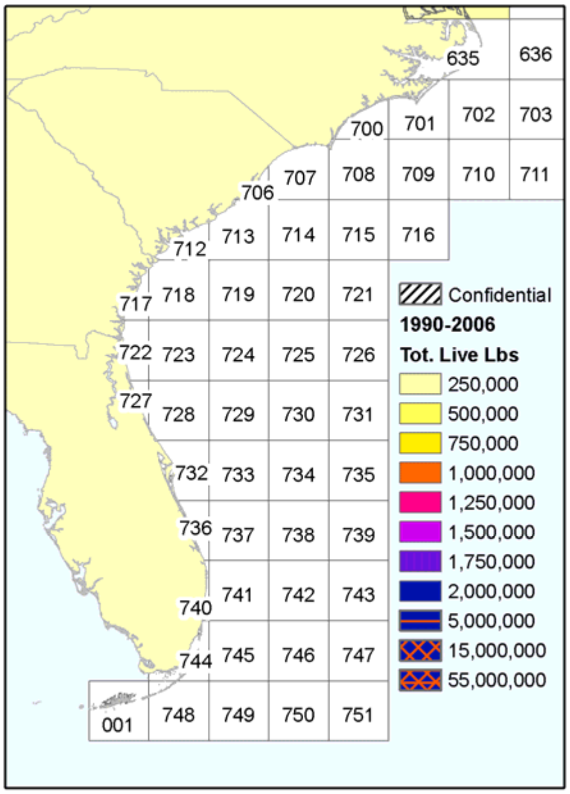


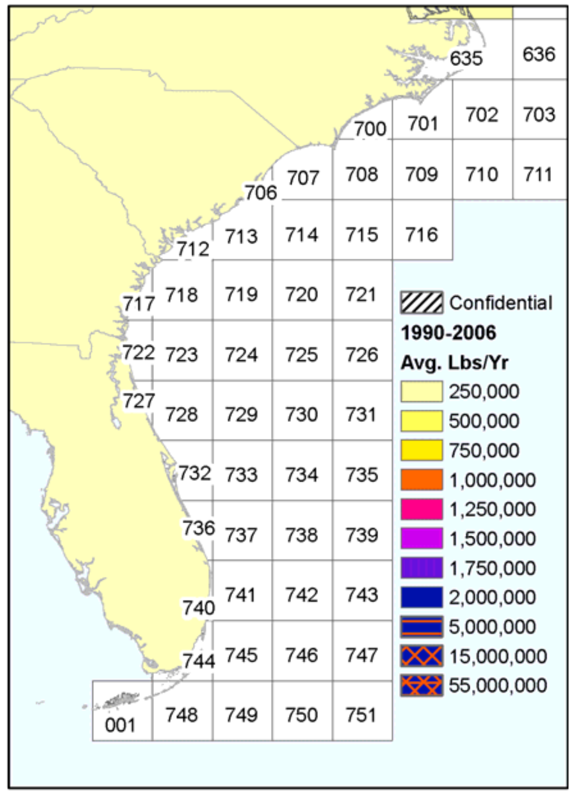


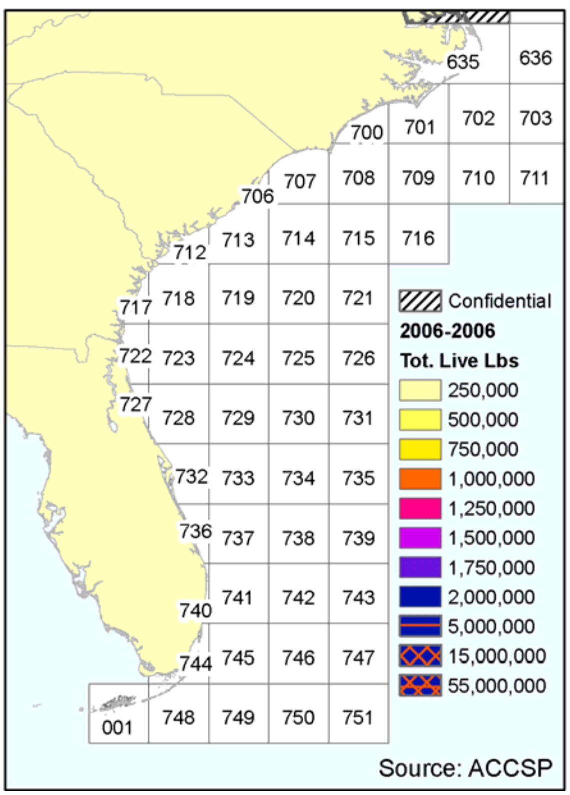


Logbook Catch: WRECKFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	Conf.	Conf.	0.00
701	926.54	54.50	0.00
707	Conf.	Conf.	Conf.
713	100.41	5.91	Conf.
714	122.07	7.18	Conf.
717	96.52	5.68	Conf.
720	Conf.	Conf.	0.00
722	241.88	14.23	0.00
728	2,295.81	135.05	Conf.
732	33.00	1.94	0.00
741	0.22	0.01	0.00
744	0.03	0.00	0.00

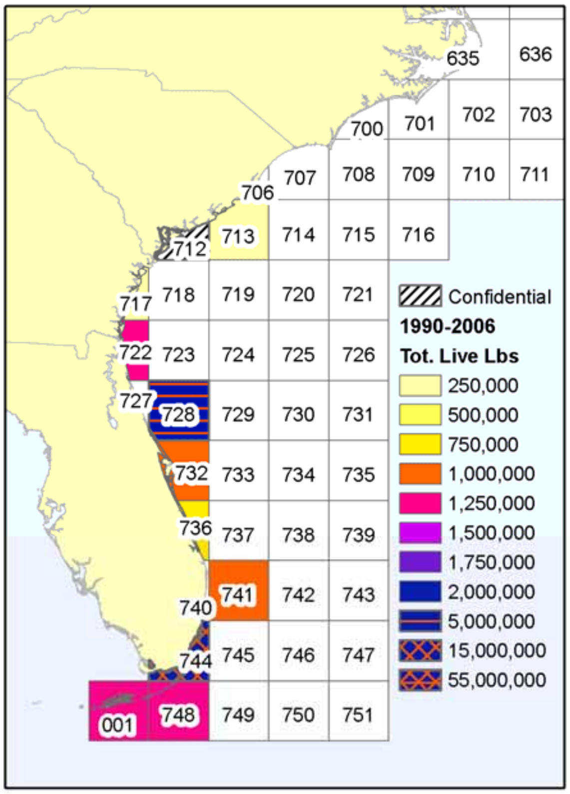


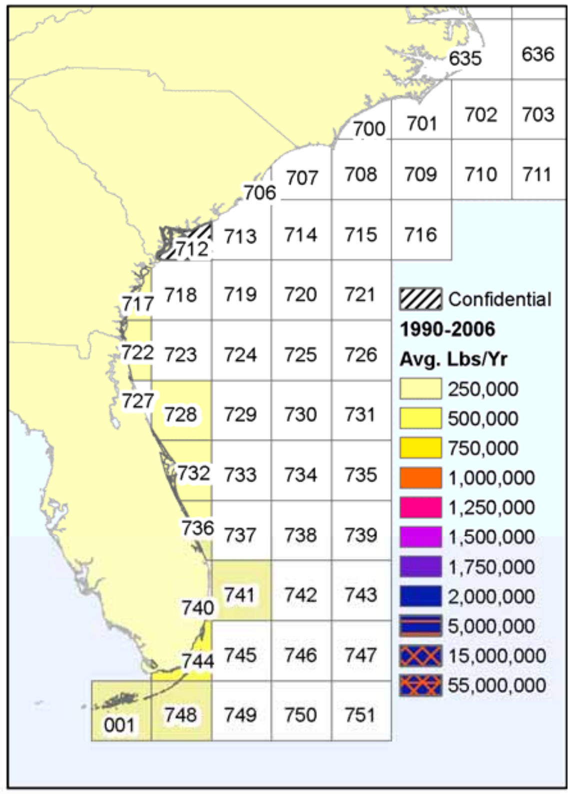


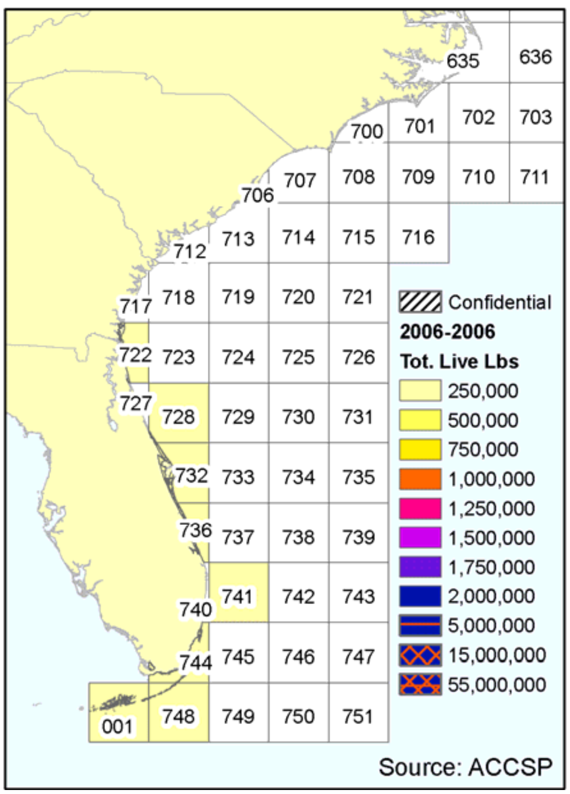


Logbook Catch: ALEWIFE
1990-2006
Pounds in Thousands

No data for this area

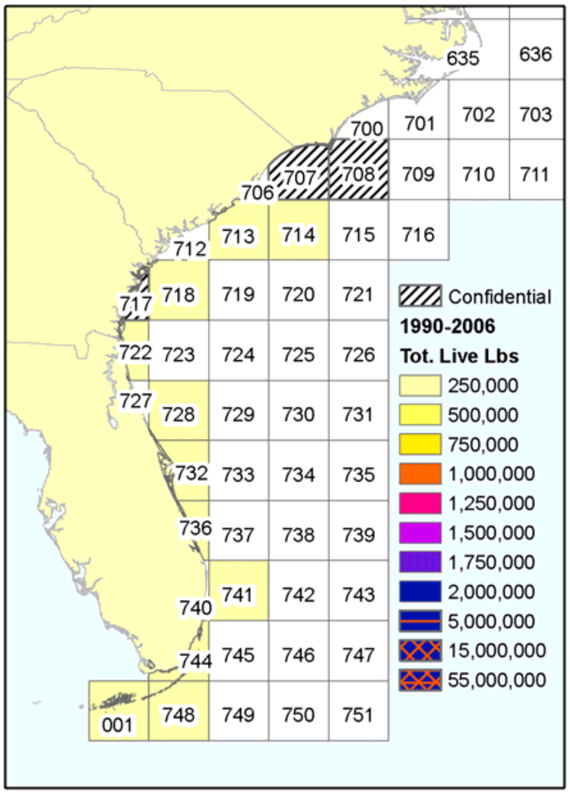


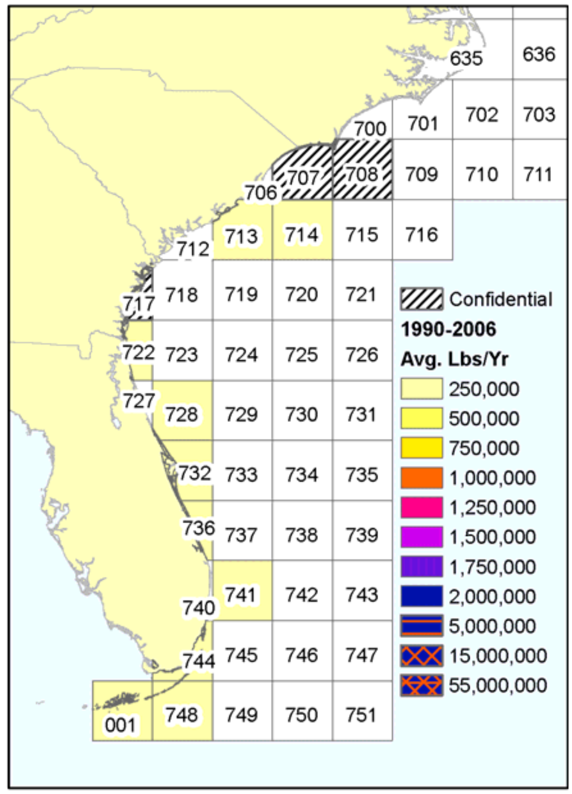


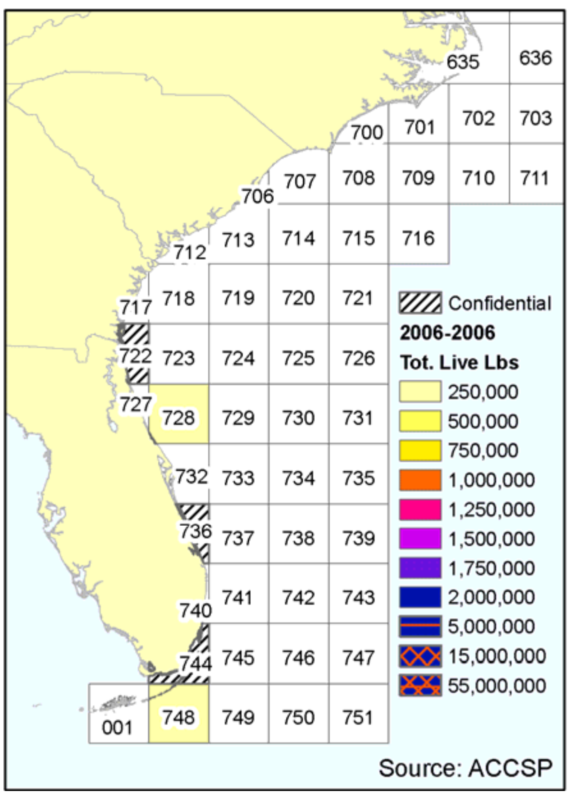


Logbook Catch: AMBERJACK, GREATER
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	1,160.02	68.24	42.29
712	Conf.	Conf.	0.00
713	0.03	0.00	0.00
717	3.83	0.23	0.00
722	1,211.61	71.27	9.92
728	2,563.07	150.77	21.07
732	878.11	51.65	7.50
736	664.71	39.10	22.39
741	811.16	47.72	21.31
744	5,380.43	316.50	131.98
748	1,203.27	70.78	129.53

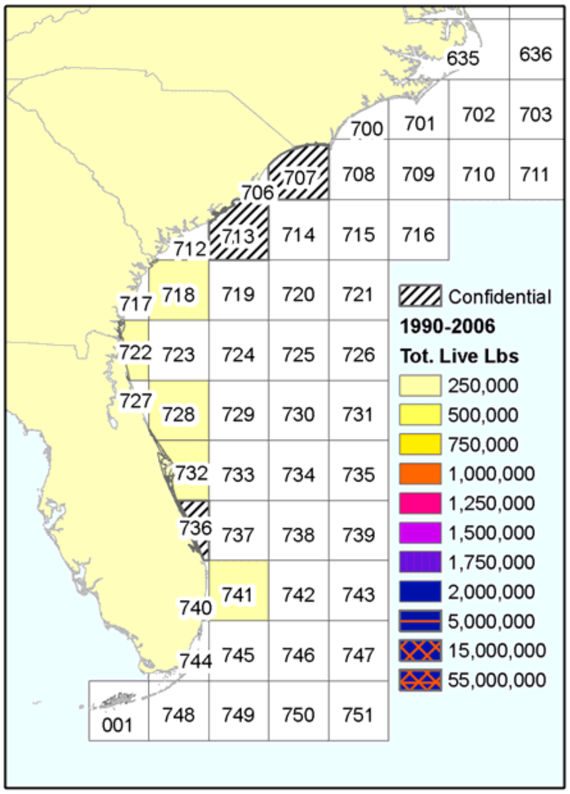


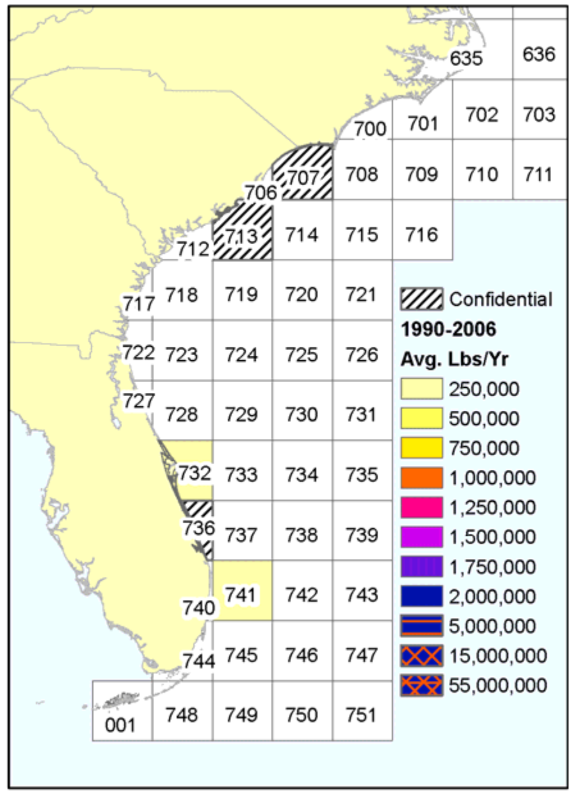


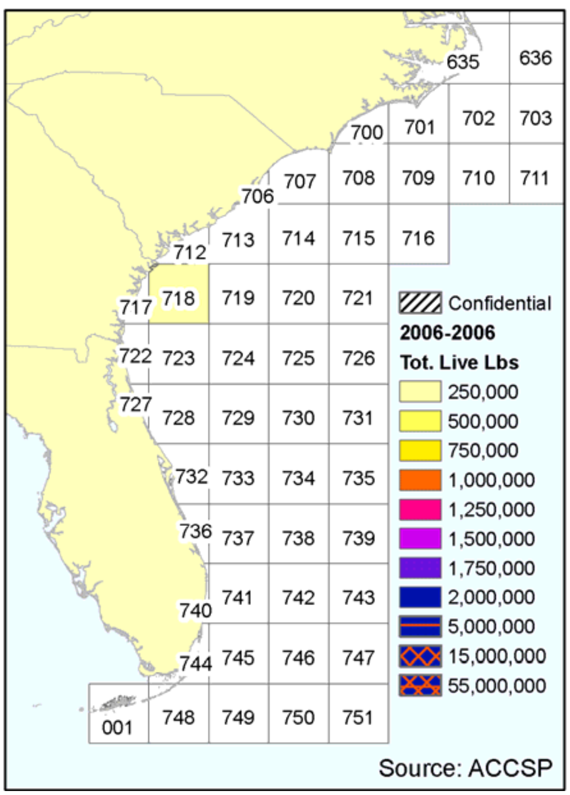


Logbook Catch: AMBERJACK, LESSER
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	12.77	0.75	0.00
707	Conf.	Conf.	0.00
708	Conf.	Conf.	0.00
713	0.46	0.03	0.00
714	0.68	0.04	0.00
717	Conf.	Conf.	0.00
718	0.01	0.00	0.00
722	14.23	0.84	Conf.
728	9.71	0.57	0.92
732	2.21	0.13	0.00
736	4.68	0.28	Conf.
741	7.36	0.43	0.00
744	11.73	0.69	Conf.
748	7.26	0.43	0.06

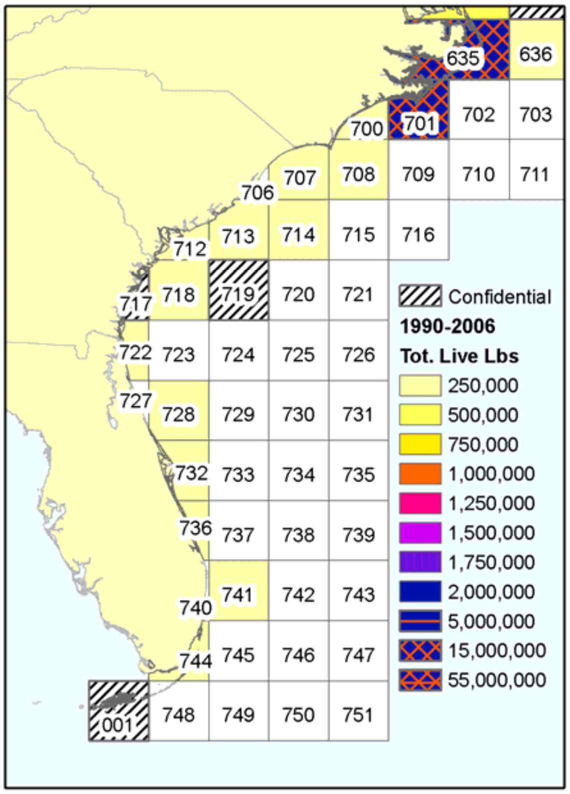


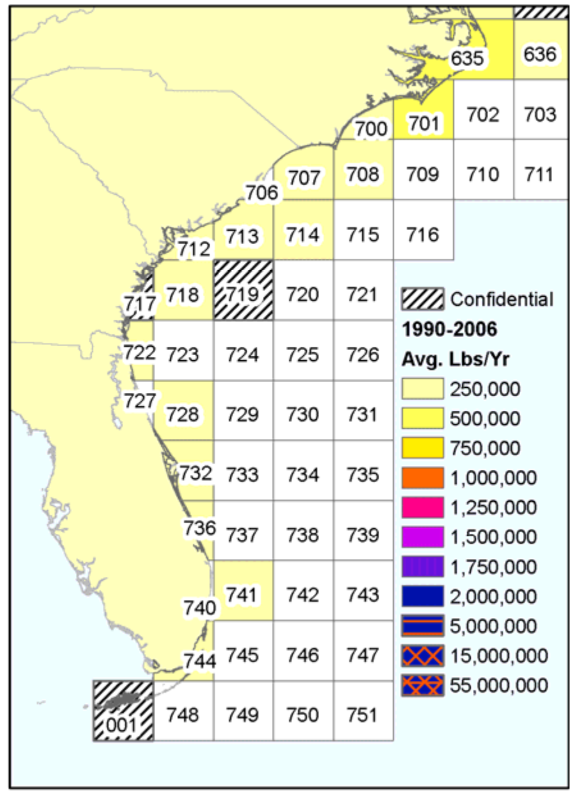


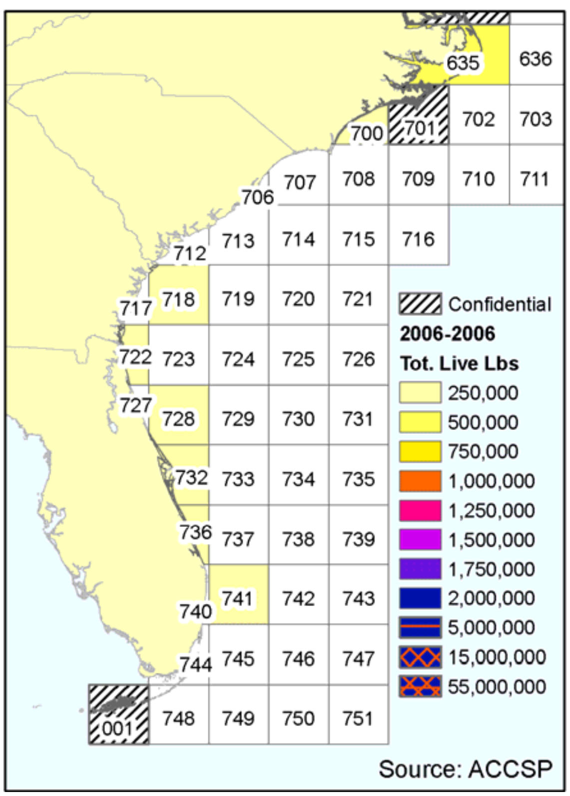


Logbook Catch: BASS, BANK SEA
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
707	Conf.	Conf.	0.00
713	Conf.	Conf.	0.00
718	0.05	0.00	0.03
722	0.03	0.00	0.00
728	0.01	0.00	0.00
732	0.07	0.00	0.00
736	Conf.	Conf.	0.00
741	0.09	0.01	0.00

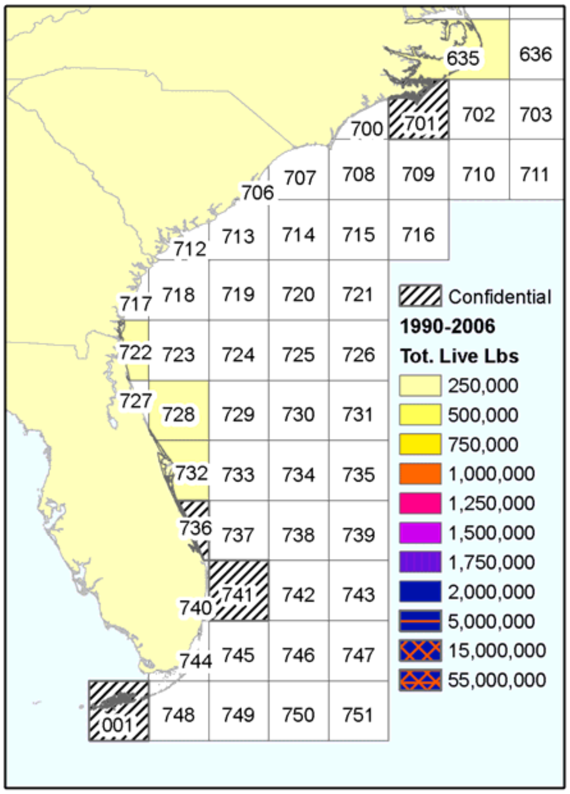


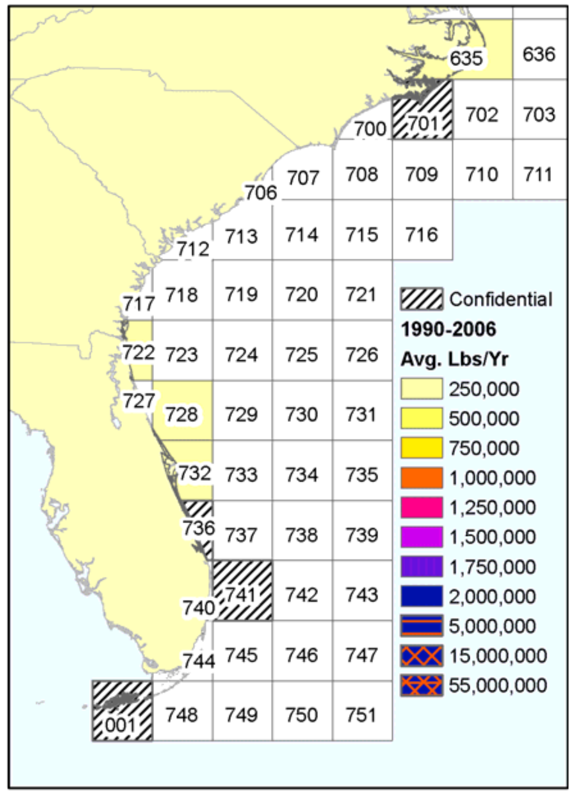


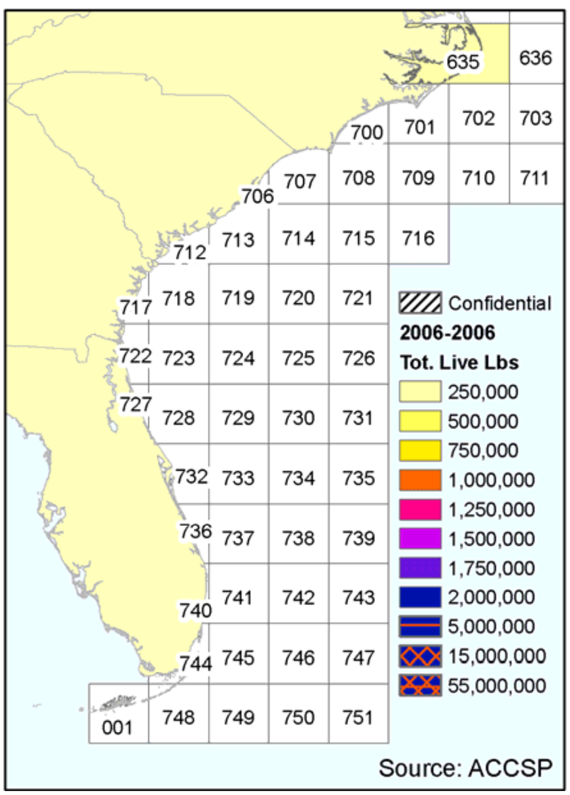


Logbook Catch: BASS, BLACK SEA
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	Conf.	Conf.	Conf.
635	6,440.60	378.86	388.21
636	7.30	0.43	0.00
700	0.94	0.06	0.01
701	5,139.21	302.31	Conf.
707	238.99	14.06	0.00
708	4.27	0.25	0.00
712	0.08	0.00	0.00
713	80.32	4.72	0.00
714	5.37	0.32	0.00
717	Conf.	Conf.	0.00
718	0.85	0.05	0.25
719	Conf.	Conf.	0.00
722	15.29	0.90	0.45
728	46.90	2.76	5.93
732	9.48	0.56	0.86
736	4.31	0.25	0.63
741	1.07	0.06	0.04
744	0.36	0.02	0.00

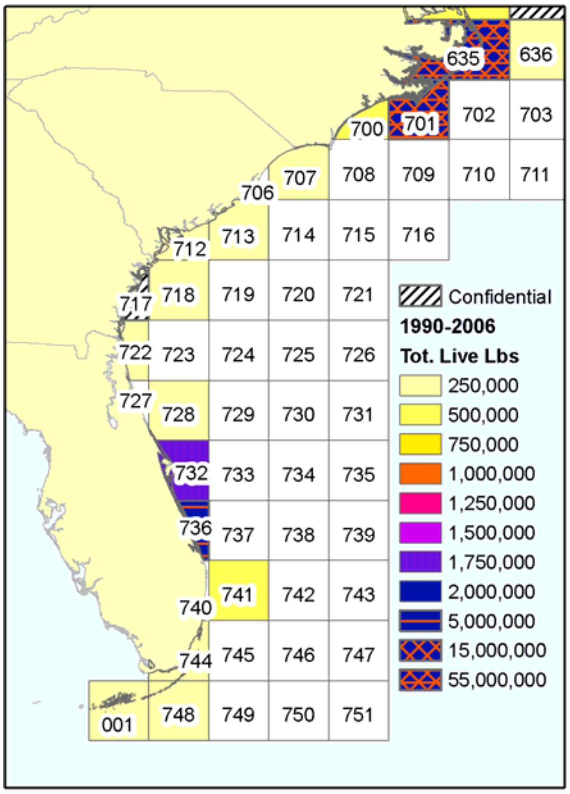


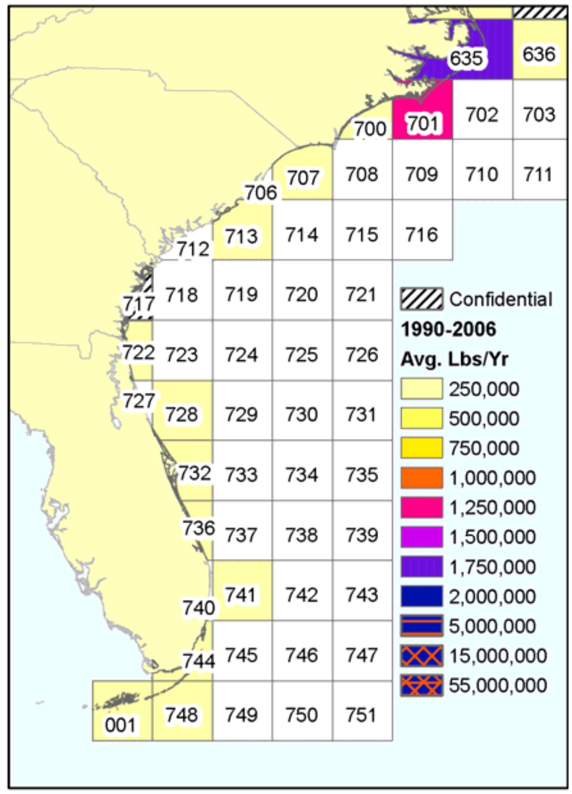


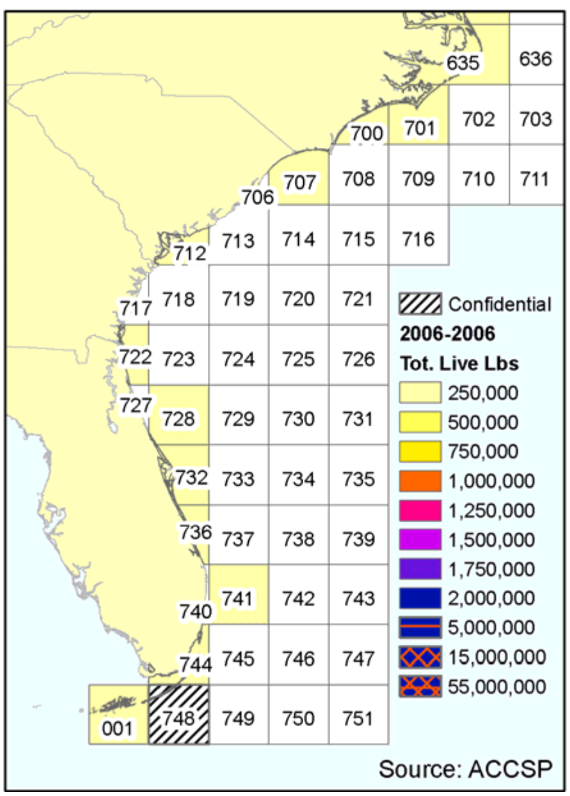


Logbook Catch: BASS, ROCK SEA
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	Conf.	Conf.	0.00
635	5.67	0.33	0.58
701	Conf.	Conf.	0.00
722	0.51	0.03	0.00
728	5.75	0.34	0.00
732	0.22	0.01	0.00
736	Conf.	Conf.	0.00
741	Conf.	Conf.	0.00

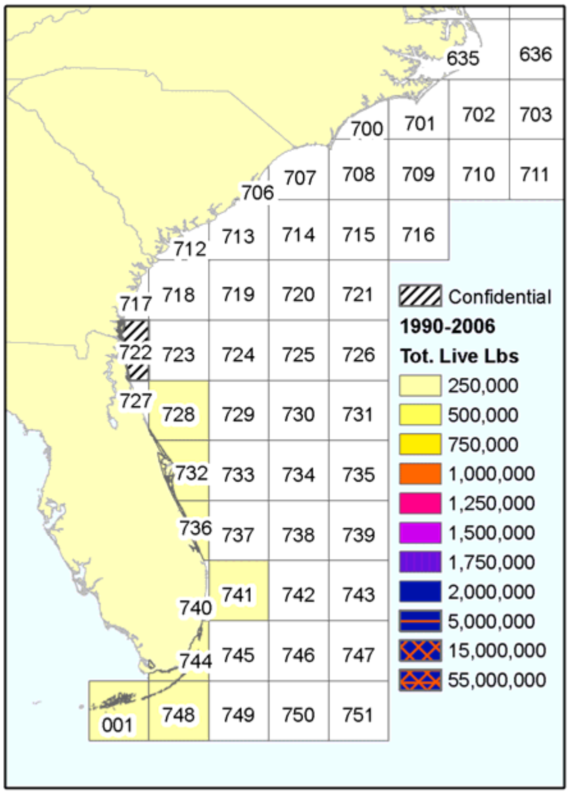


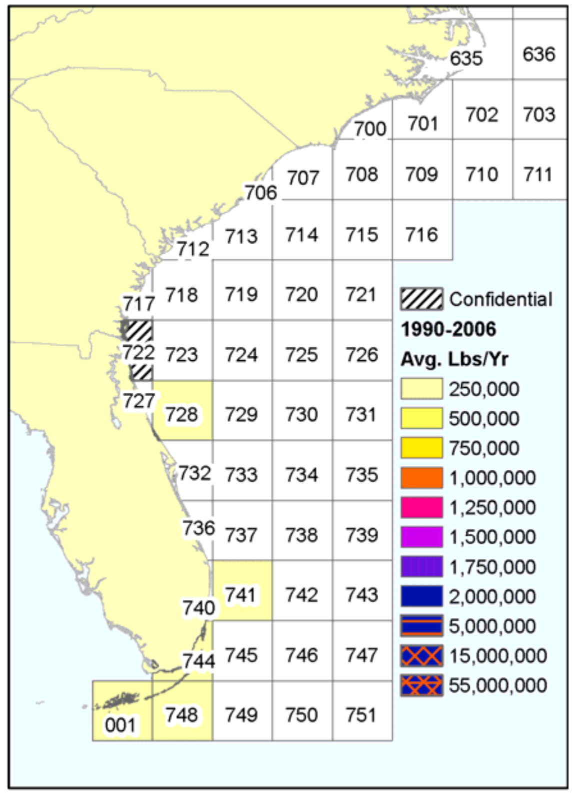


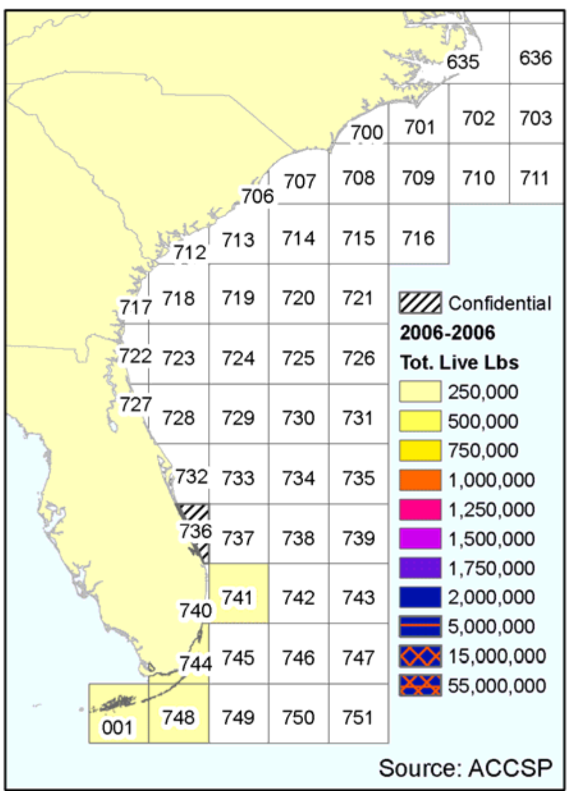


Logbook Catch: BLUEFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	92.11	5.42	12.72
635	28,658.04	1,685.77	146.80
636	1.45	0.09	0.00
700	358.74	21.10	3.54
701	18,966.46	1,115.67	29.56
707	2.19	0.13	0.34
712	0.01	0.00	0.01
713	0.07	0.00	0.00
717	Conf.	Conf.	0.00
718	0.01	0.00	0.00
722	52.42	3.08	0.16
728	93.01	5.47	0.45
732	1,580.69	92.98	38.59
736	3,374.83	198.52	43.92
741	252.17	14.83	12.18
744	123.70	7.28	0.27
748	35.62	2.10	Conf.

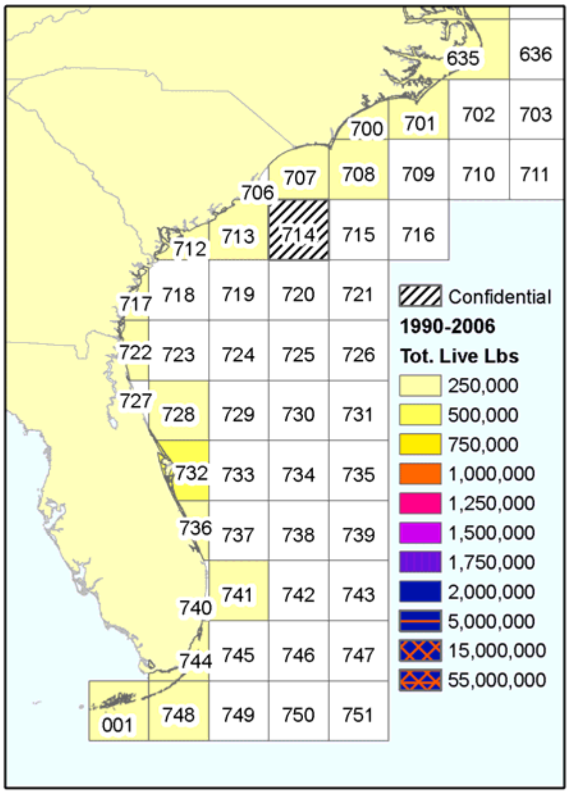


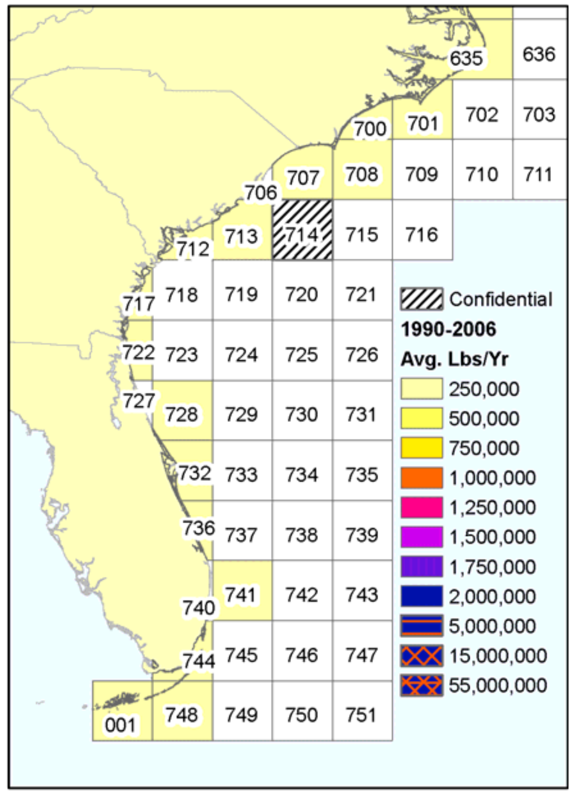


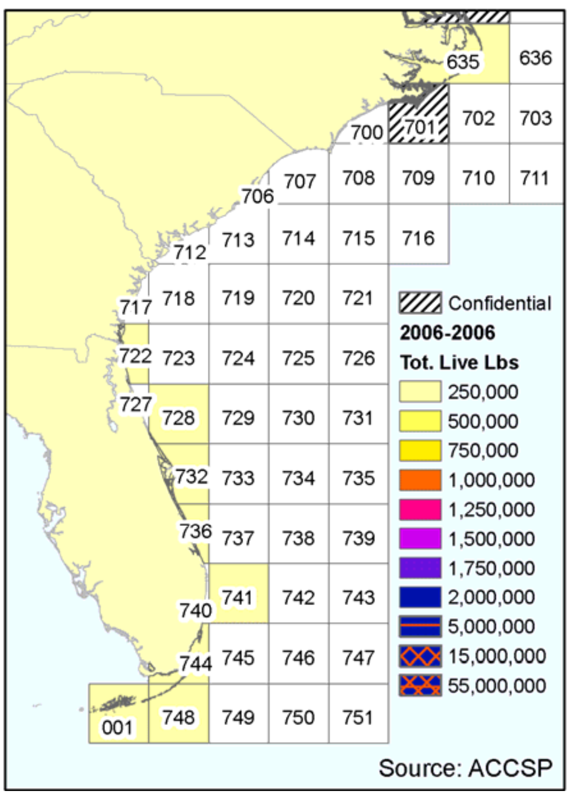


Logbook Catch: CERO
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	80.01	4.71	1.96
722	Conf.	Conf.	0.00
728	0.09	0.01	0.00
732	0.02	0.00	0.00
736	0.06	0.00	Conf.
741	3.65	0.21	0.24
744	35.60	2.09	1.47
748	28.03	1.65	0.76

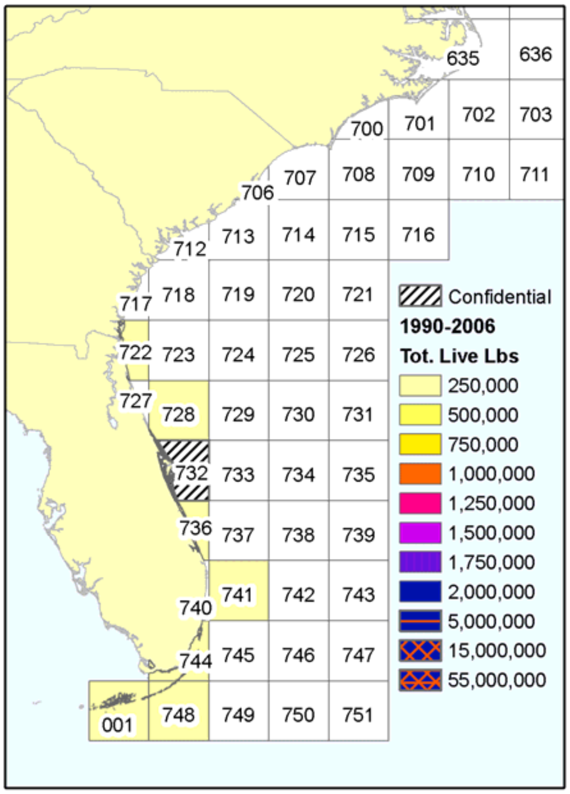


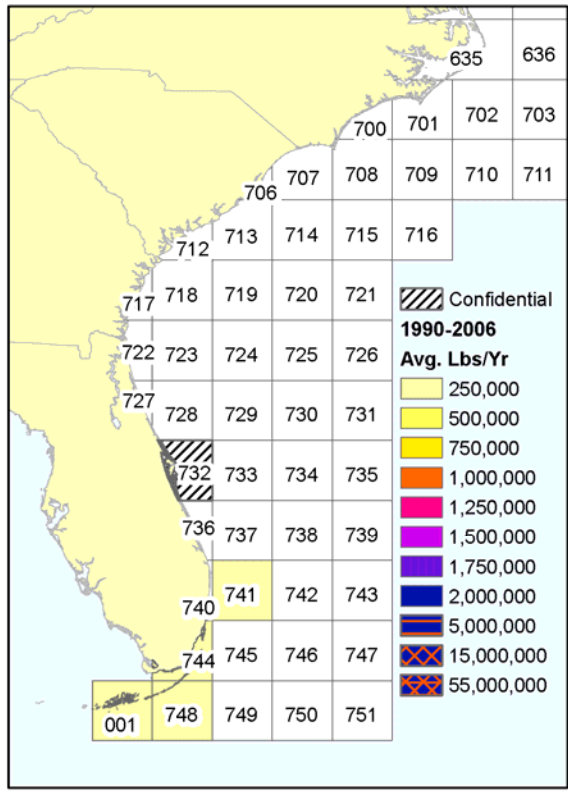


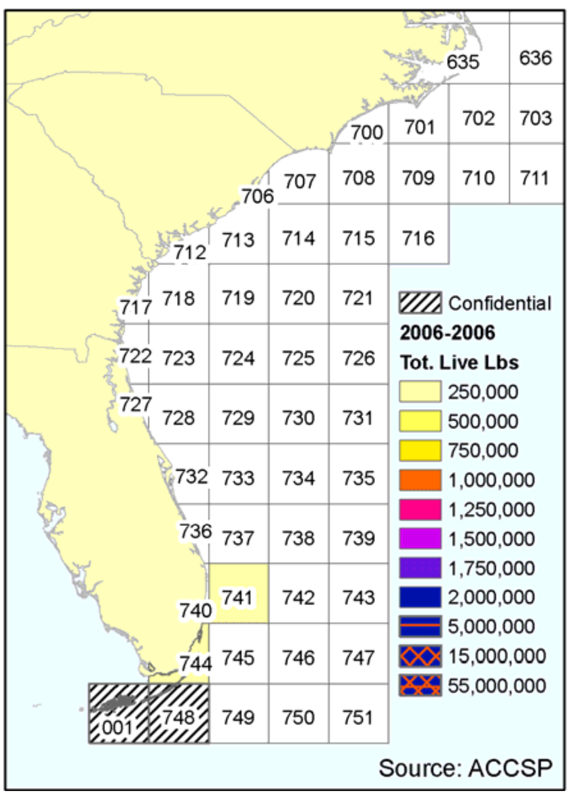


Logbook Catch: COBIA
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	240.70	14.16	7.47
635	220.67	12.98	5.41
700	1.40	0.08	0.00
701	162.49	9.56	Conf.
707	2.69	0.16	0.00
708	0.64	0.04	0.00
712	2.31	0.14	0.00
713	3.19	0.19	0.00
714	Conf.	Conf.	0.00
717	1.19	0.07	0.00
722	230.52	13.56	4.53
728	182.95	10.76	6.54
732	332.23	19.54	17.05
736	200.07	11.77	16.56
741	98.01	5.77	10.54
744	57.53	3.38	1.59
748	113.60	6.68	3.02

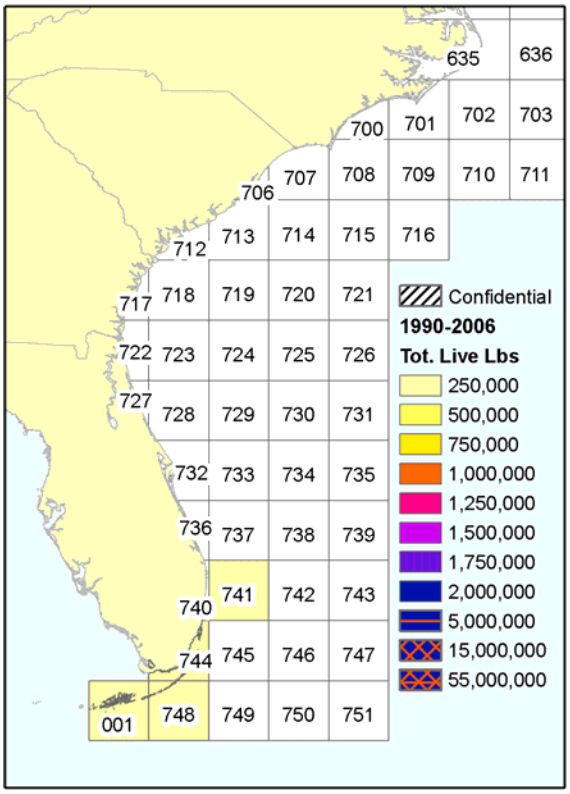


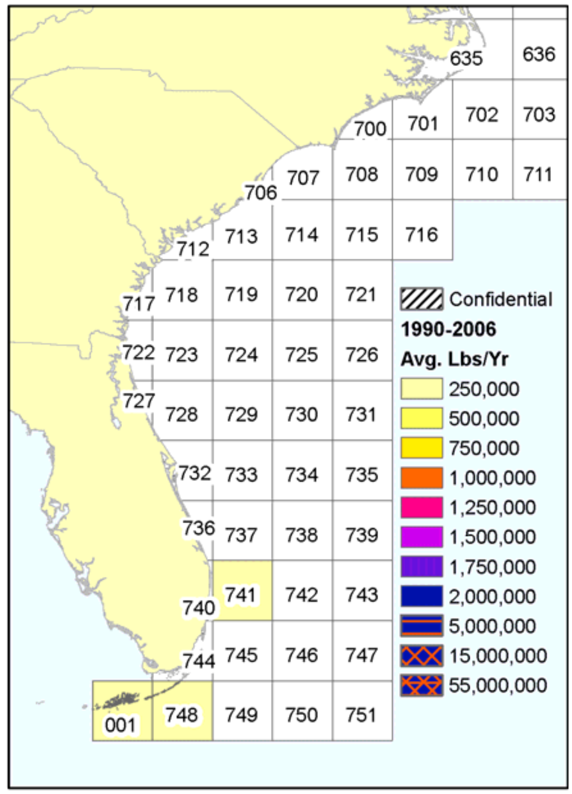


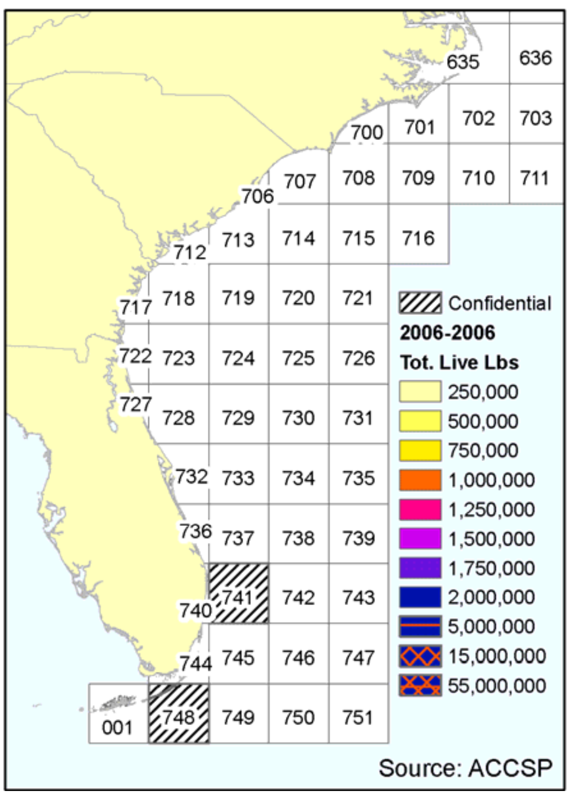


Logbook Catch: CONEY
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.44	0.03	Conf.
722	0.02	0.00	0.00
728	0.05	0.00	0.00
732	Conf.	Conf.	0.00
736	0.01	0.00	0.00
741	0.89	0.05	0.03
744	1.16	0.07	0.01
748	1.75	0.10	Conf.

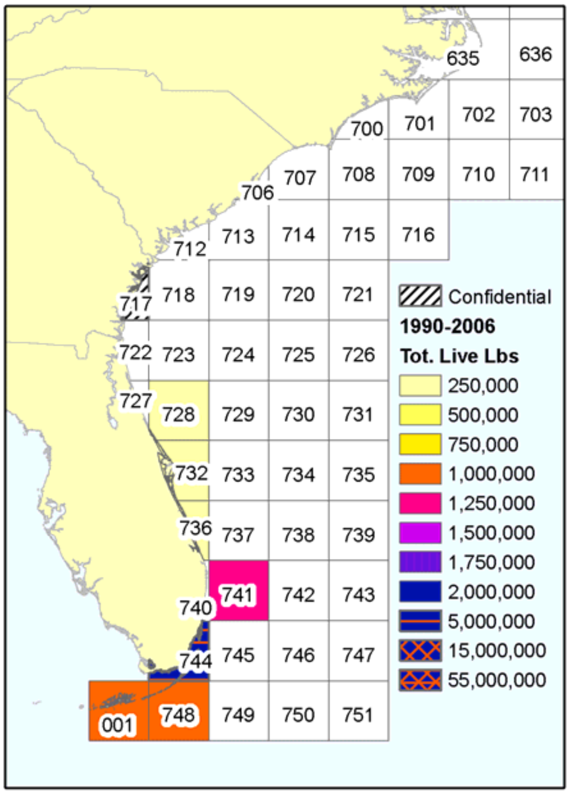


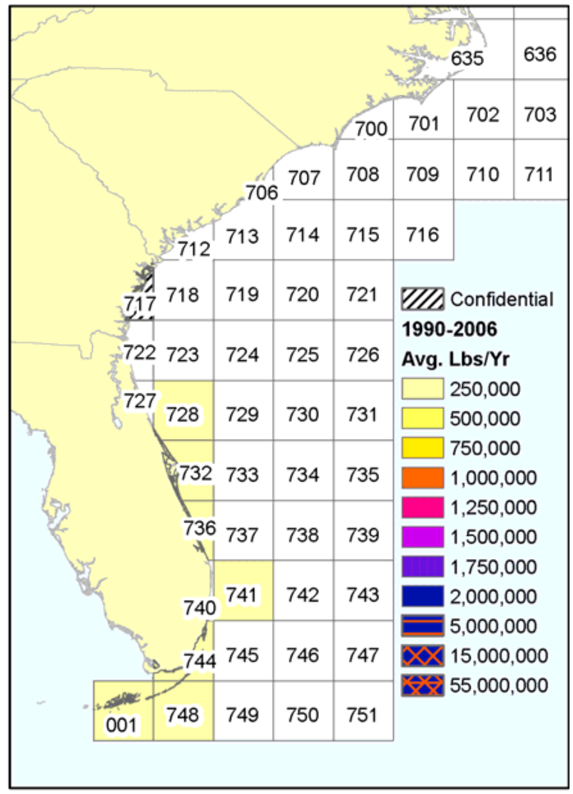


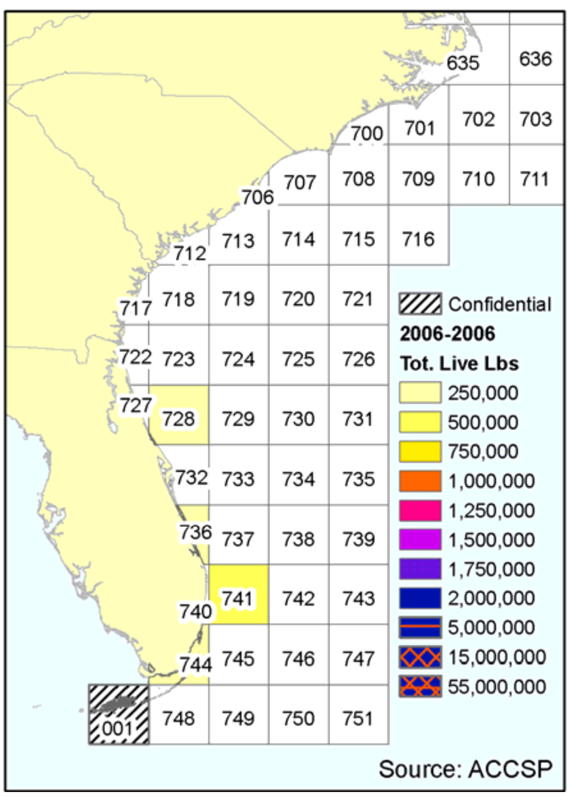


Logbook Catch: COTTONWICK
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.20	0.01	0.00
741	0.22	0.01	Conf.
744	0.05	0.00	0.00
748	3.55	0.21	Conf.

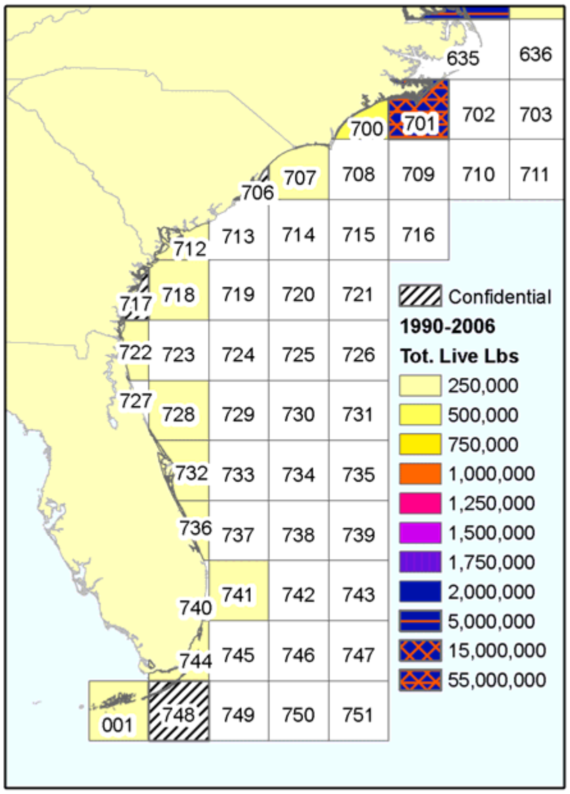


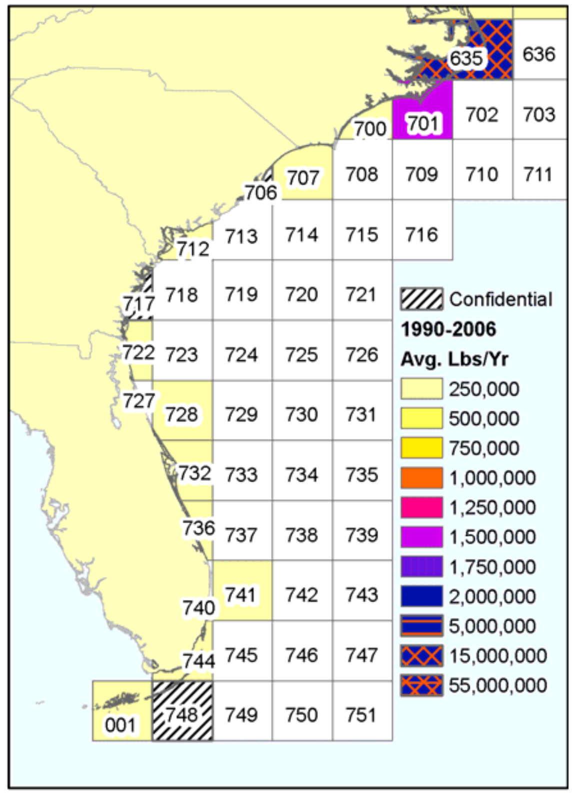


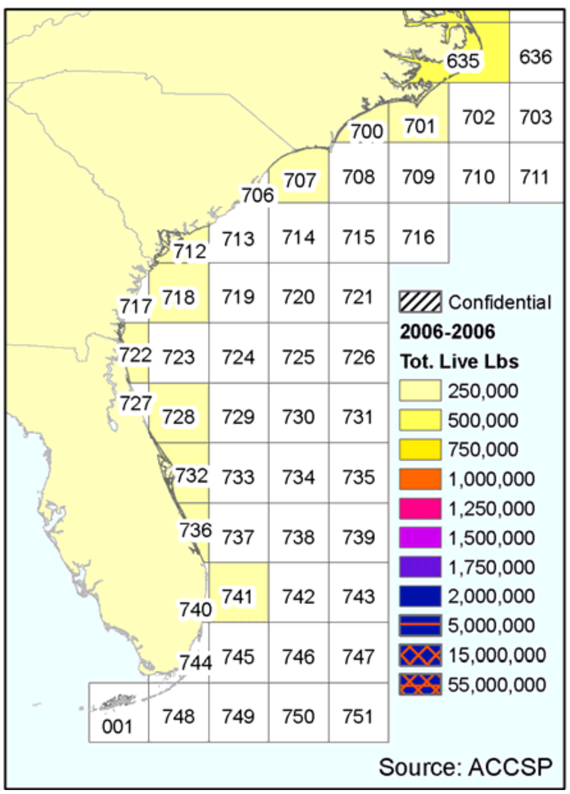


Logbook Catch: CRAB, GOLDEN DEEPSEA
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	957.21	56.31	Conf.
717	Conf.	Conf.	0.00
728	36.81	2.17	5.15
732	74.75	4.40	0.00
736	21.08	1.24	21.08
741	1,178.92	69.35	259.31
744	3,164.60	186.15	212.75
748	945.07	55.59	0.00

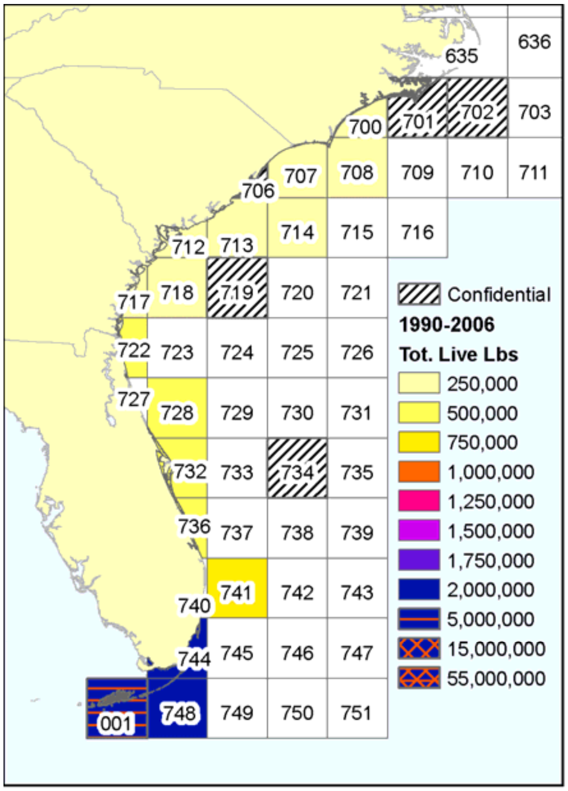


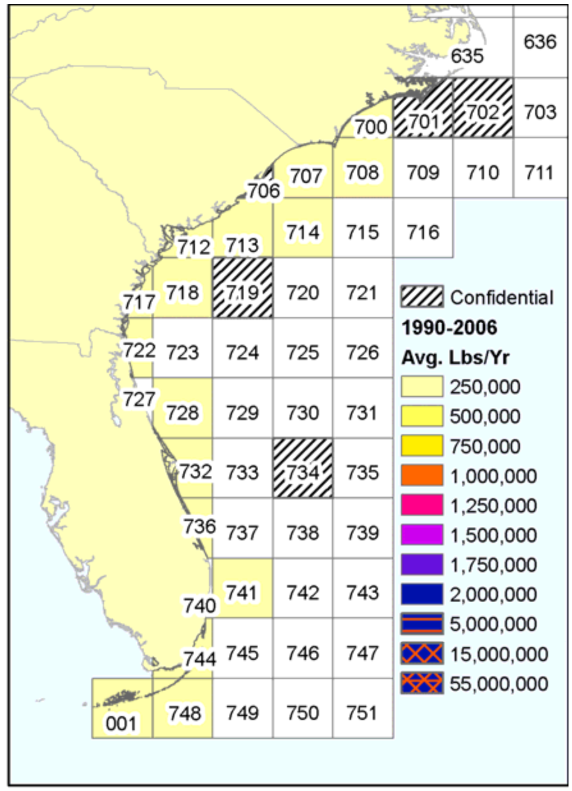


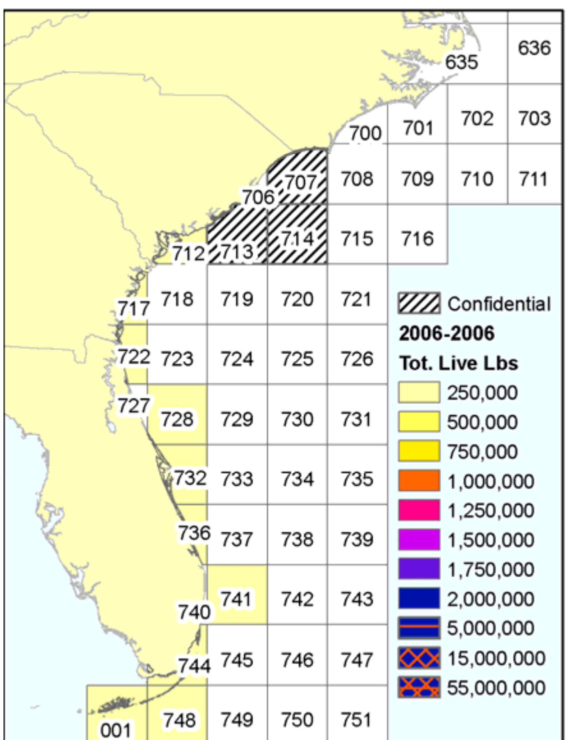


Logbook Catch: CROAKER, ATLANTIC
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	5.26	0.31	0.00
635	99,584.17	5,857.89	382.44
700	321.63	18.92	1.74
701	24,715.00	1,453.82	3.84
706	Conf.	Conf.	0.00
707	2.82	0.17	0.15
712	0.10	0.01	0.00
717	Conf.	Conf.	0.00
718	0.01	0.00	0.01
722	147.75	8.69	1.17
728	7.93	0.47	0.00
732	44.88	2.64	8.94
736	167.25	9.84	13.77
741	40.11	2.36	1.91
744	1.29	0.08	0.00
748	Conf.	Conf.	0.00



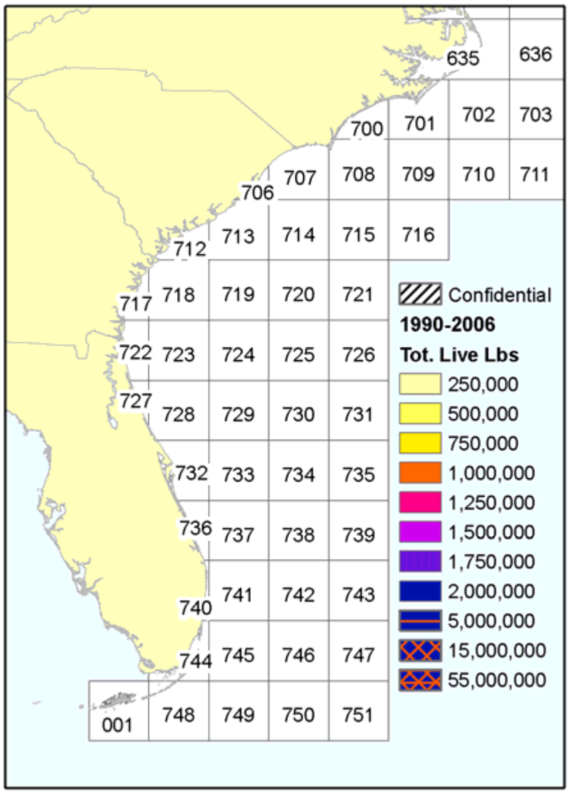


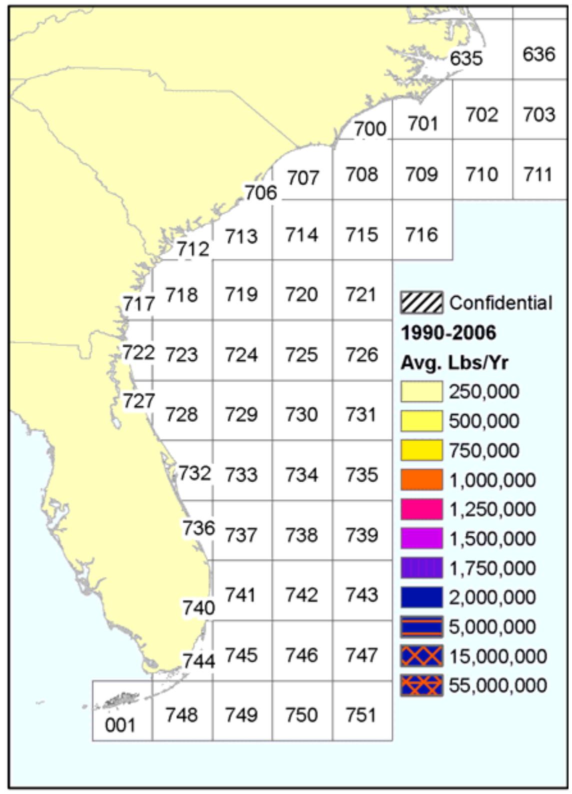


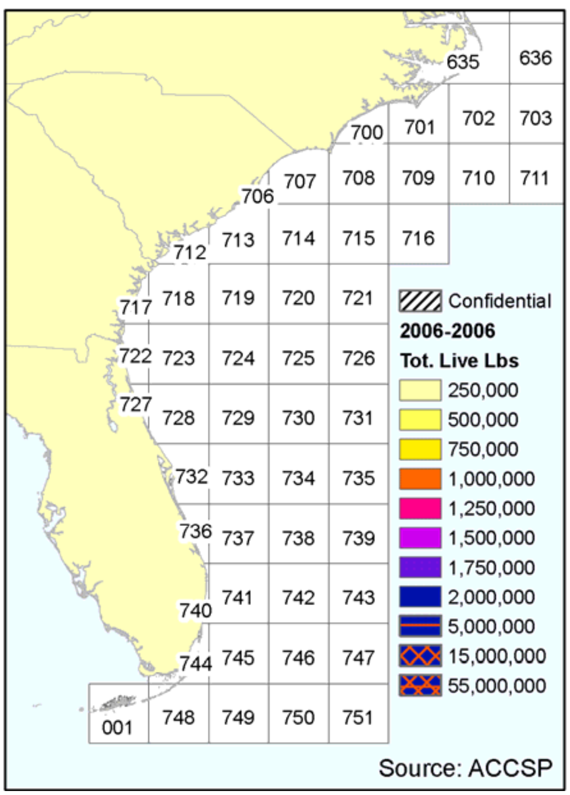
Source: ACCSP

Logbook Catch: DOLPHIN
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	2,094.24	123.19	31.23
700	1.64	0.10	0.00
701	Conf.	Conf.	0.00
702	Conf.	Conf.	0.00
706	Conf.	Conf.	0.00
707	13.99	0.82	Conf.
708	23.16	1.36	0.00
712	68.86	4.05	19.80
713	57.51	3.38	Conf.
714	135.75	7.99	Conf.
717	97.44	5.73	37.09
718	0.47	0.03	0.00
719	Conf.	Conf.	0.00
722	405.69	23.86	19.90
728	456.96	26.88	14.02
732	450.34	26.49	22.10
734	Conf.	Conf.	0.00
736	490.79	28.87	13.25
741	718.54	42.27	16.28
744	1,762.87	103.70	43.80
748	1,984.22	116.72	77.72

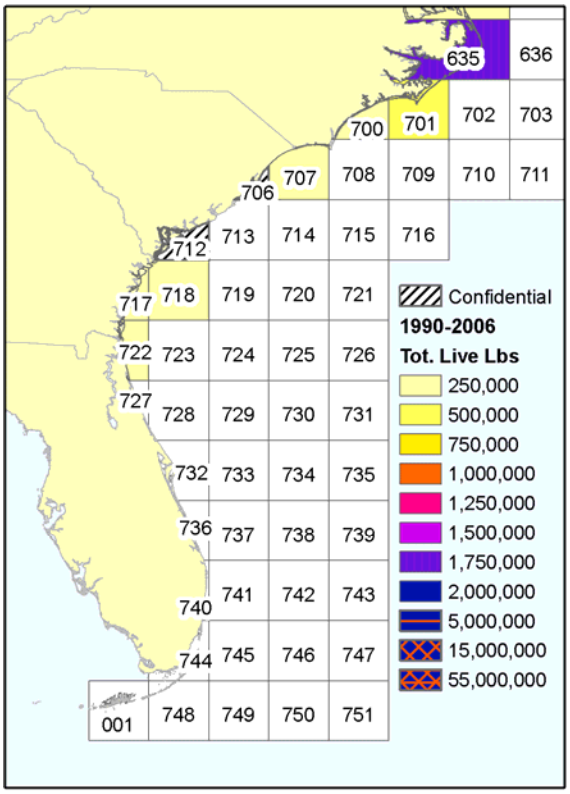


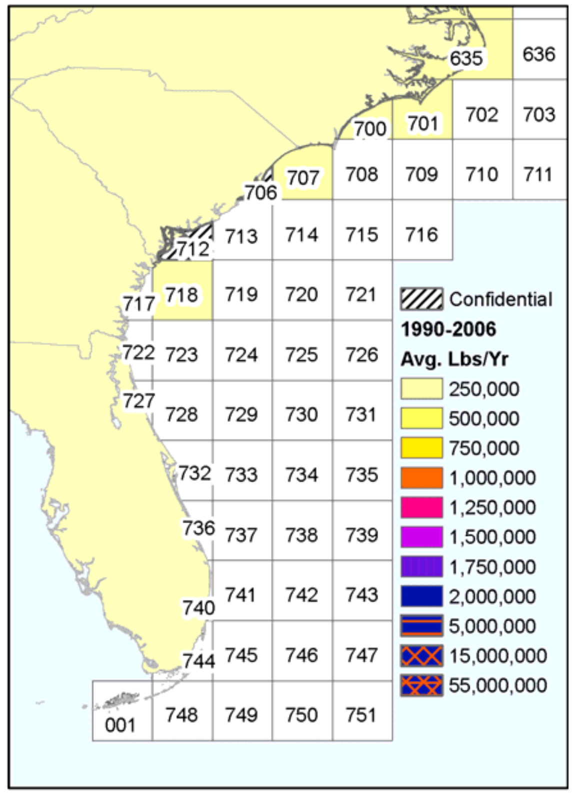


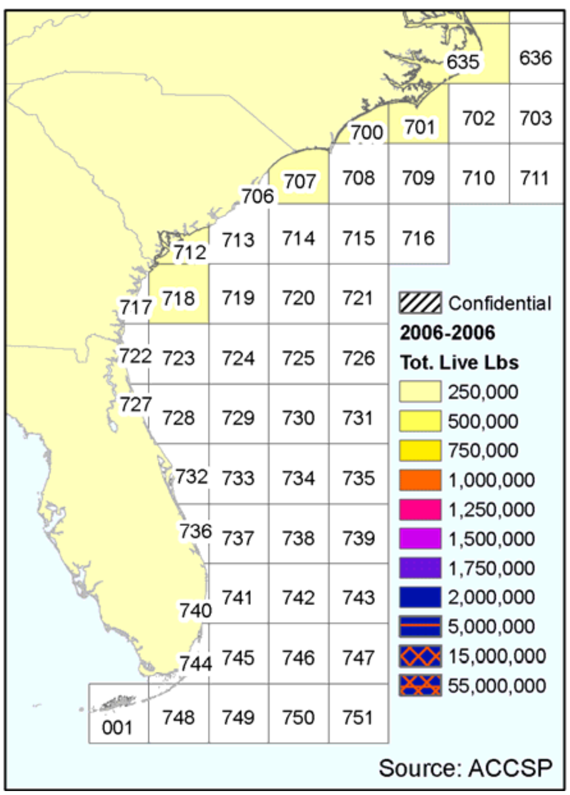


Logbook Catch: DOLPHIN, POMPANO
1990-2006
Pounds in Thousands

No data for this area

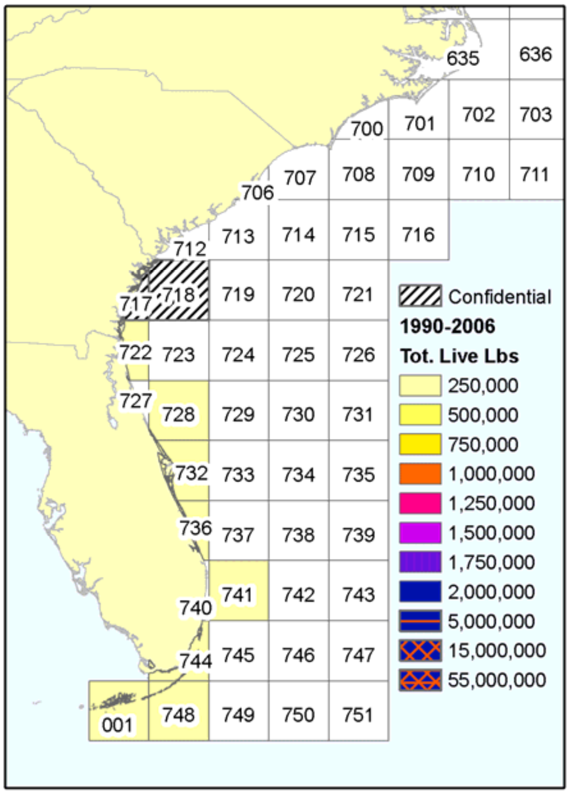


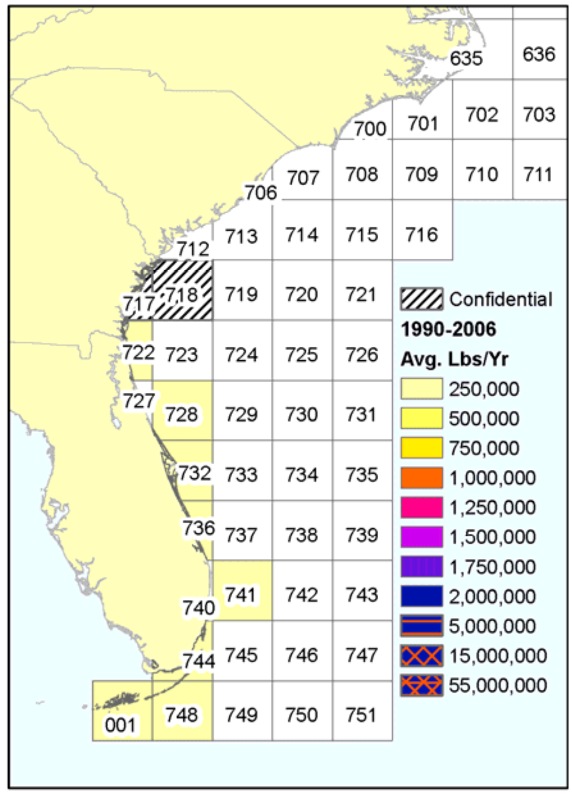


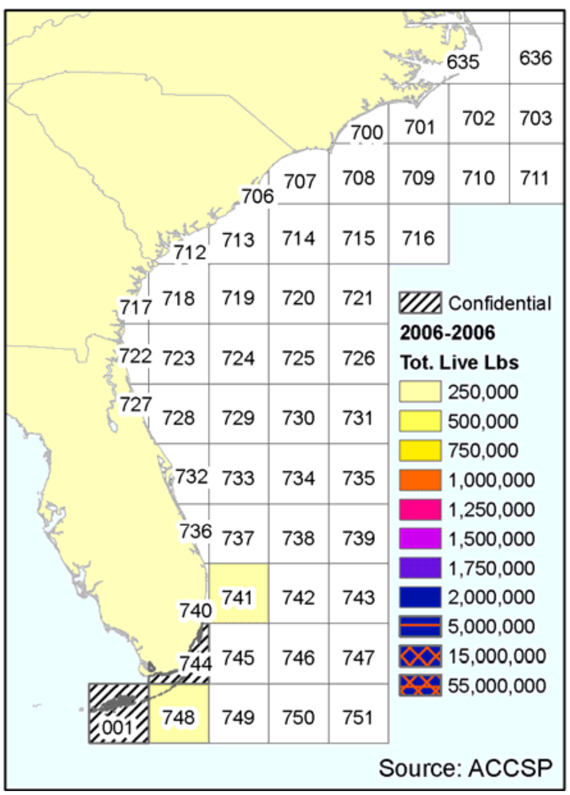


Logbook Catch: DRUM, RED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
635	1,732.09	101.89	44.01
700	248.51	14.62	21.32
701	441.30	25.96	15.48
706	Conf.	Conf.	0.00
707	6.30	0.37	1.14
712	Conf.	Conf.	0.10
717	0.03	0.00	0.00
718	0.42	0.02	0.34
722	0.02	0.00	0.00

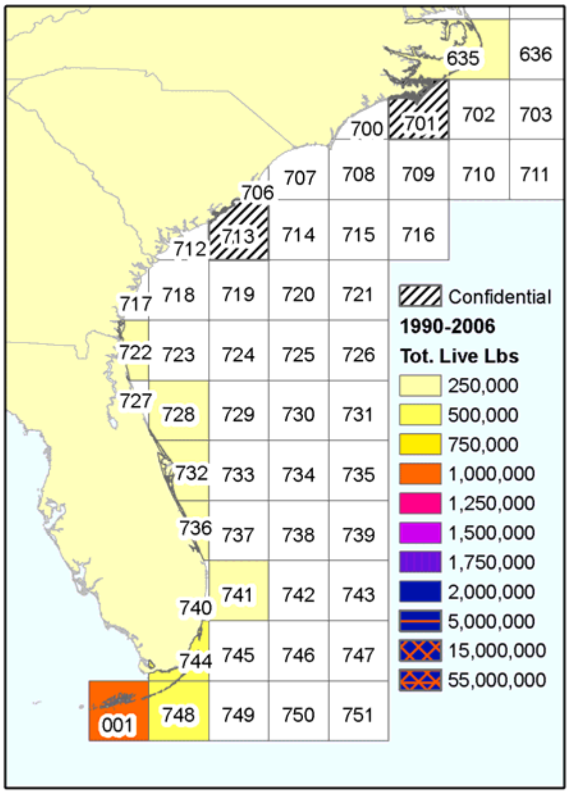


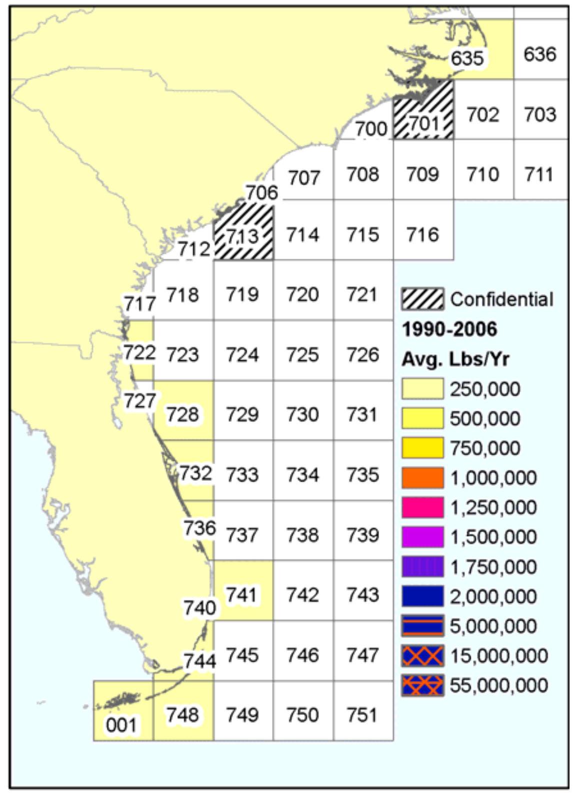


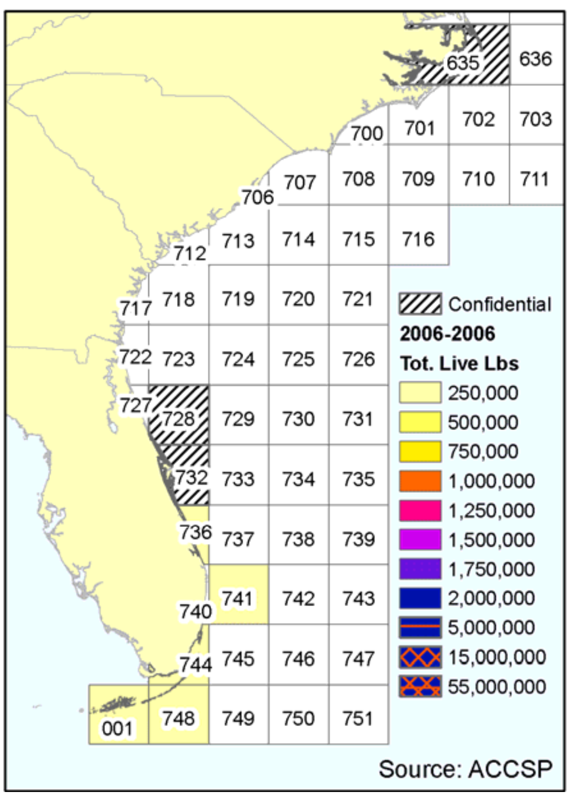


Logbook Catch: GRAYSBY
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	1.54	0.09	Conf.
701	0.00	0.00	0.00
717	Conf.	Conf.	0.00
718	Conf.	Conf.	0.00
722	19.27	1.13	0.00
728	3.34	0.20	0.00
732	19.99	1.18	0.00
736	7.74	0.46	0.00
741	7.20	0.42	0.50
744	0.17	0.01	Conf.
748	1.56	0.09	0.06

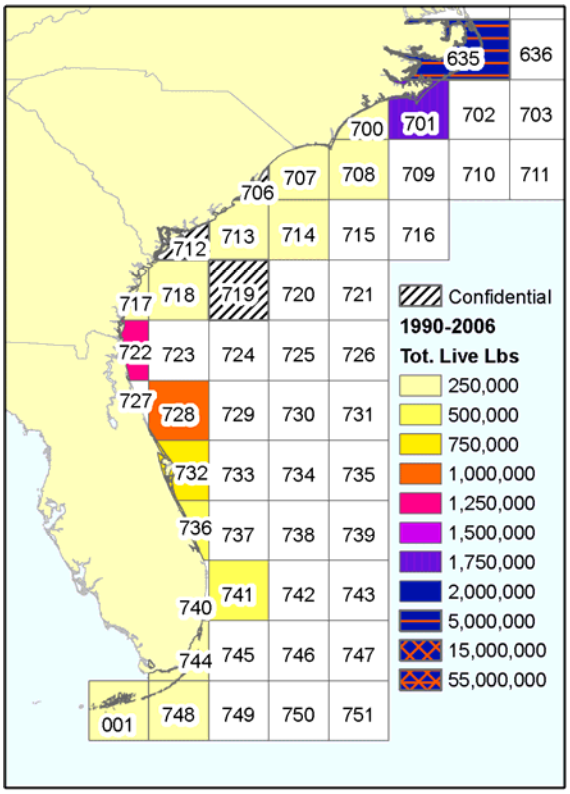


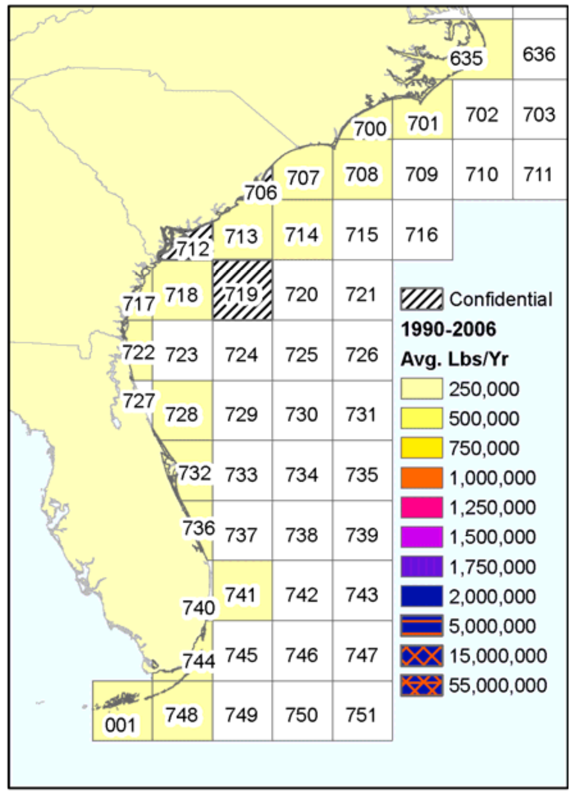


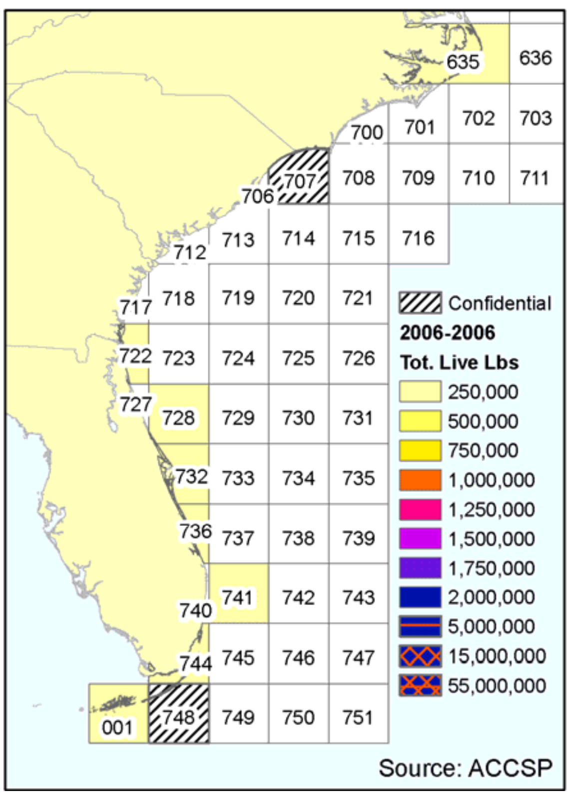


Logbook Catch: GROUPER, BLACK
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	772.70	45.45	31.58
635	0.98	0.06	Conf.
701	Conf.	Conf.	0.00
713	Conf.	Conf.	0.00
722	6.74	0.40	0.00
728	15.95	0.94	Conf.
732	96.03	5.65	Conf.
736	54.26	3.19	4.42
741	133.53	7.85	1.87
744	306.99	18.06	12.09
748	376.13	22.13	21.57

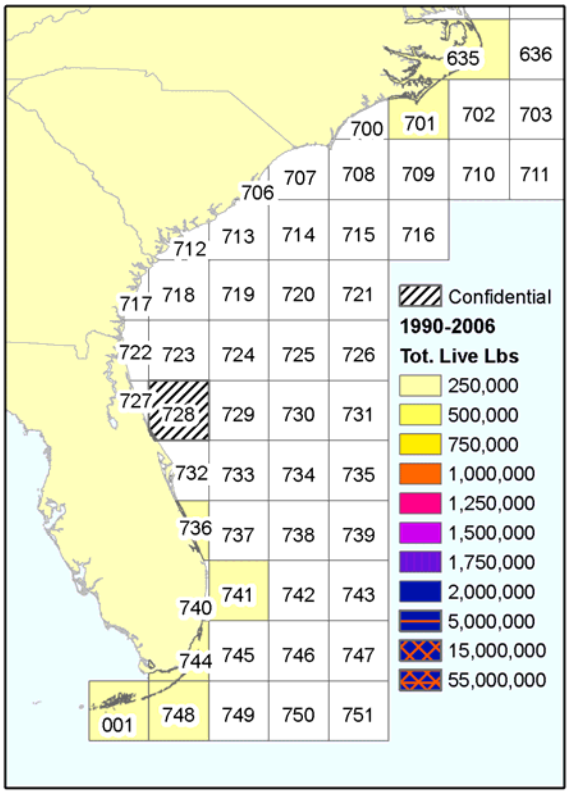


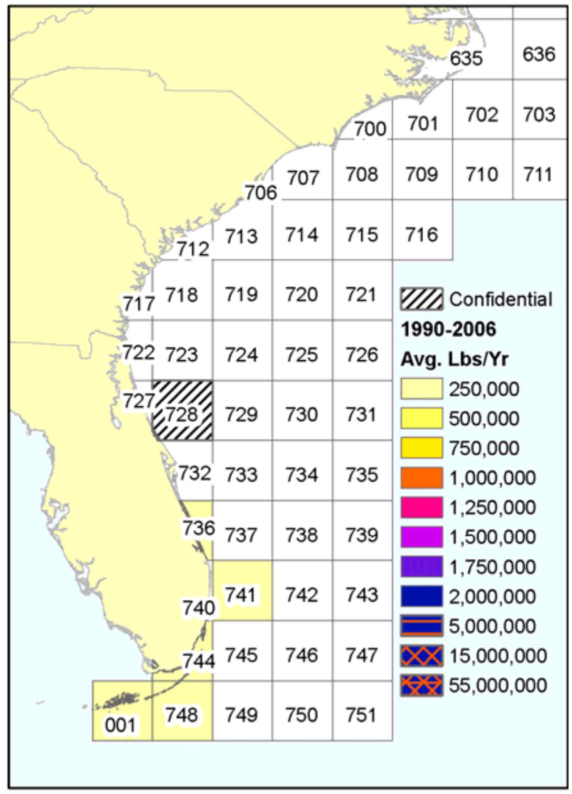


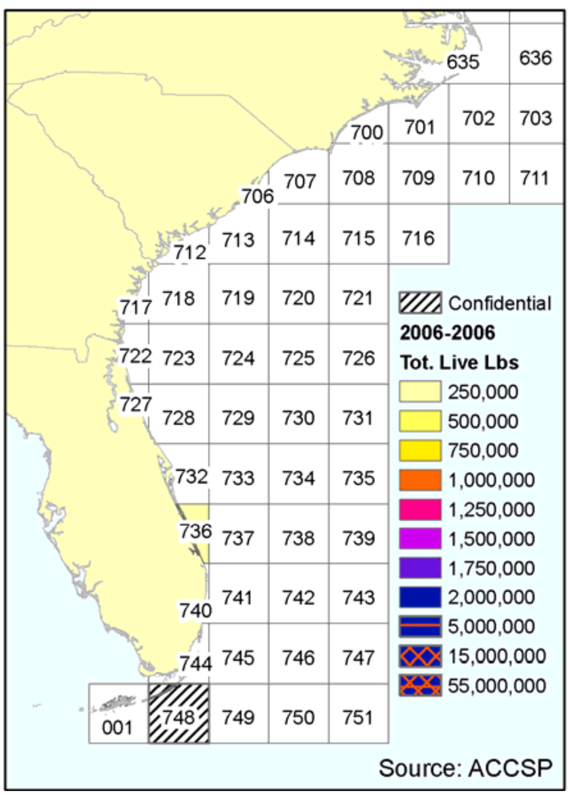


Logbook Catch: GROUPER, GAG
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	44.58	2.62	3.19
635	2,246.83	132.17	195.33
700	34.93	2.05	0.00
701	1,696.83	99.81	0.00
706	Conf.	Conf.	0.00
707	208.77	12.28	Conf.
708	50.04	2.94	0.00
712	Conf.	Conf.	0.00
713	159.33	9.37	0.00
714	19.25	1.13	0.00
717	3.56	0.21	0.00
718	6.20	0.36	0.00
719	Conf.	Conf.	0.00
722	1,065.84	62.70	20.33
728	884.13	52.01	25.96
732	529.57	31.15	31.34
736	378.70	22.28	18.91
741	261.69	15.39	4.52
744	28.68	1.69	0.66
748	5.46	0.32	Conf.

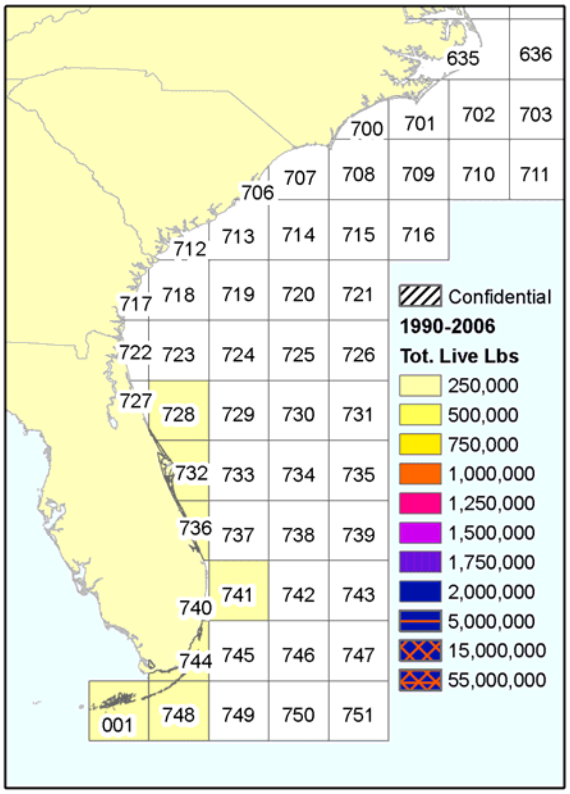


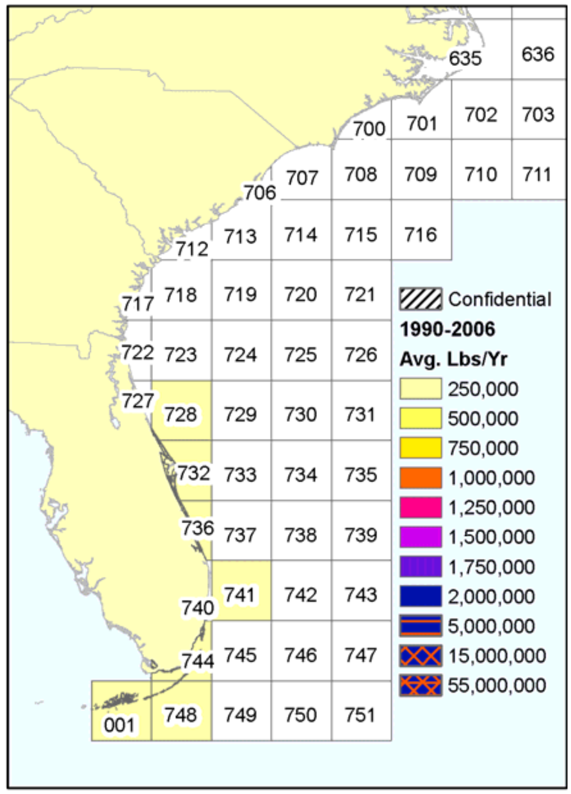


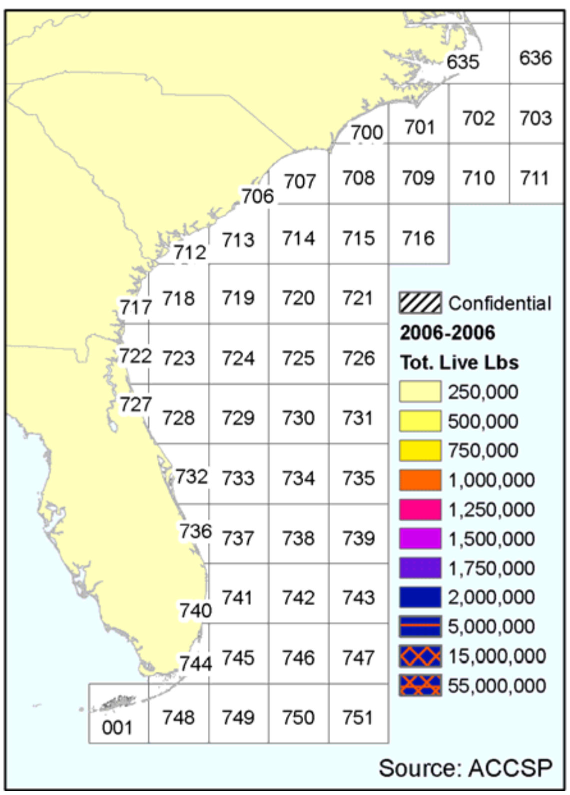


Logbook Catch: GROUPER, MISTY
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	2.17	0.13	0.00
635	0.01	0.00	0.00
701	0.00	0.00	0.00
728	Conf.	Conf.	0.00
736	2.95	0.17	0.10
741	0.20	0.01	0.00
744	13.36	0.79	0.00
748	0.50	0.03	Conf.

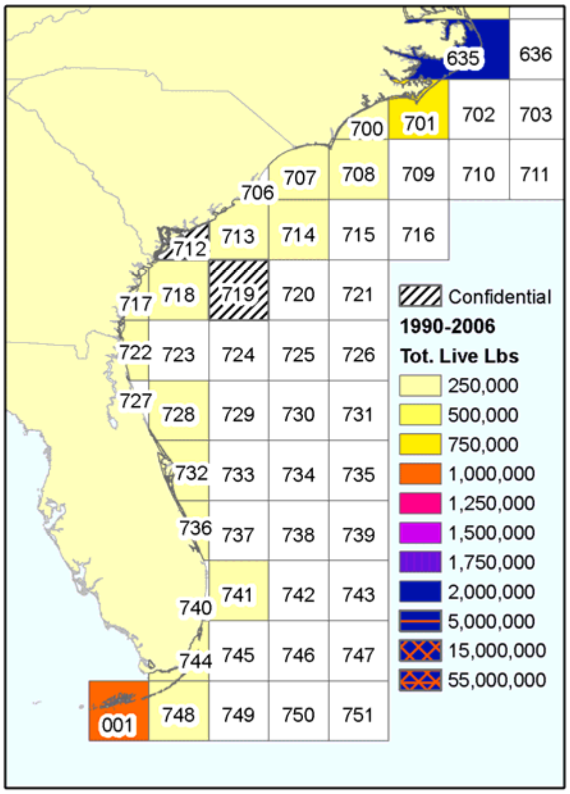


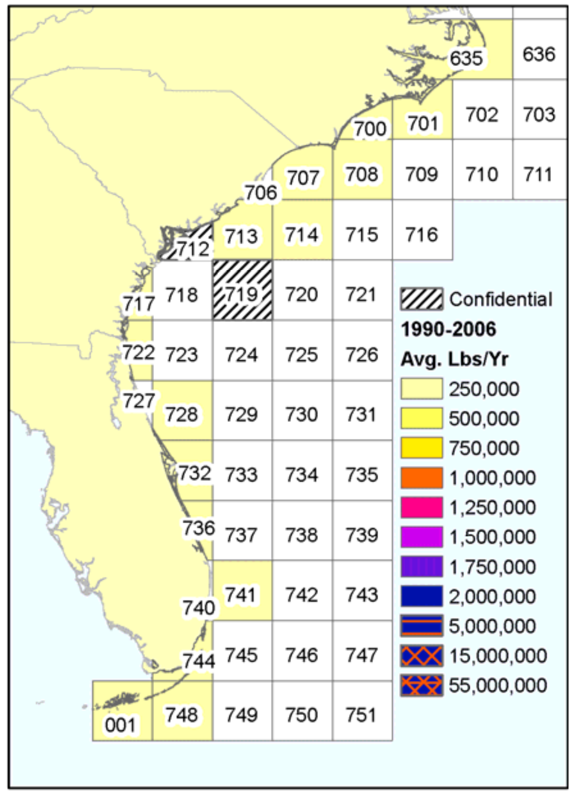


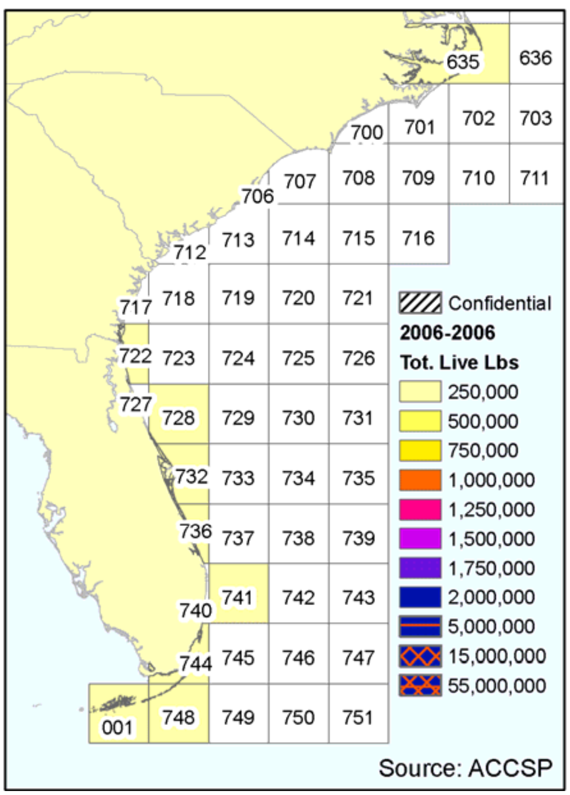


Logbook Catch: GROUPER, NASSAU
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.07	0.00	0.00
728	1.91	0.11	0.00
732	0.59	0.03	0.00
736	0.09	0.01	0.00
741	1.10	0.06	0.00
744	0.41	0.02	0.00
748	0.18	0.01	0.00

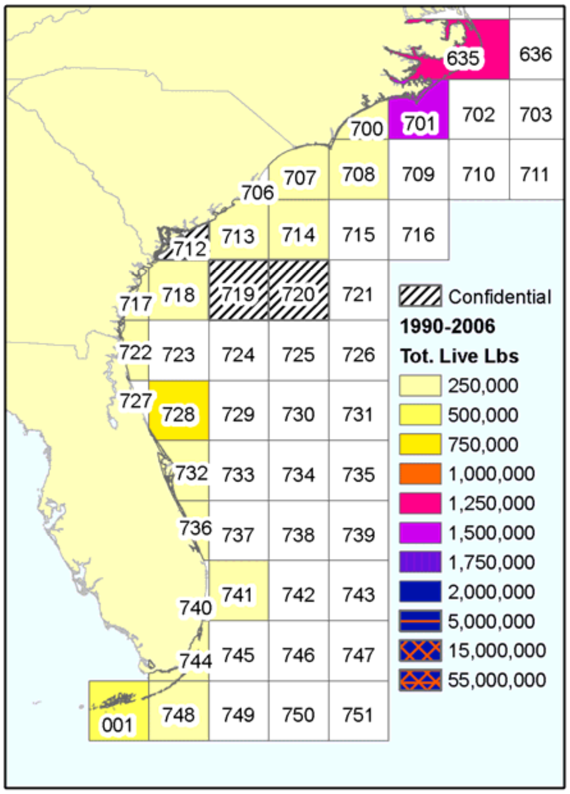


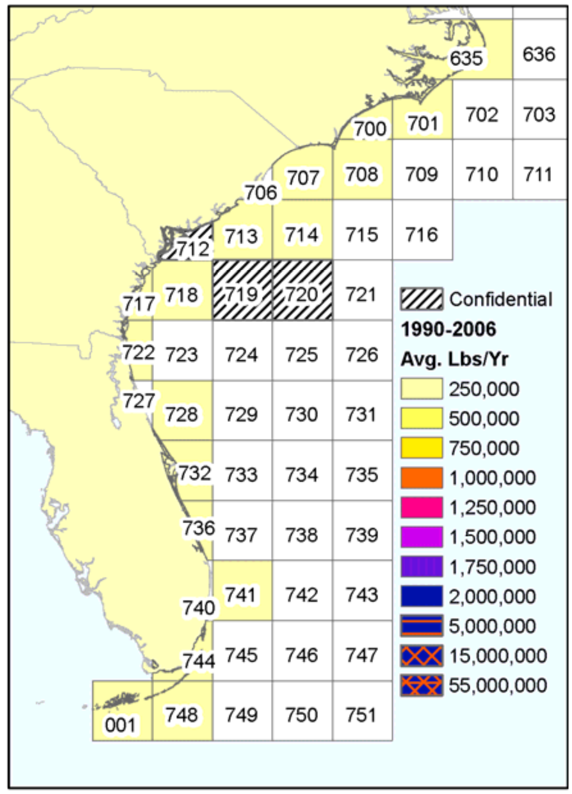


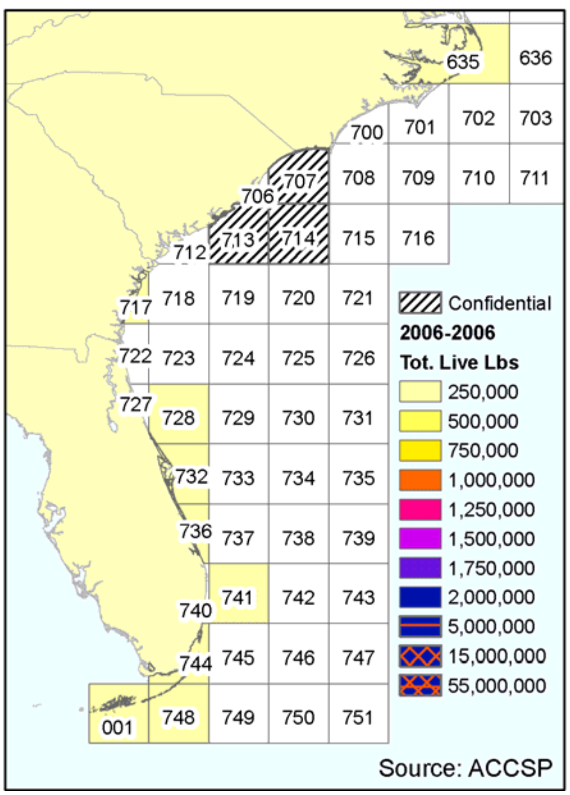


Logbook Catch: GROUPER, RED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	781.23	45.95	18.43
635	1,886.43	110.97	189.20
700	20.68	1.22	0.00
701	576.26	33.90	0.00
707	27.66	1.63	0.00
708	16.51	0.97	0.00
712	Conf.	Conf.	0.00
713	11.86	0.70	0.00
714	0.51	0.03	0.00
717	0.11	0.01	0.00
718	0.03	0.00	0.00
719	Conf.	Conf.	0.00
722	51.01	3.00	1.69
728	108.76	6.40	5.44
732	45.57	2.68	2.08
736	37.56	2.21	1.02
741	42.01	2.47	0.72
744	113.65	6.69	3.97
748	147.27	8.66	1.56

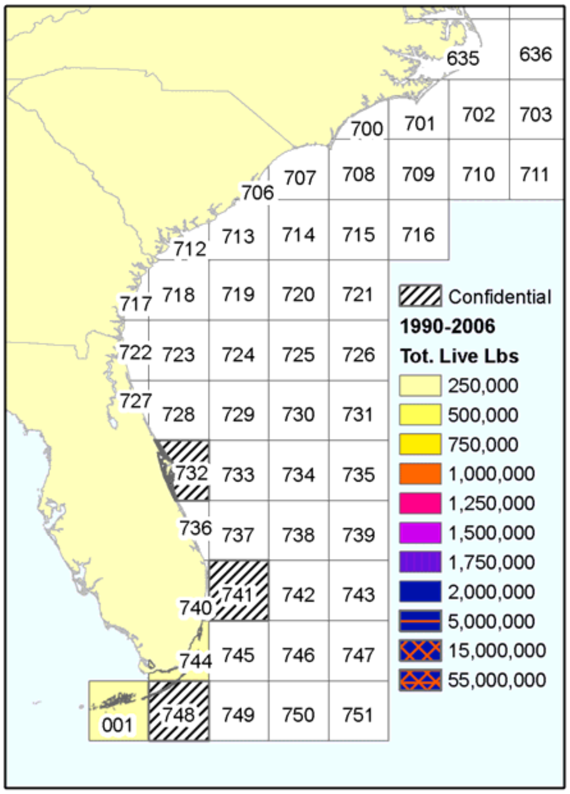


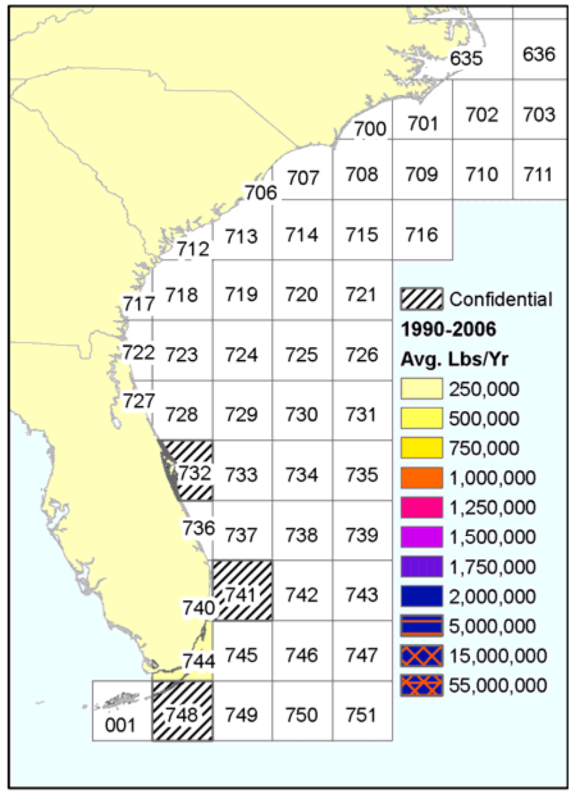


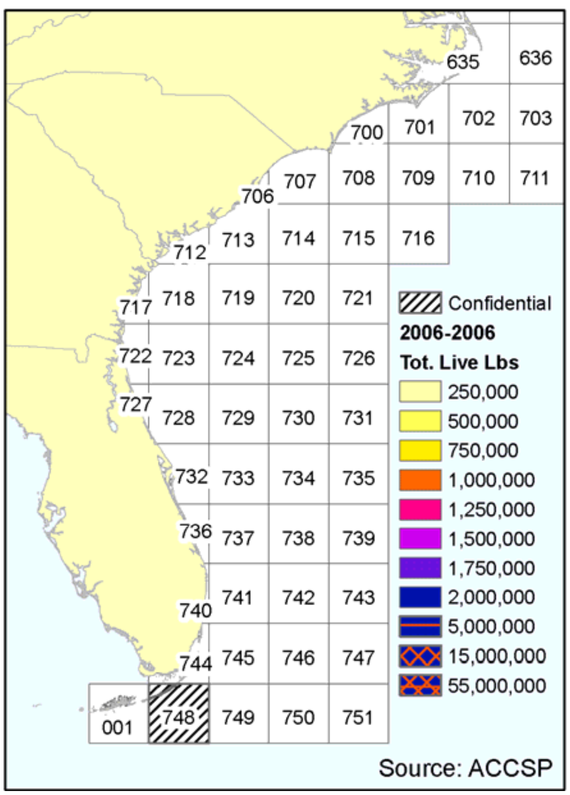


Logbook Catch: GROUPER, SNOWY
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	329.64	19.39	9.08
635	1,118.18	65.78	15.87
700	0.19	0.01	0.00
701	1,275.36	75.02	0.00
707	37.92	2.23	Conf.
708	16.44	0.97	0.00
712	Conf.	Conf.	0.00
713	36.20	2.13	Conf.
714	43.13	2.54	Conf.
717	15.88	0.93	3.57
718	0.17	0.01	0.00
719	Conf.	Conf.	0.00
720	Conf.	Conf.	0.00
722	118.74	6.98	0.00
728	608.61	35.80	5.46
732	156.69	9.22	0.80
736	118.14	6.95	4.23
741	137.73	8.10	2.46
744	142.51	8.38	4.55
748	163.86	9.64	12.71

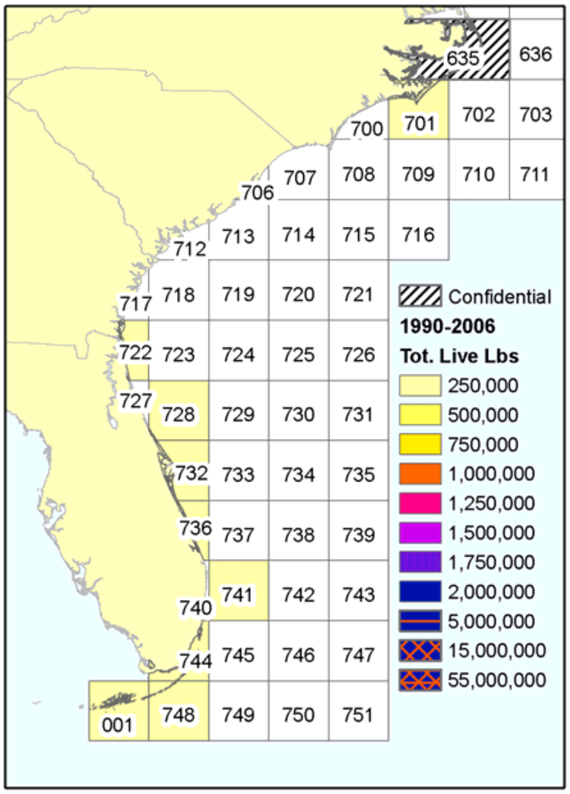


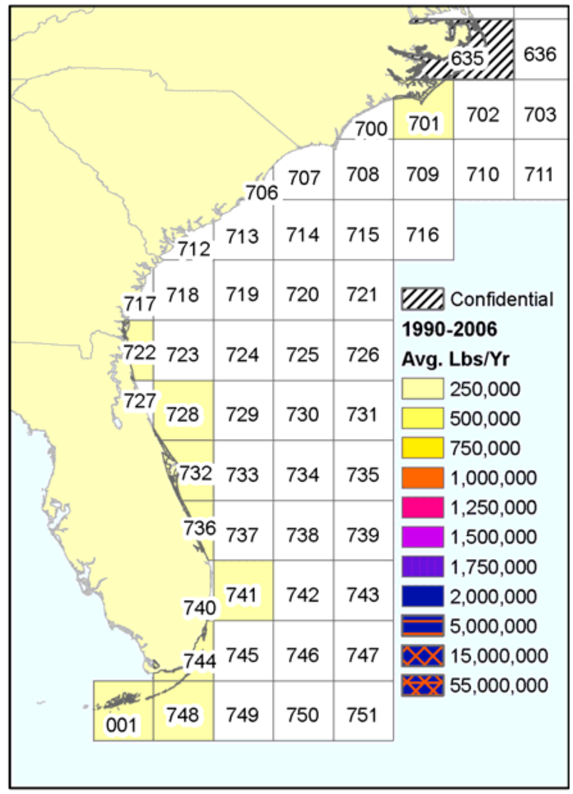


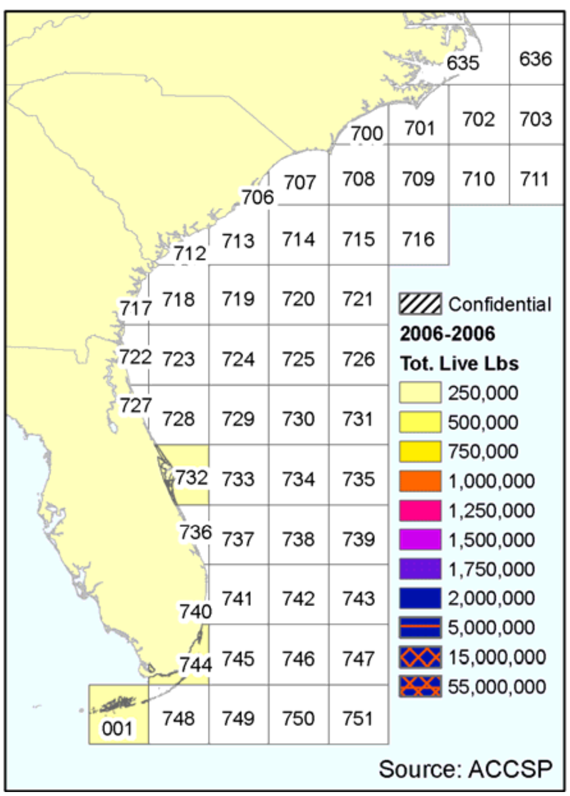


Logbook Catch: GROUPER, TIGER
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.06	0.00	0.00
732	Conf.	Conf.	0.00
741	Conf.	Conf.	0.00
744	0.18	0.01	0.00
748	Conf.	Conf.	Conf.

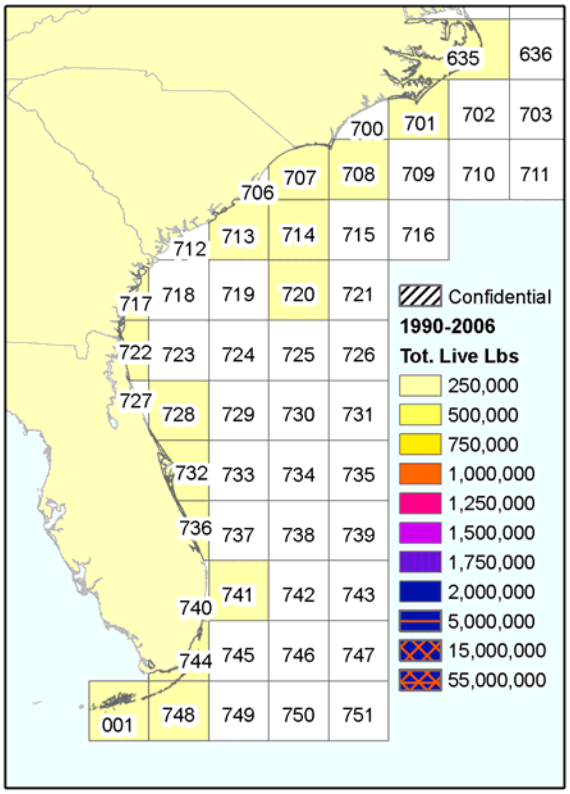


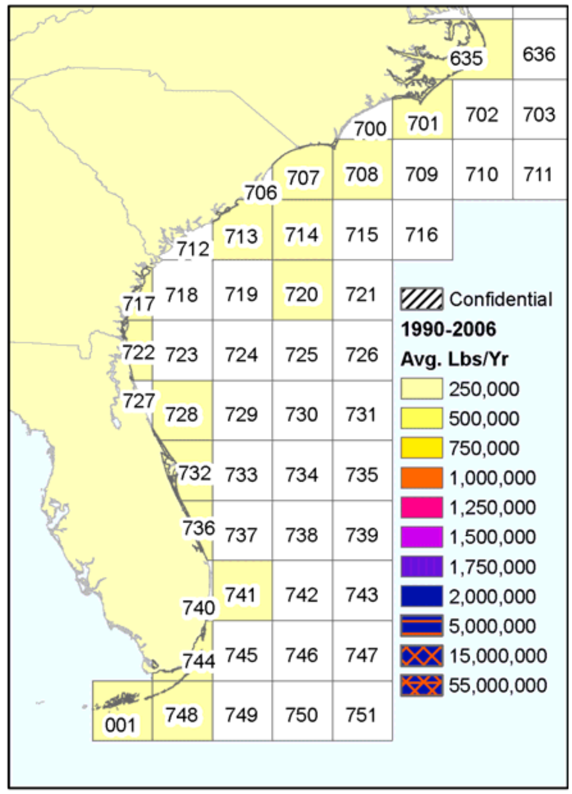


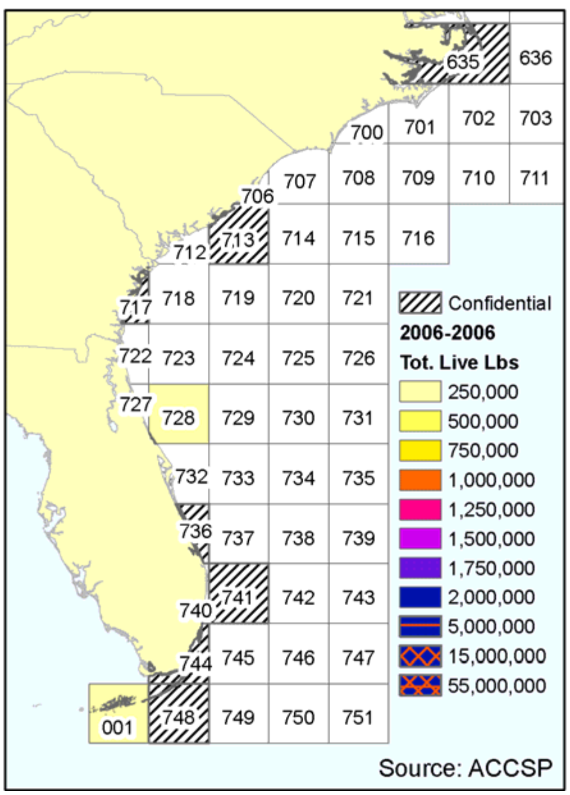


Logbook Catch: GROUPER, WARSAW
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	9.47	0.56	0.18
635	Conf.	Conf.	0.00
701	2.66	0.16	0.00
722	1.54	0.09	0.00
728	13.70	0.81	0.00
732	18.99	1.12	0.10
736	1.83	0.11	0.00
741	4.34	0.26	0.00
744	4.50	0.26	0.08
748	0.87	0.05	0.00

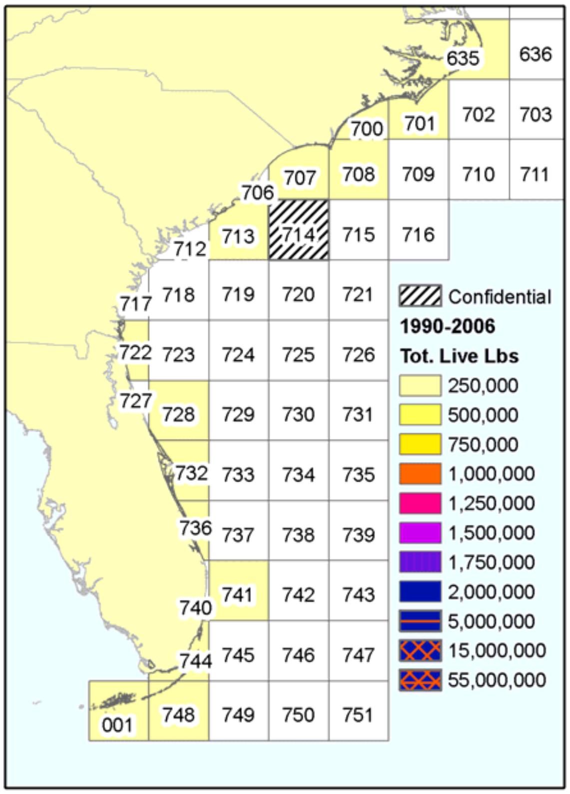


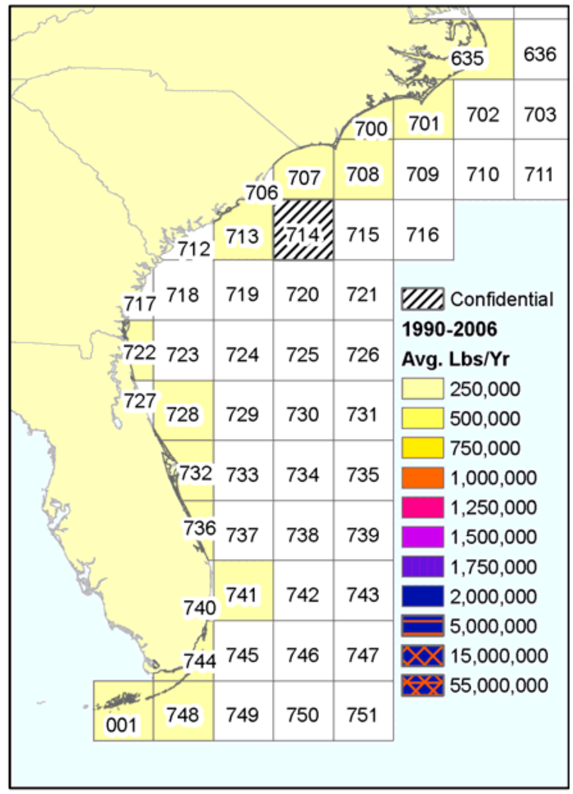


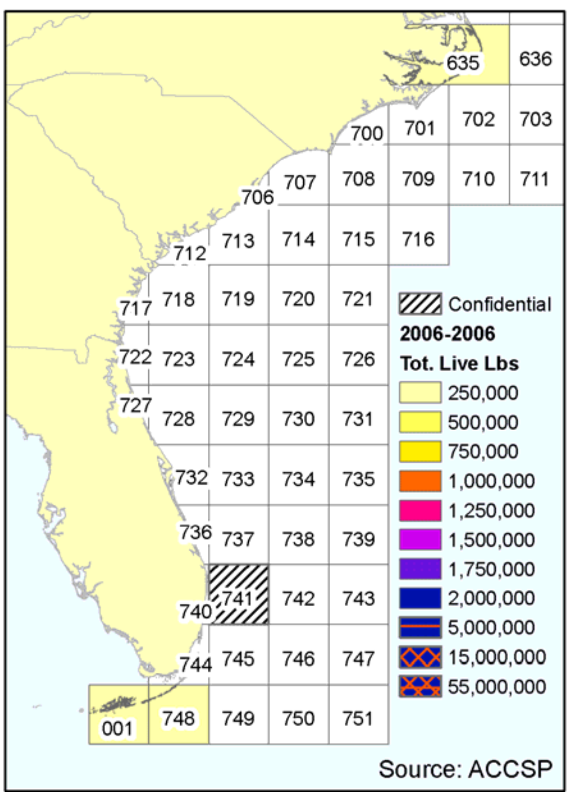


Logbook Catch: GROUPER, YELLOWEDGE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	62.47	3.67	0.36
635	13.62	0.80	Conf.
701	32.55	1.91	0.00
707	1.96	0.12	0.00
708	1.01	0.06	0.00
713	1.31	0.08	Conf.
714	2.82	0.17	0.00
717	1.62	0.10	Conf.
720	0.07	0.00	0.00
722	3.83	0.23	0.00
728	61.21	3.60	0.66
732	44.63	2.63	0.00
736	35.06	2.06	Conf.
741	6.43	0.38	Conf.
744	8.25	0.49	Conf.
748	1.83	0.11	Conf.

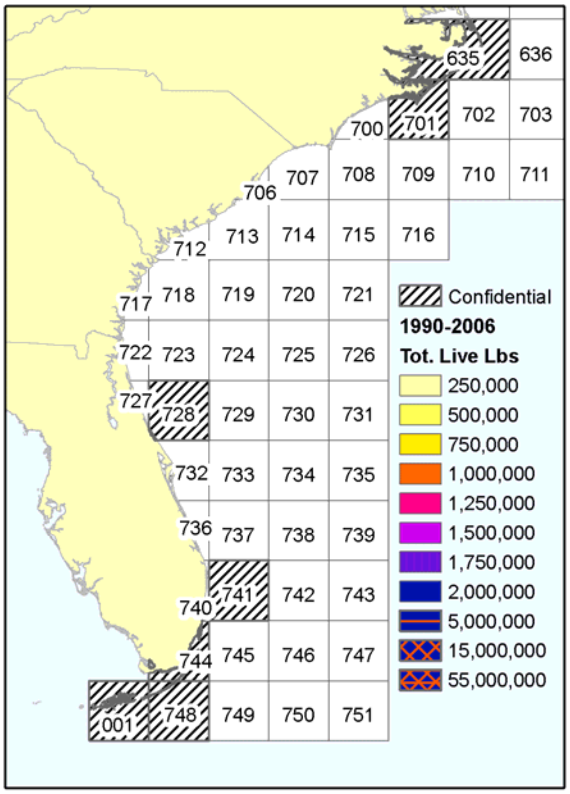


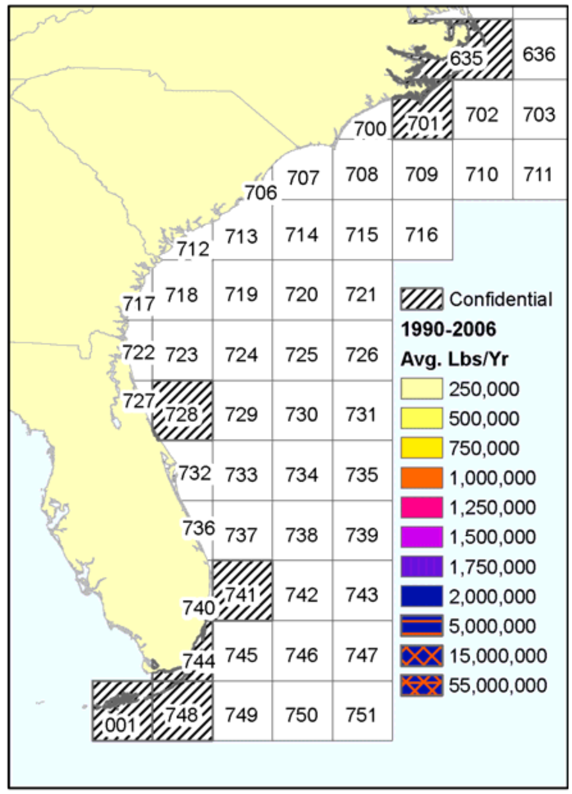


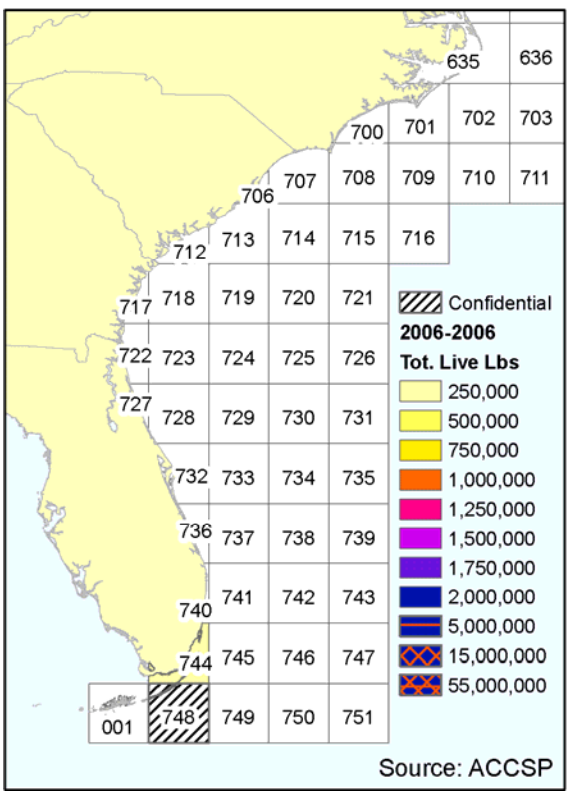


Logbook Catch: GROUPER, YELLOWFIN
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	2.57	0.15	0.04
635	8.86	0.52	0.81
700	4.14	0.24	0.00
701	15.17	0.89	0.00
707	0.63	0.04	0.00
708	3.14	0.18	0.00
713	0.30	0.02	0.00
714	Conf.	Conf.	0.00
722	0.22	0.01	0.00
728	0.57	0.03	0.00
732	0.51	0.03	0.00
736	0.93	0.05	0.00
741	1.23	0.07	Conf.
744	2.08	0.12	0.00
748	0.52	0.03	0.22

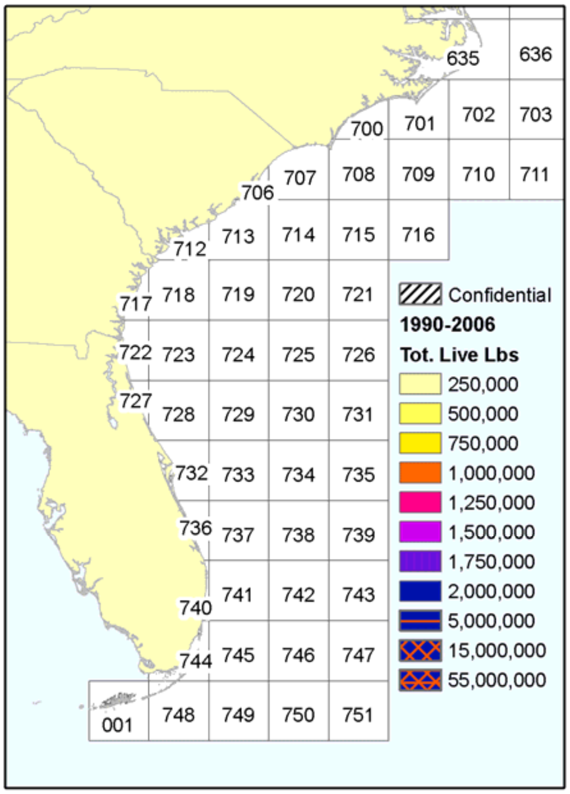


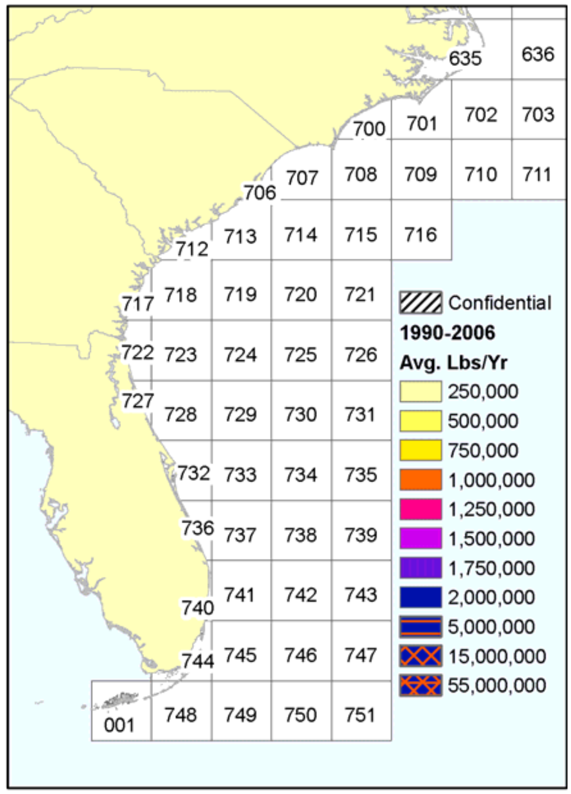


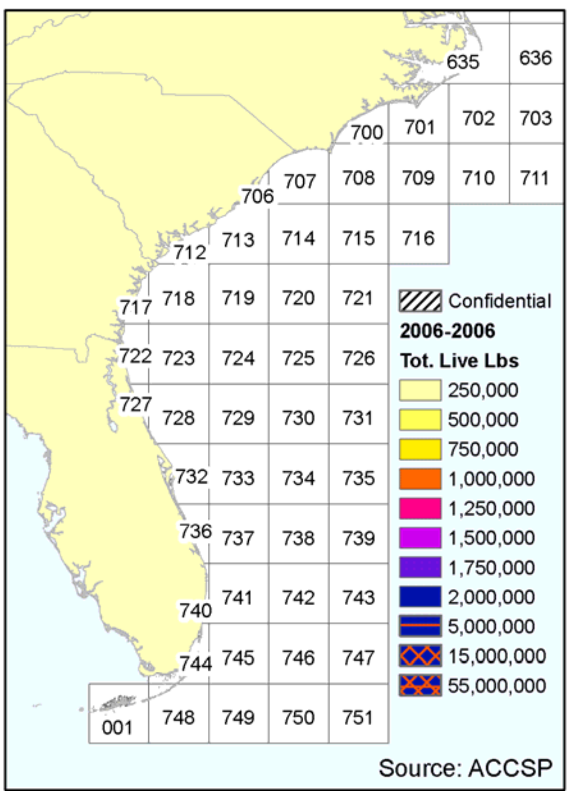


Logbook Catch: GROUPER, YELLOWMOUTH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	Conf.	Conf.	0.00
635	Conf.	Conf.	0.00
701	Conf.	Conf.	0.00
728	Conf.	Conf.	0.00
741	Conf.	Conf.	0.00
744	Conf.	Conf.	0.02
748	Conf.	Conf.	Conf.

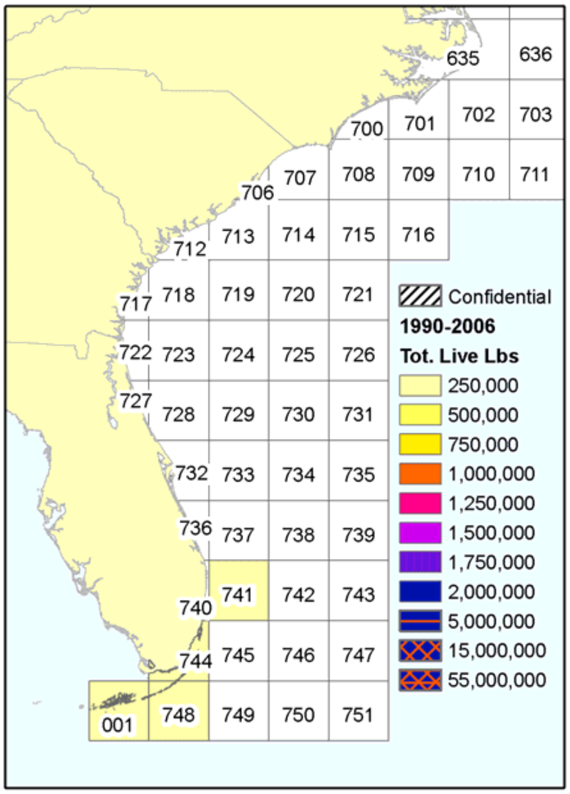


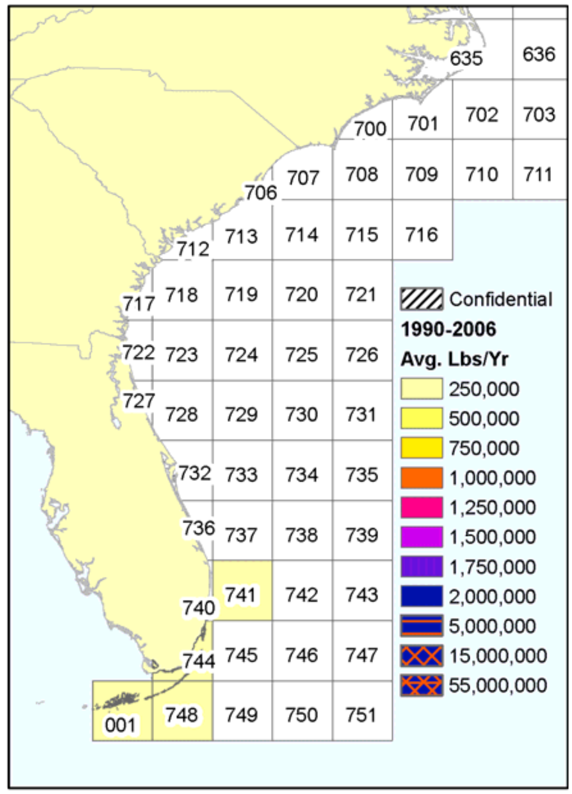


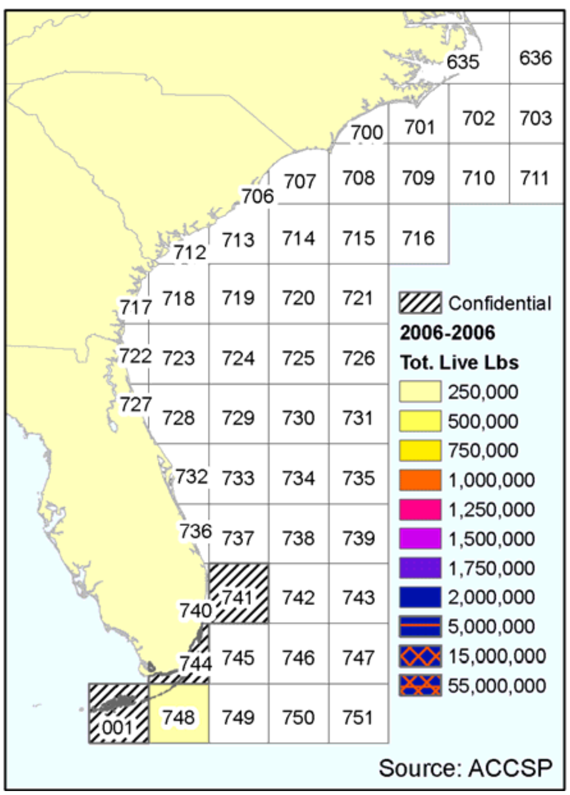


Logbook Catch: GRUNT, BLUESTRIPED
1990-2006
Pounds in Thousands

No data for this area

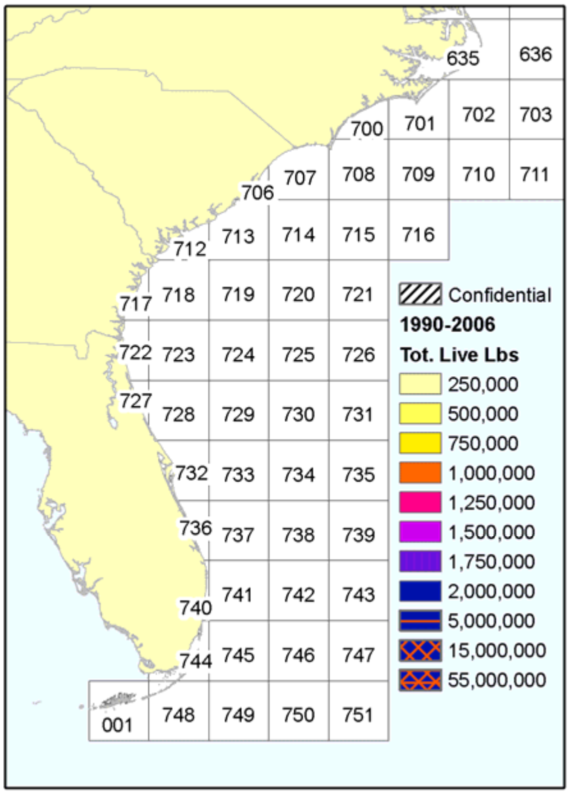


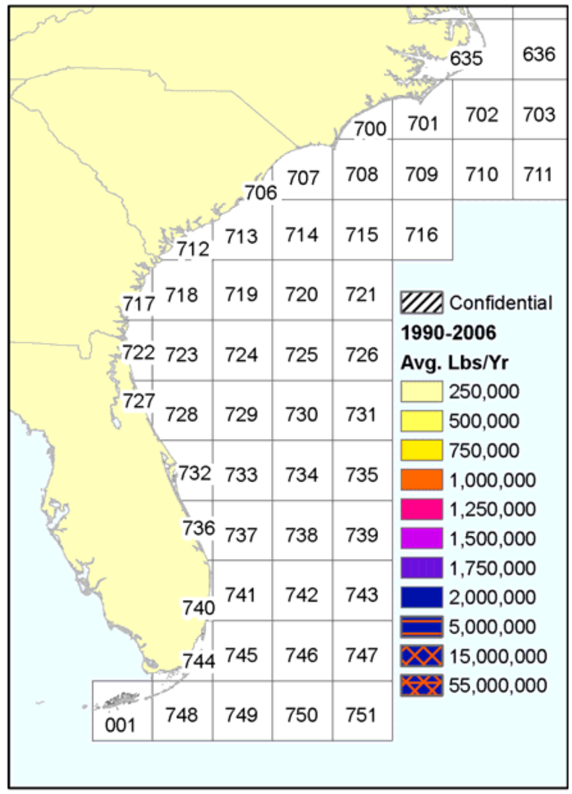


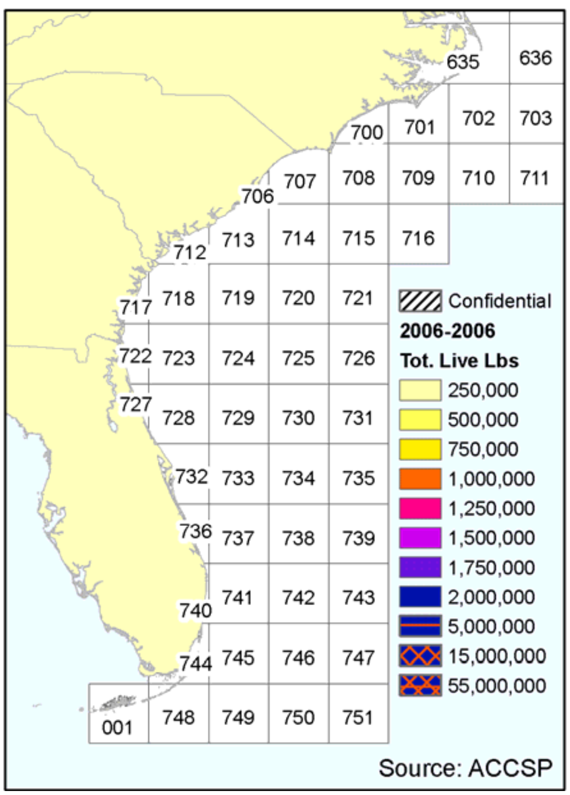


Logbook Catch: GRUNT, FRENCH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.88	0.05	Conf.
741	1.80	0.11	Conf.
744	0.82	0.05	Conf.
748	14.19	0.83	1.06

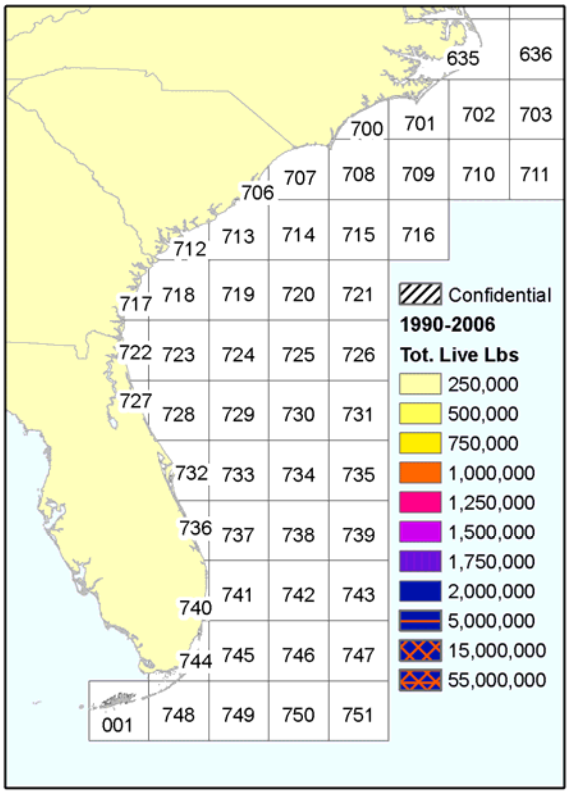


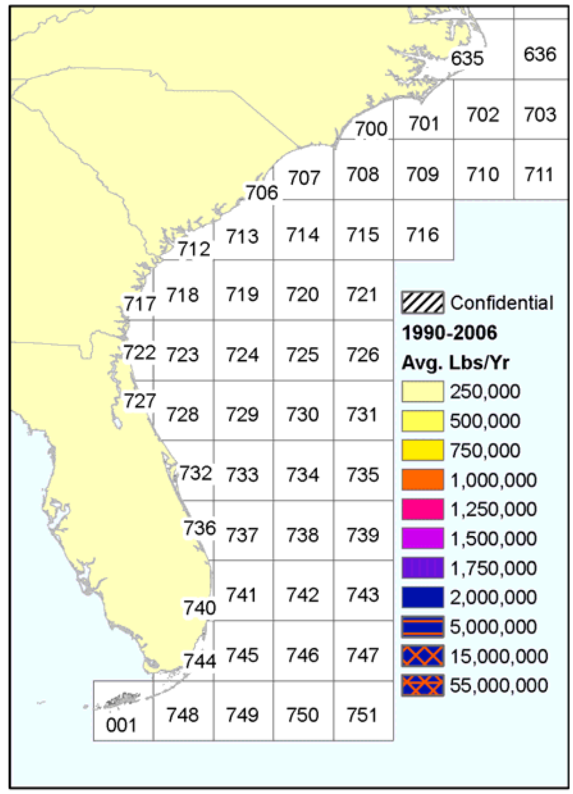


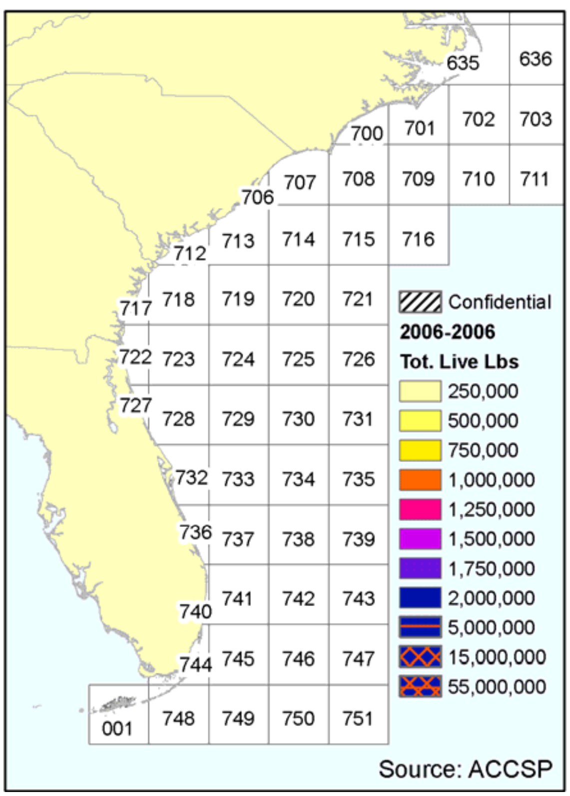


Logbook Catch: GRUNT, SMALLMOUTH
1990-2006
Pounds in Thousands

No data for this area

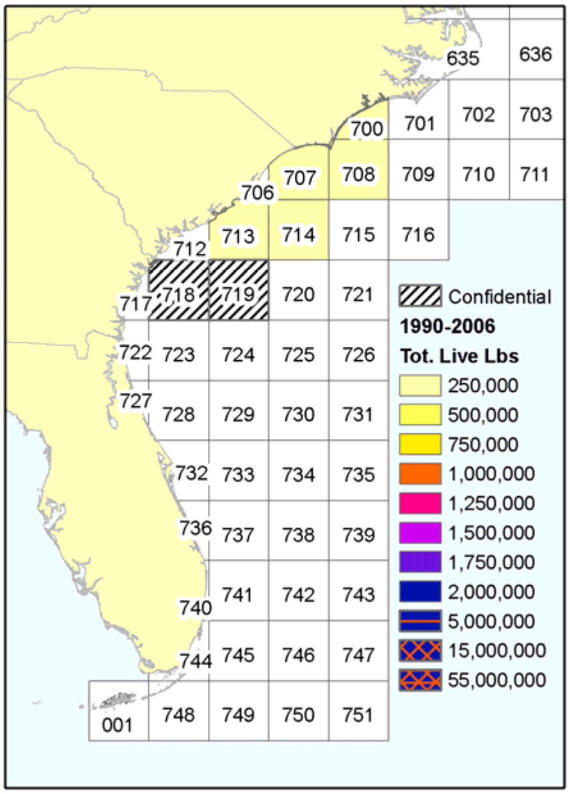


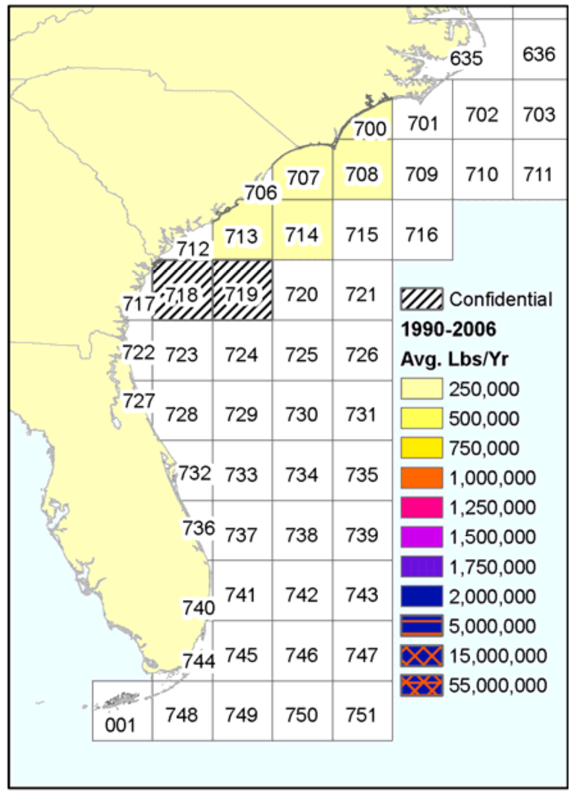


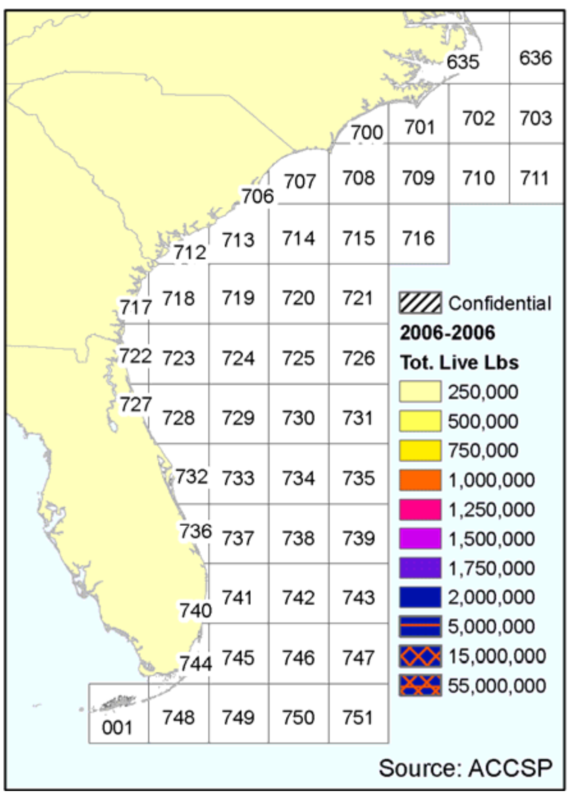


Logbook Catch: GRUNT, SPANISH
1990-2006
Pounds in Thousands

No data for this area

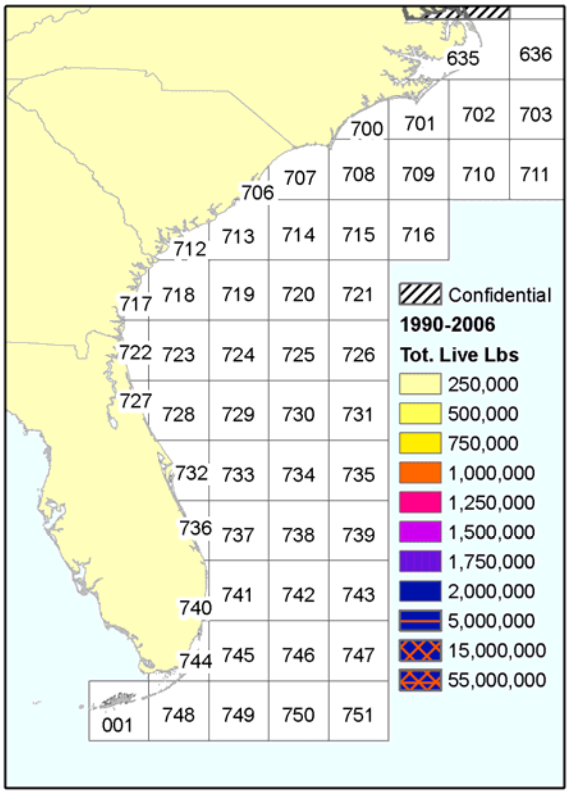


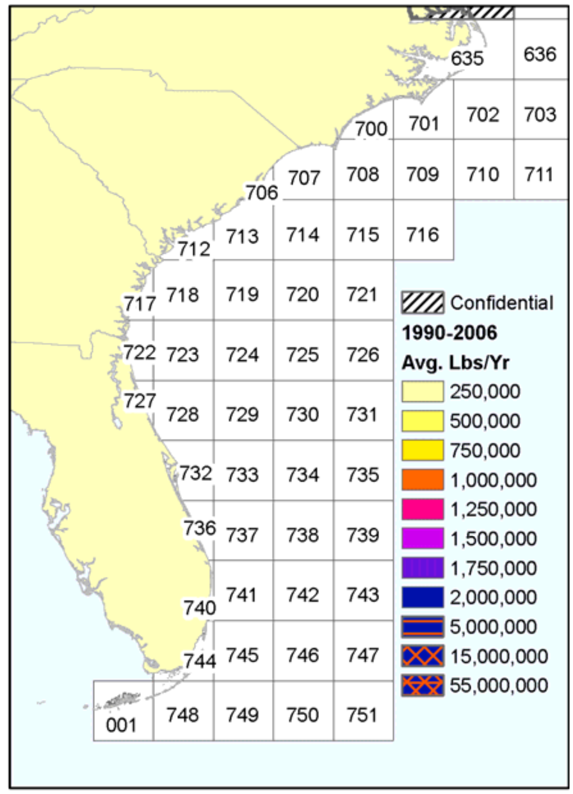


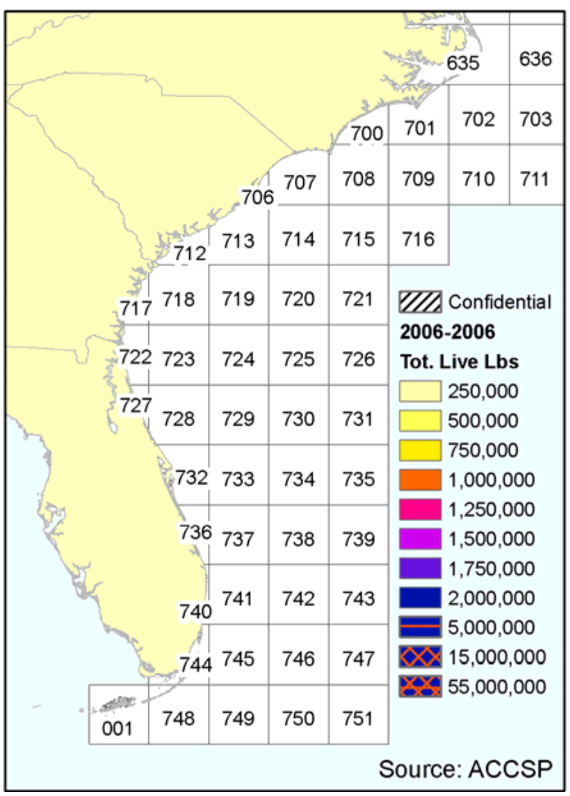


Logbook Catch: GRUNT, WHITE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
700	3.47	0.20	0.00
707	21.49	1.26	0.00
708	1.67	0.10	0.00
713	8.18	0.48	0.00
714	0.61	0.04	0.00
718	Conf.	Conf.	0.00
719	Conf.	Conf.	0.00

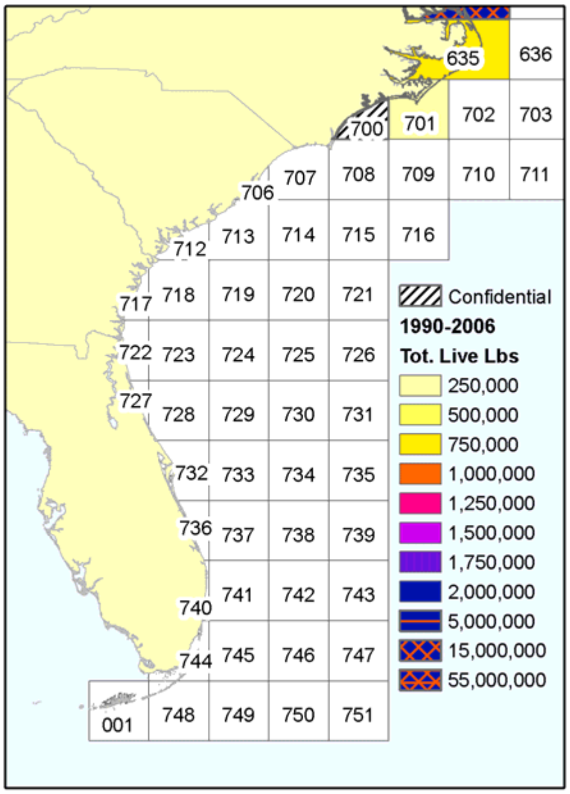


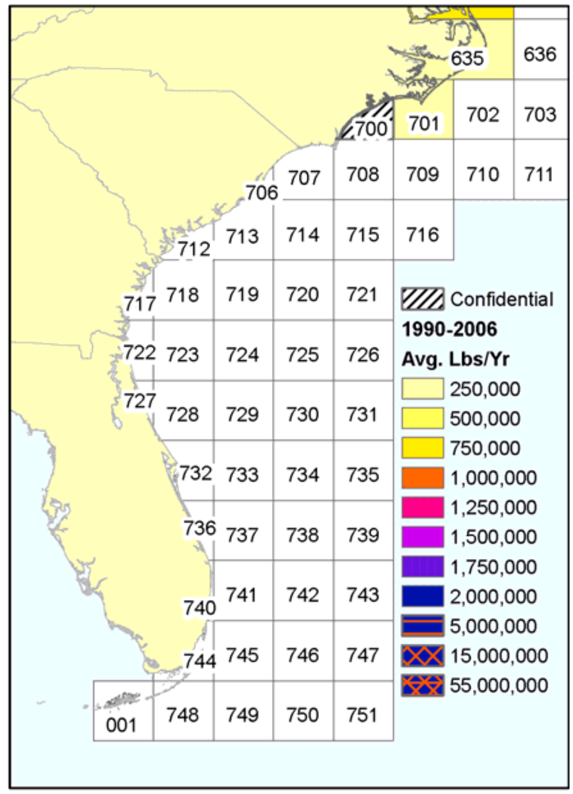


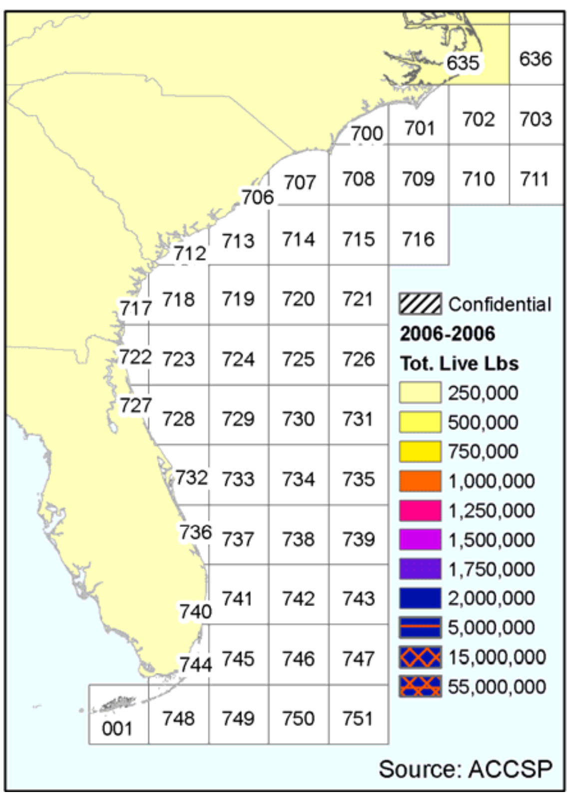


Logbook Catch: HERRING, BLUEBACK
1990-2006
Pounds in Thousands

No data for this area

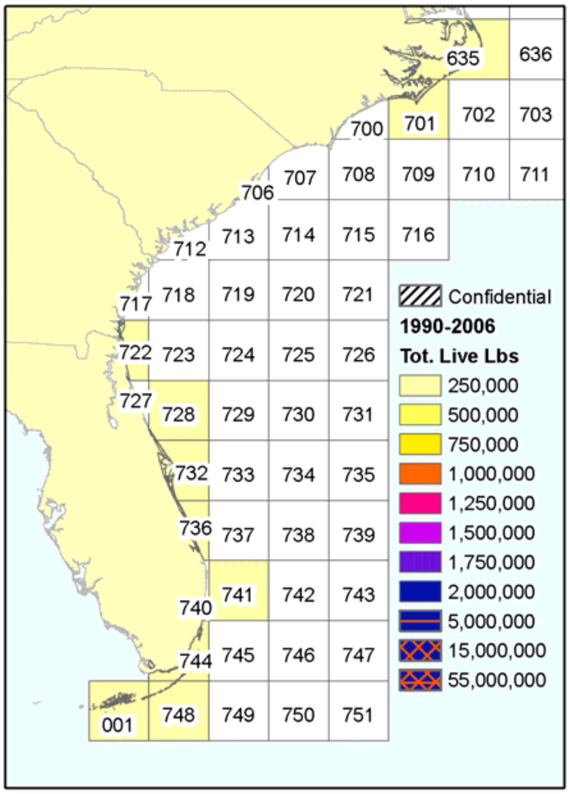


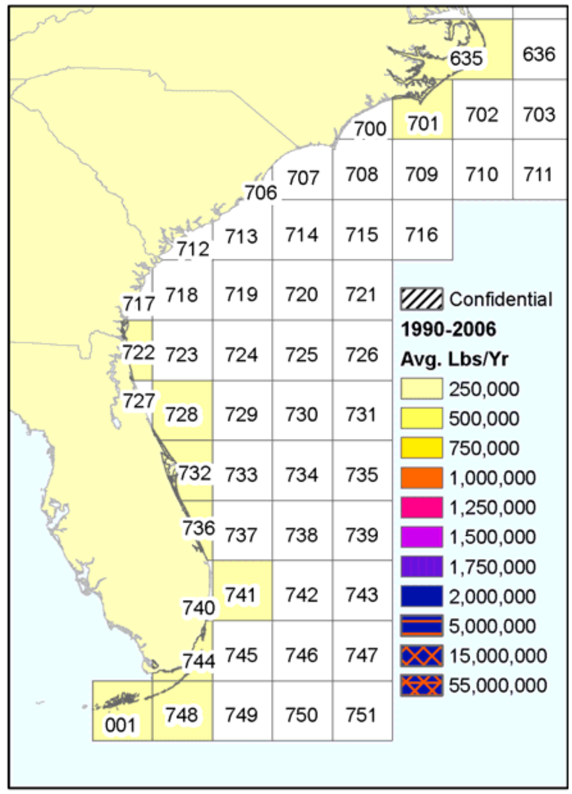


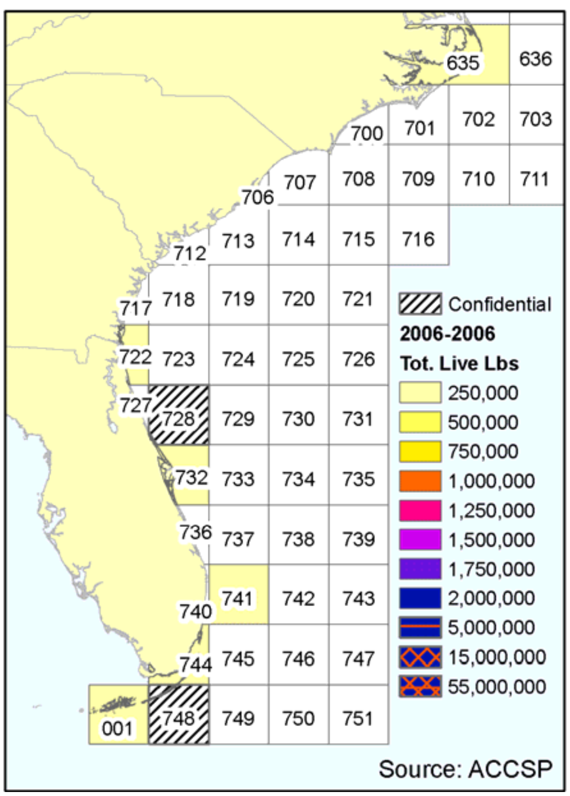


Logbook Catch: HERRINGS, RIVER
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
635	690.05	40.59	13.46
700	Conf.	Conf.	0.00
701	180.32	10.61	0.00

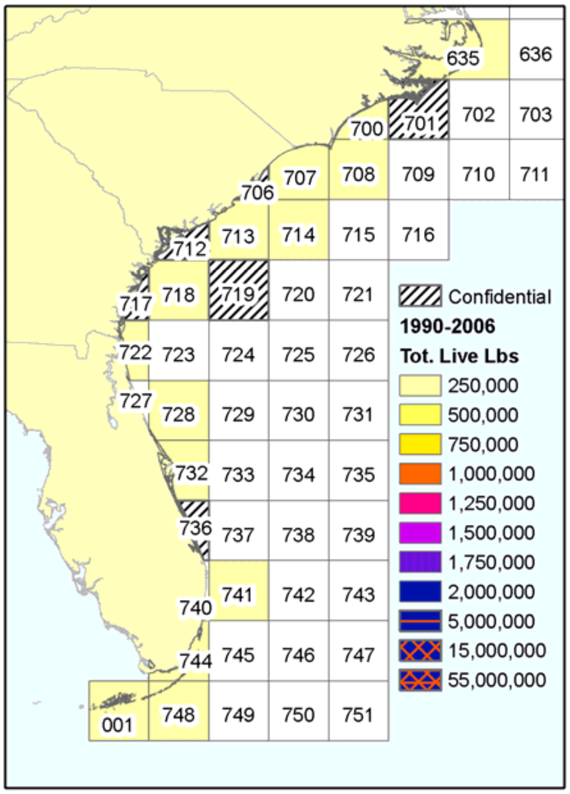


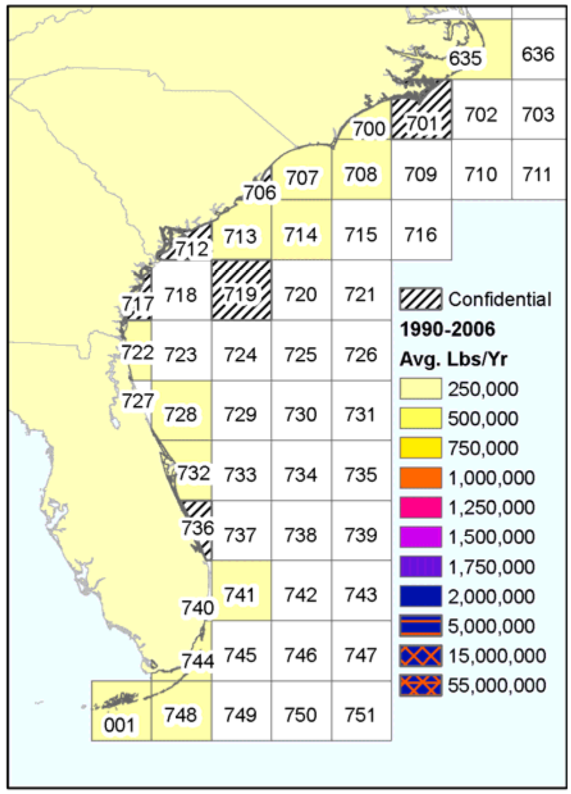


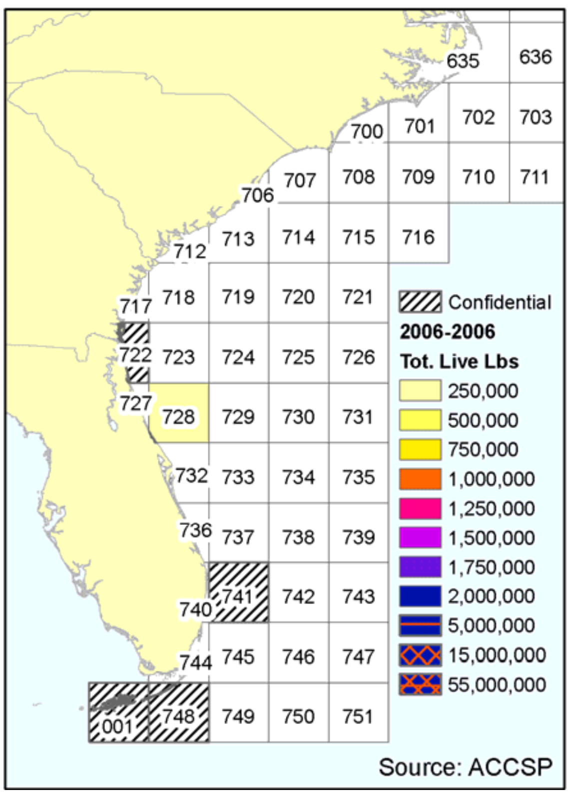


Logbook Catch: HIND, RED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	19.39	1.14	0.12
635	159.33	9.37	15.03
701	146.66	8.63	0.00
722	7.10	0.42	0.05
728	1.76	0.10	Conf.
732	1.58	0.09	0.01
736	0.11	0.01	0.00
741	0.98	0.06	0.06
744	2.99	0.18	0.05
748	1.86	0.11	Conf.

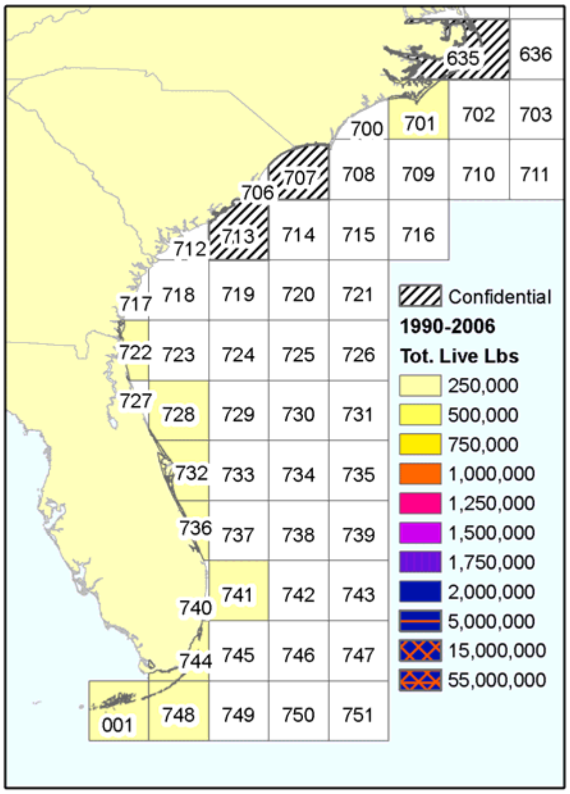


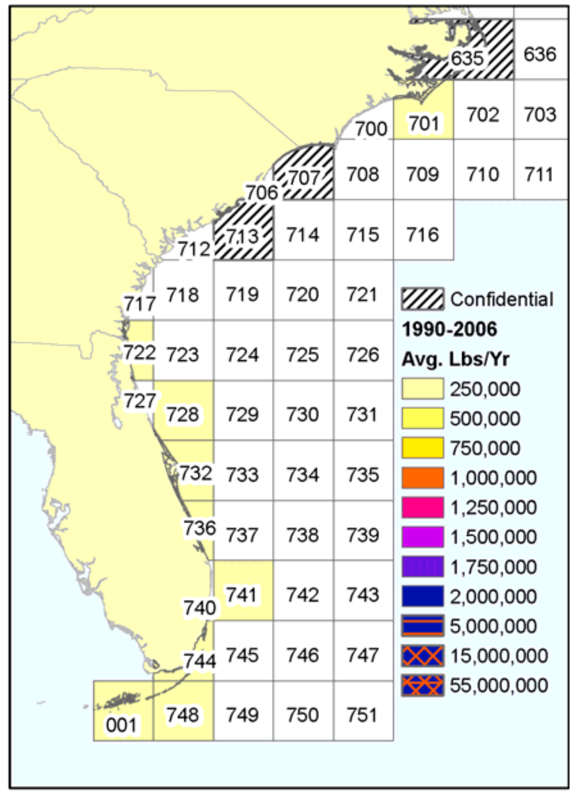


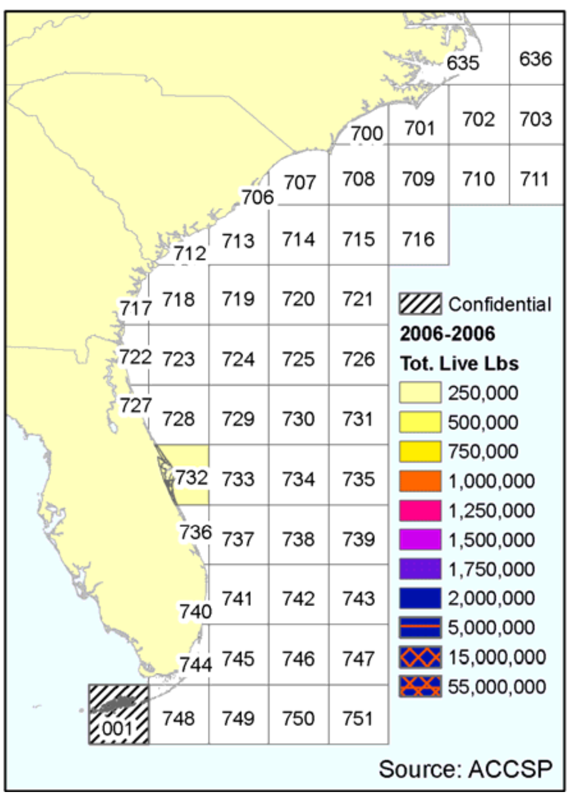


Logbook Catch: HIND, ROCK
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.30	0.02	Conf.
635	0.09	0.01	0.00
700	5.19	0.31	0.00
701	Conf.	Conf.	0.00
706	Conf.	Conf.	0.00
707	17.42	1.02	0.00
708	7.07	0.42	0.00
712	Conf.	Conf.	0.00
713	7.23	0.43	0.00
714	0.52	0.03	0.00
717	Conf.	Conf.	0.00
718	0.03	0.00	0.00
719	Conf.	Conf.	0.00
722	4.15	0.24	Conf.
728	0.92	0.05	0.05
732	0.11	0.01	0.00
736	Conf.	Conf.	0.00
741	1.00	0.06	Conf.
744	0.59	0.03	0.00
748	0.27	0.02	Conf.

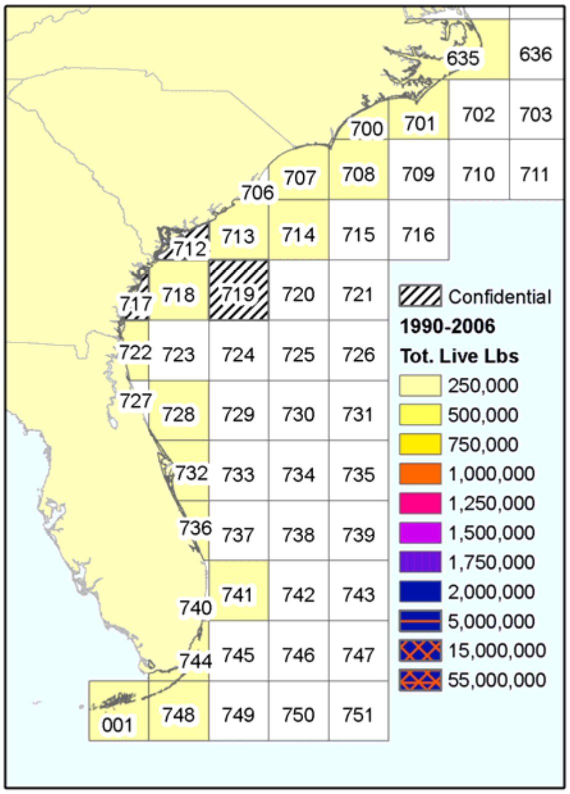


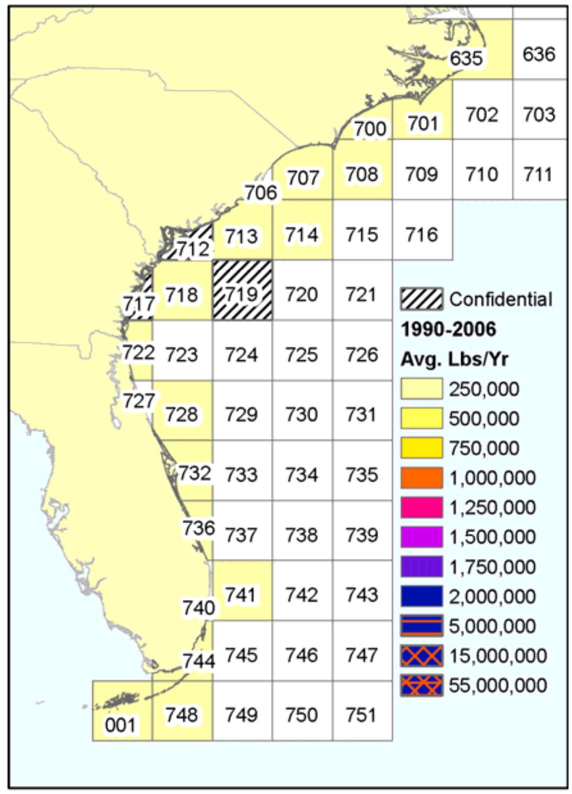


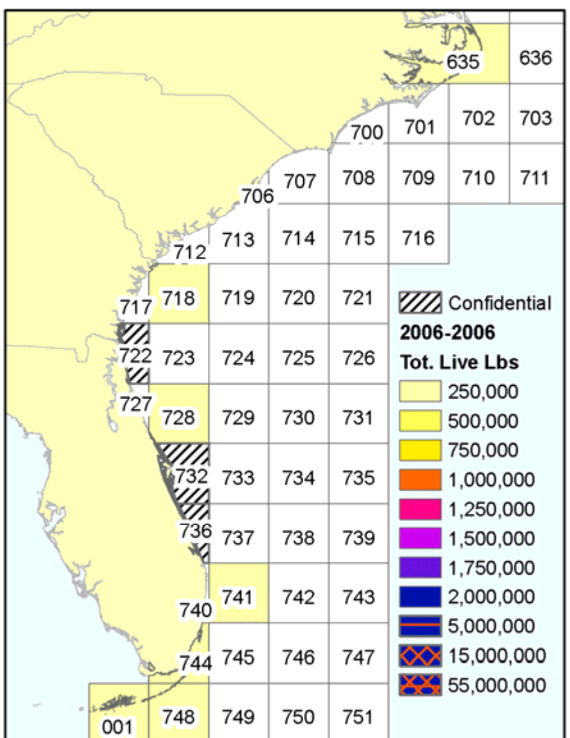


Logbook Catch: HIND, SPECKLED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	17.39	1.02	Conf.
635	Conf.	Conf.	0.00
701	16.73	0.98	0.00
707	Conf.	Conf.	0.00
713	Conf.	Conf.	0.00
722	1.35	0.08	0.00
728	0.44	0.03	0.00
732	0.82	0.05	0.02
736	0.15	0.01	0.00
741	0.41	0.02	0.00
744	0.90	0.05	0.00
748	0.25	0.01	0.00



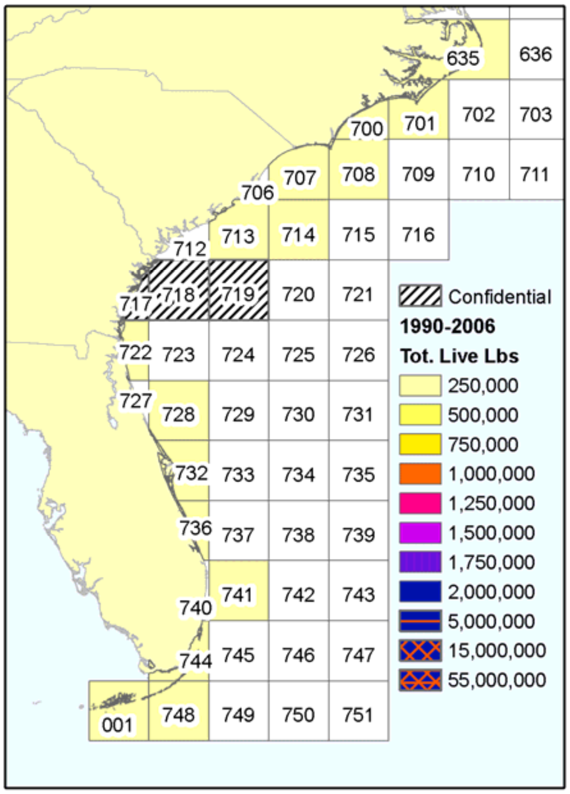


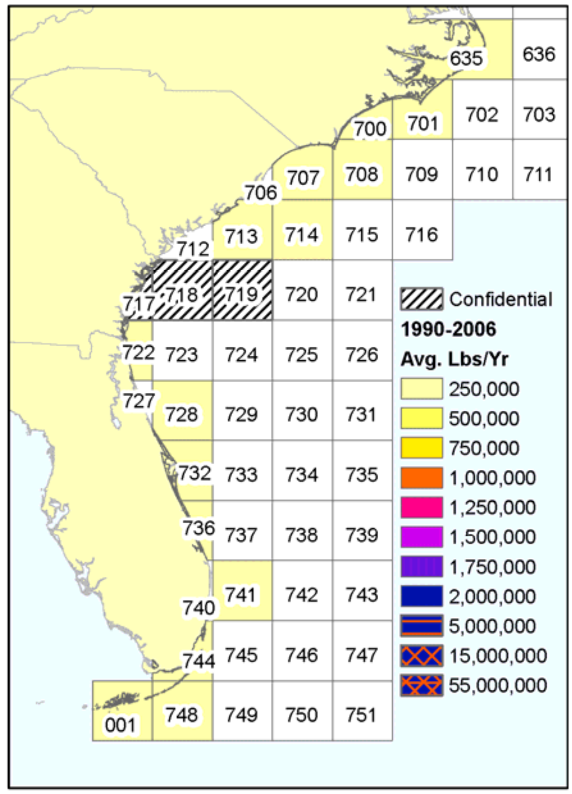


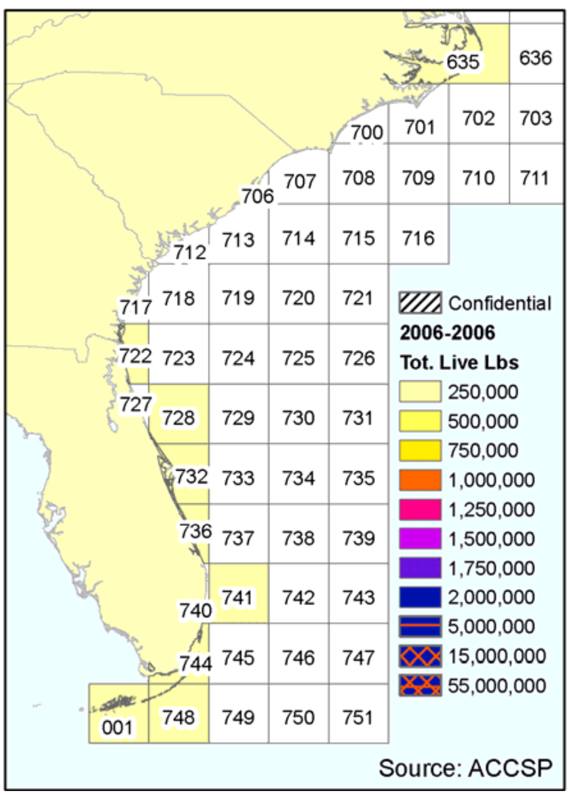
Source: ACCSP

Logbook Catch: HOGFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	160.65	9.45	3.43
635	106.49	6.26	7.14
700	3.08	0.18	0.00
701	148.31	8.72	0.00
707	7.51	0.44	0.00
708	3.92	0.23	0.00
712	Conf.	Conf.	0.00
713	6.43	0.38	0.00
714	0.19	0.01	0.00
717	Conf.	Conf.	0.00
718	0.08	0.00	0.01
719	Conf.	Conf.	0.00
722	13.36	0.79	Conf.
728	5.37	0.32	0.20
732	2.55	0.15	Conf.
736	6.33	0.37	Conf.
741	43.20	2.54	2.17
744	63.38	3.73	3.59
748	43.17	2.54	1.48

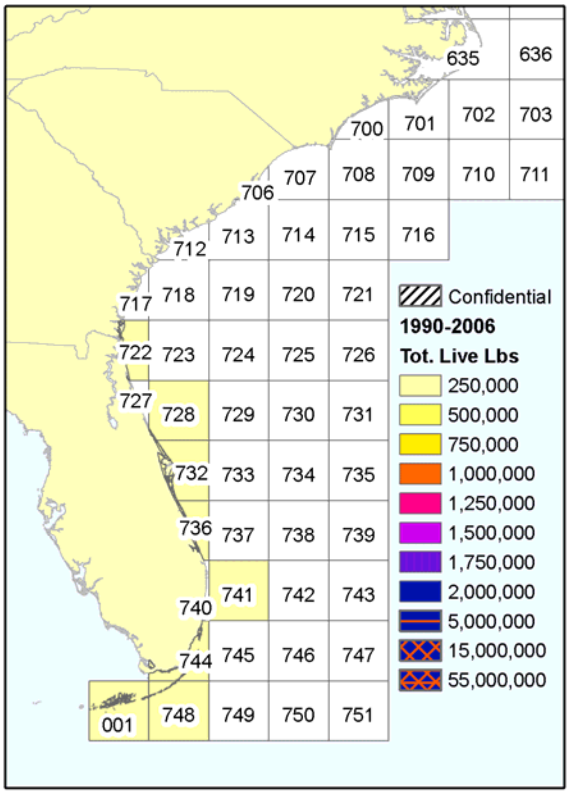


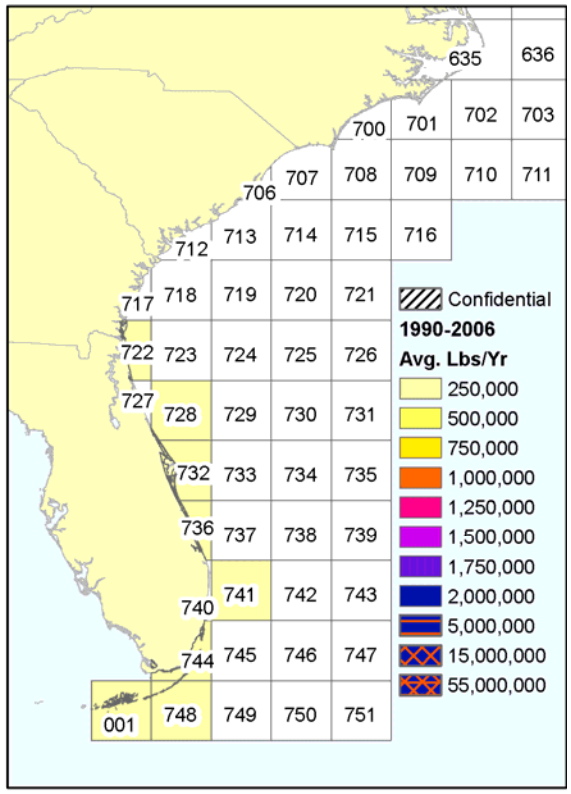


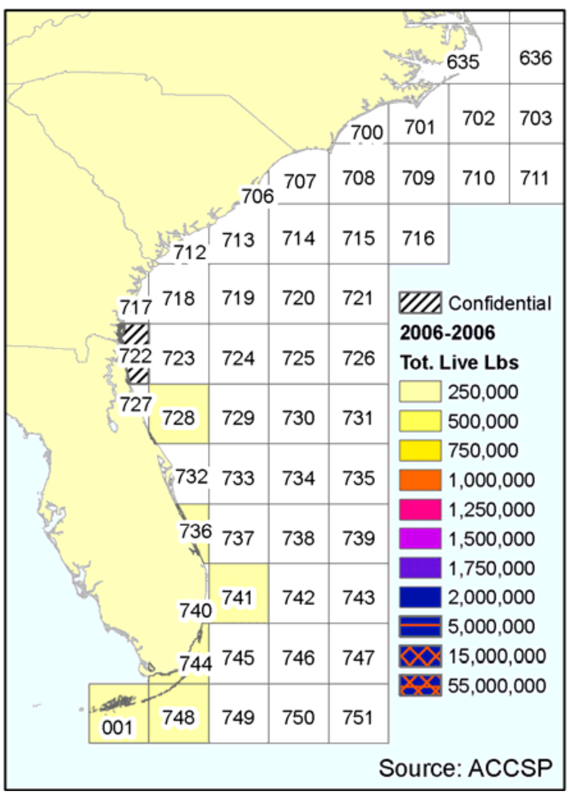


Logbook Catch: JACK, ALMACO
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	12.21	0.72	1.93
635	107.58	6.33	11.51
700	16.69	0.98	0.00
701	0.95	0.06	0.00
707	34.90	2.05	0.00
708	6.52	0.38	0.00
713	10.72	0.63	0.00
714	1.07	0.06	0.00
717	Conf.	Conf.	0.00
718	Conf.	Conf.	0.00
719	Conf.	Conf.	0.00
722	117.82	6.93	5.14
728	224.69	13.22	13.18
732	0.92	0.05	0.05
736	3.46	0.20	0.11
741	11.37	0.67	0.70
744	187.59	11.03	1.23
748	18.85	1.11	6.39

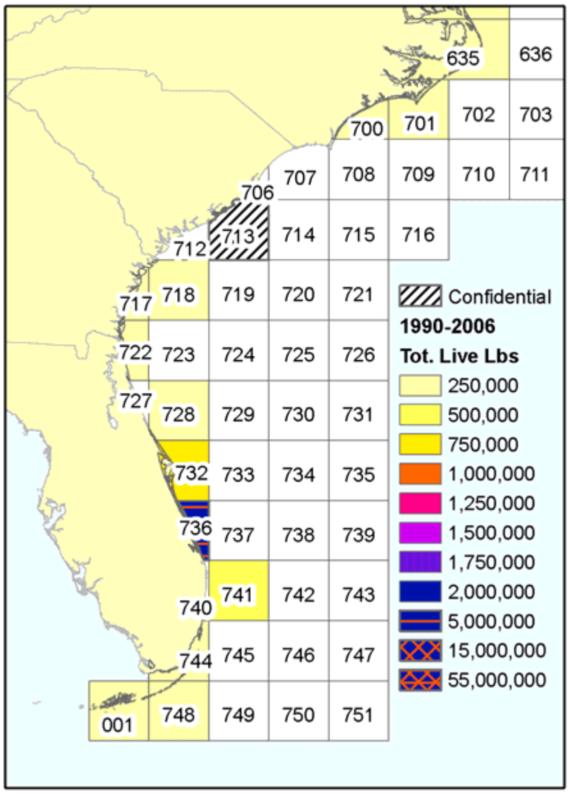


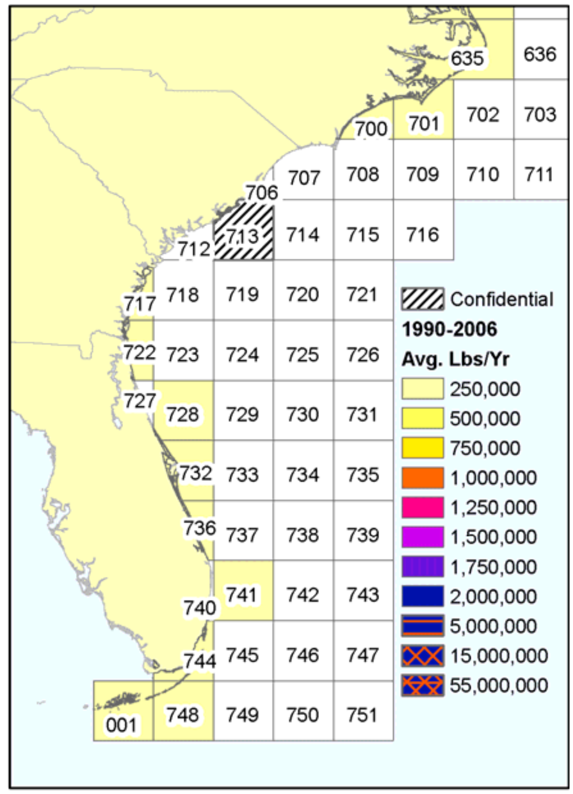


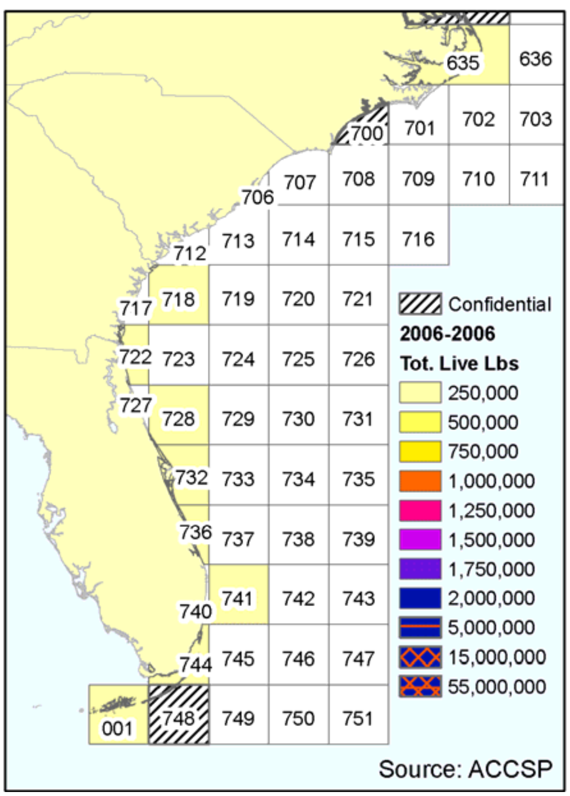


Logbook Catch: JACK, BAR
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	15.39	0.91	2.76
722	7.17	0.42	Conf.
728	8.20	0.48	0.29
732	0.12	0.01	0.00
736	0.20	0.01	0.02
741	1.75	0.10	0.19
744	10.70	0.63	0.28
748	1.63	0.10	0.09

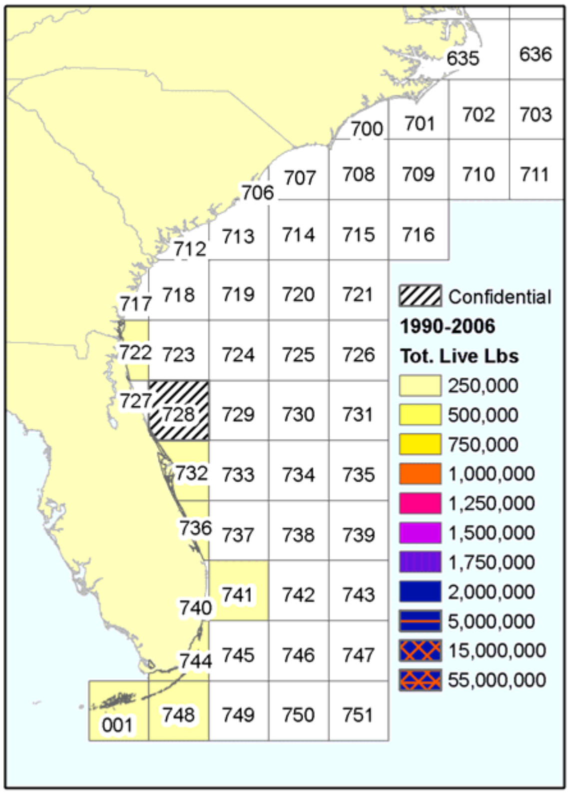


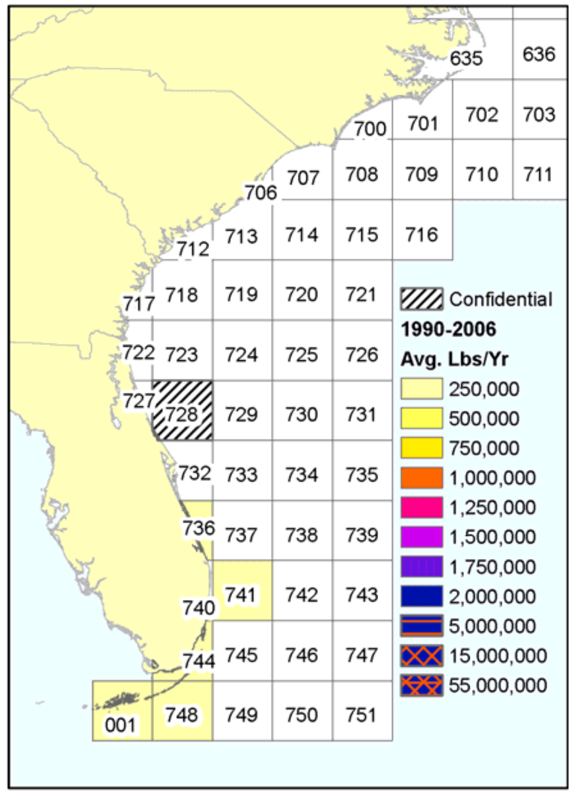


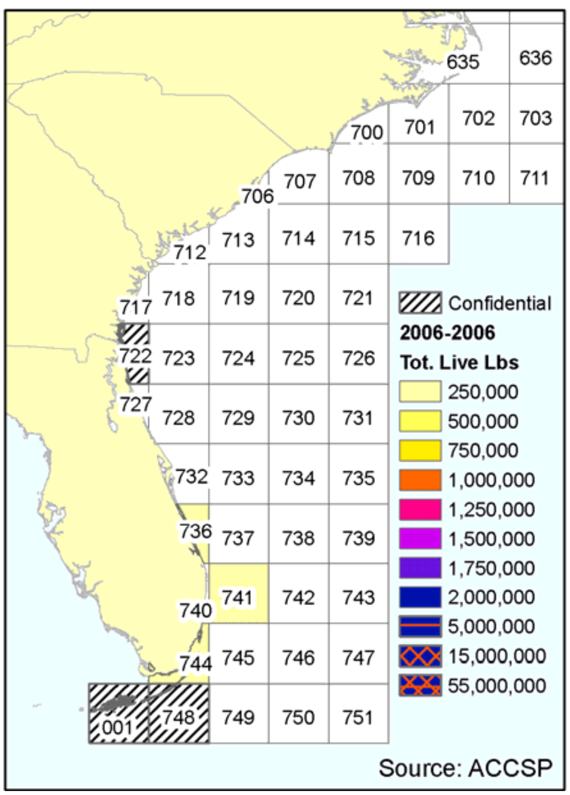


Logbook Catch: JACK, CREVALLE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	58.93	3.47	0.20
635	58.76	3.46	0.76
700	0.13	0.01	Conf.
701	37.71	2.22	0.00
713	Conf.	Conf.	0.00
717	1.18	0.07	0.00
718	0.01	0.00	0.01
722	60.03	3.53	0.64
728	246.81	14.52	9.33
732	702.81	41.34	9.13
736	2,094.75	123.22	117.02
741	397.60	23.39	35.95
744	142.30	8.37	5.89
748	26.25	1.54	Conf.

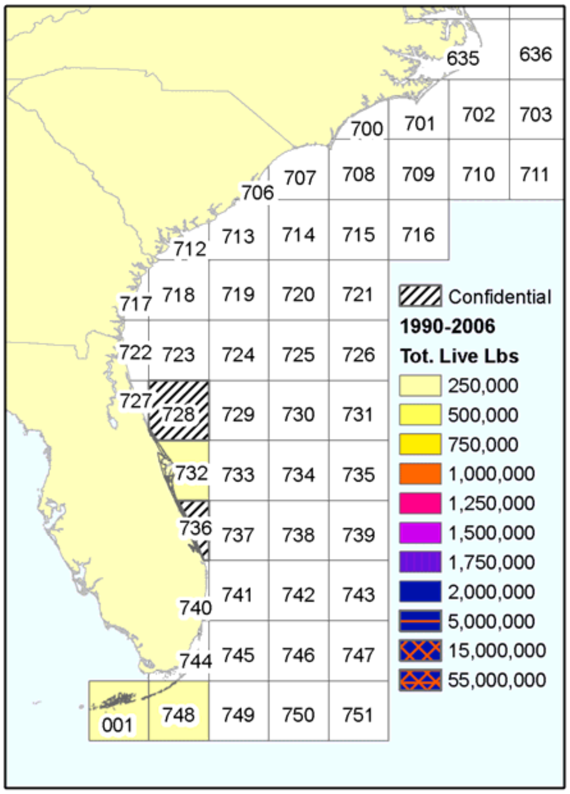


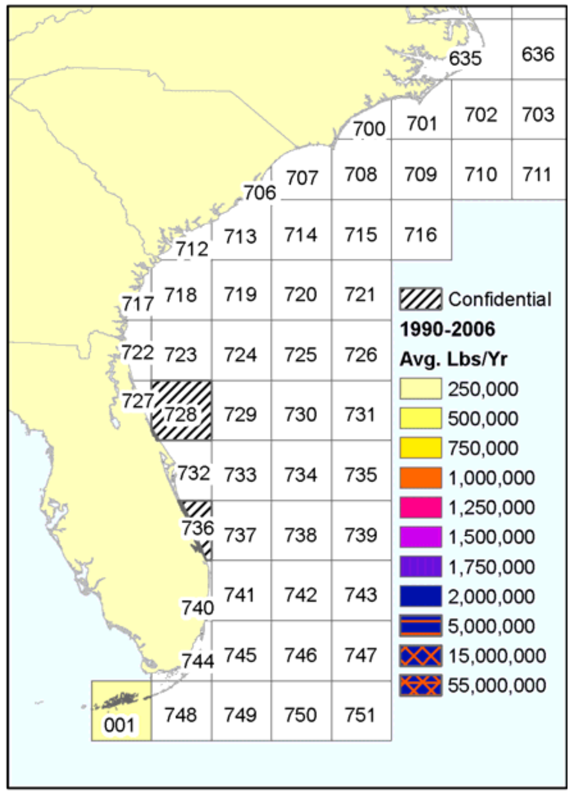


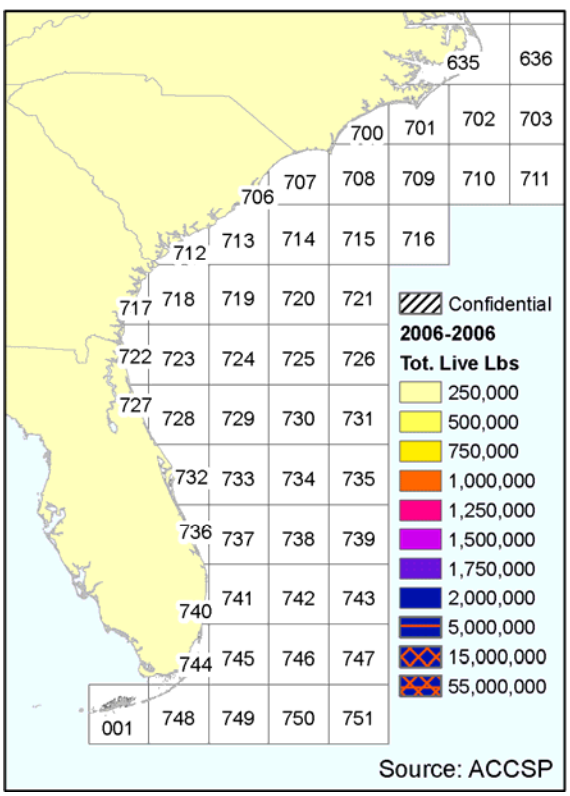


Logbook Catch: JACK, YELLOW
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	9.31	0.55	Conf.
722	0.03	0.00	Conf.
728	Conf.	Conf.	0.00
732	0.02	0.00	0.00
736	0.37	0.02	0.02
741	2.17	0.13	0.29
744	22.19	1.31	0.70
748	4.98	0.29	Conf.

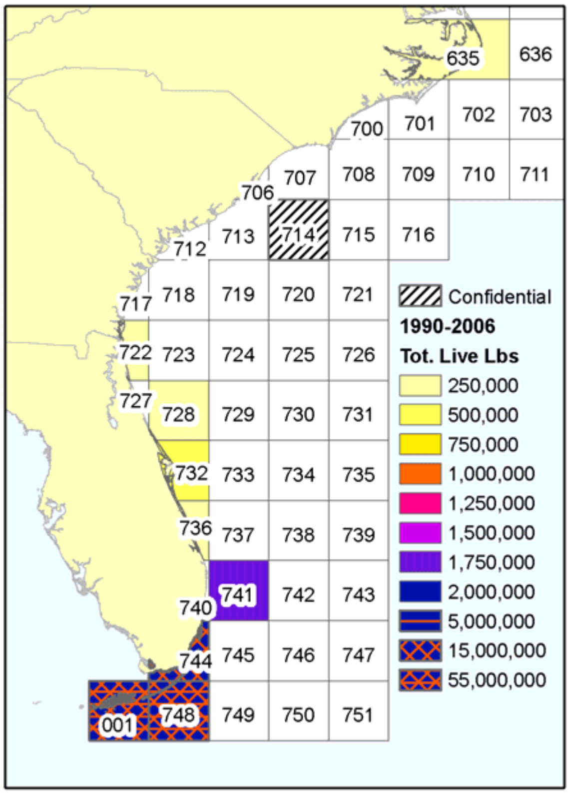


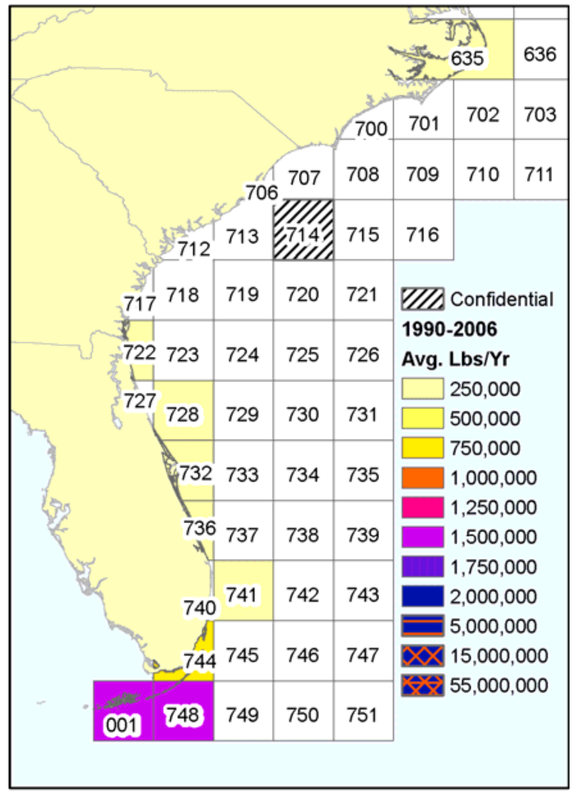


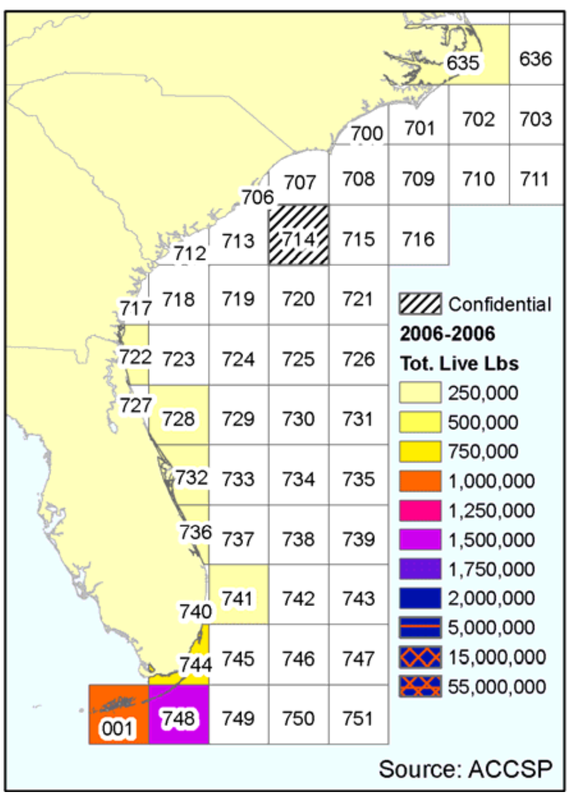


Logbook Catch: JEWFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.75	0.04	0.00
728	Conf.	Conf.	0.00
732	0.04	0.00	0.00
736	Conf.	Conf.	0.00
748	0.04	0.00	0.00

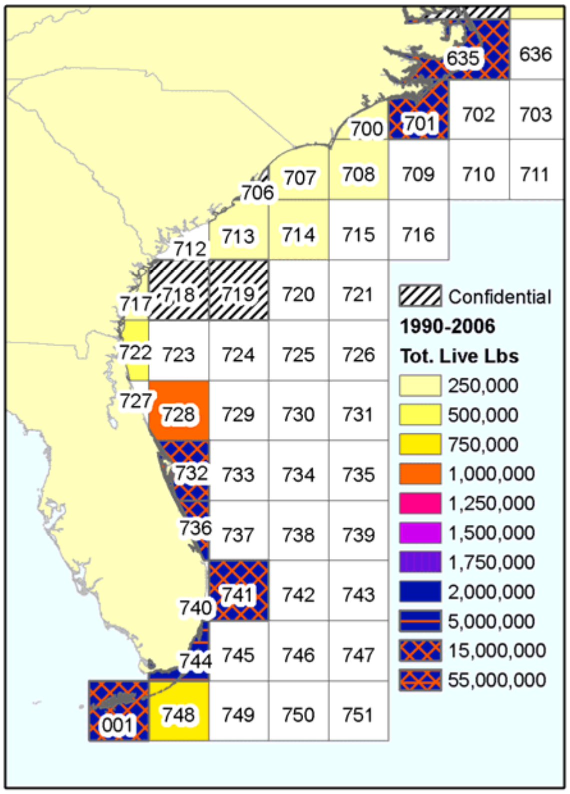


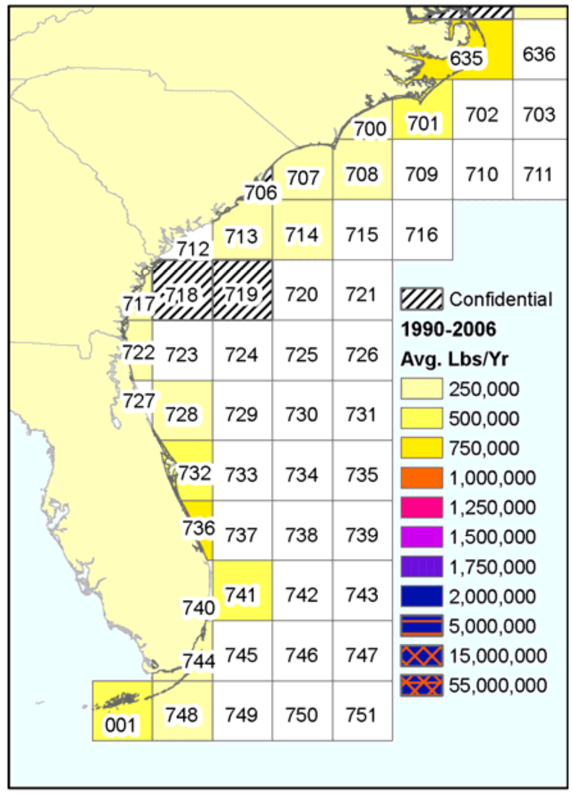


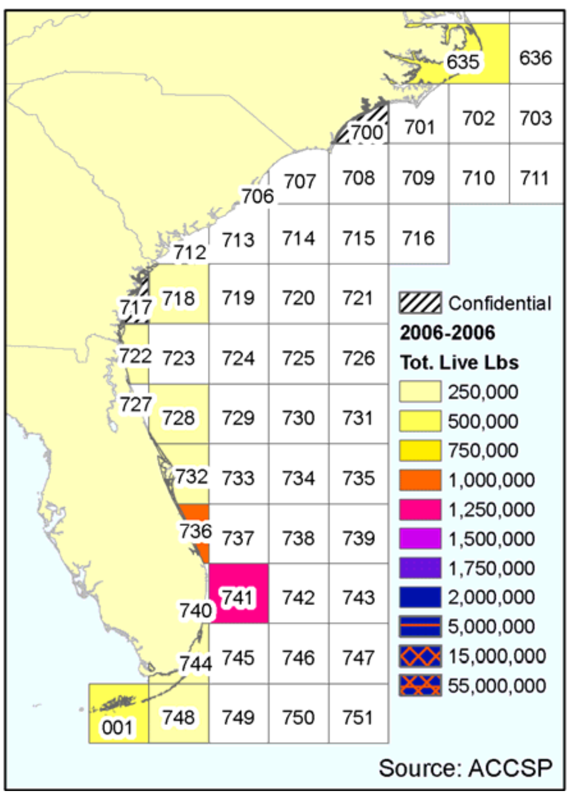


Logbook Catch: LOBSTER, CARIBBEAN SPINY
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	21,961.54	1,291.86	951.73
635	0.09	0.01	0.06
714	Conf.	Conf.	Conf.
722	234.83	13.81	6.71
728	109.46	6.44	9.97
732	367.29	21.61	24.74
736	227.07	13.36	10.21
741	1,549.84	91.17	79.92
744	12,118.86	712.87	523.00
748	22,997.09	1,352.77	1,418.34

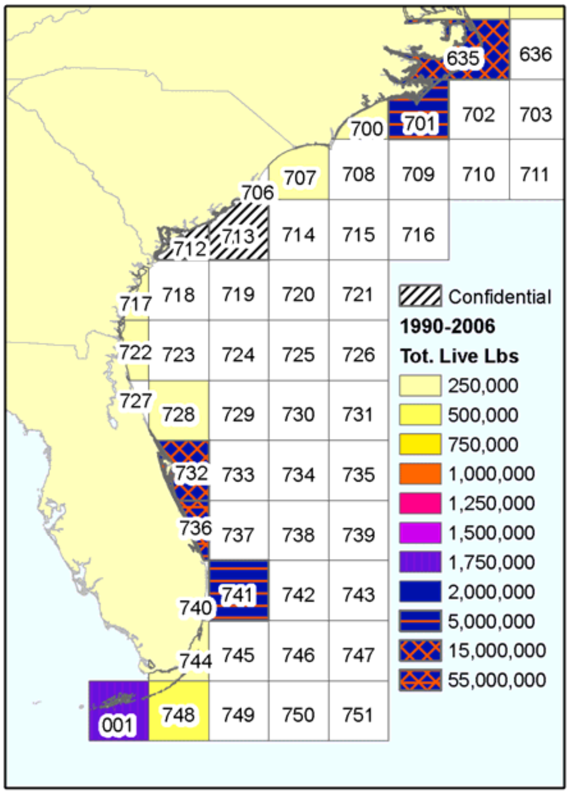


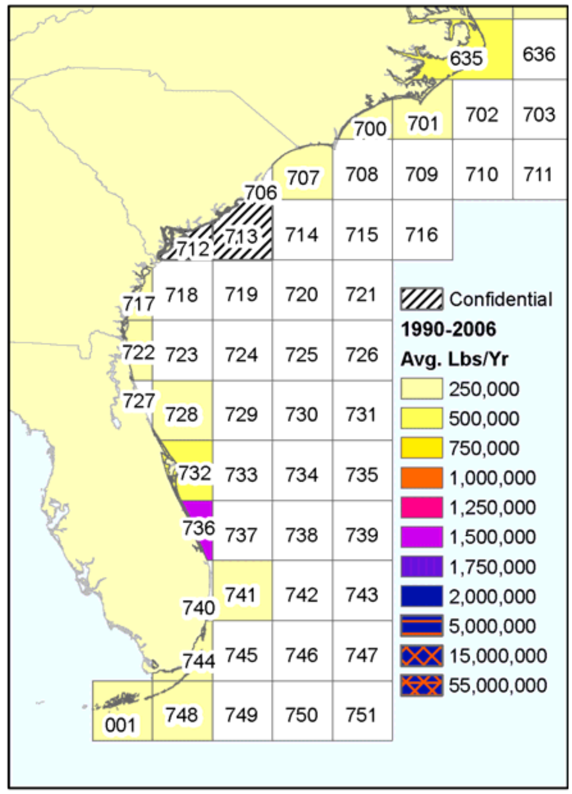


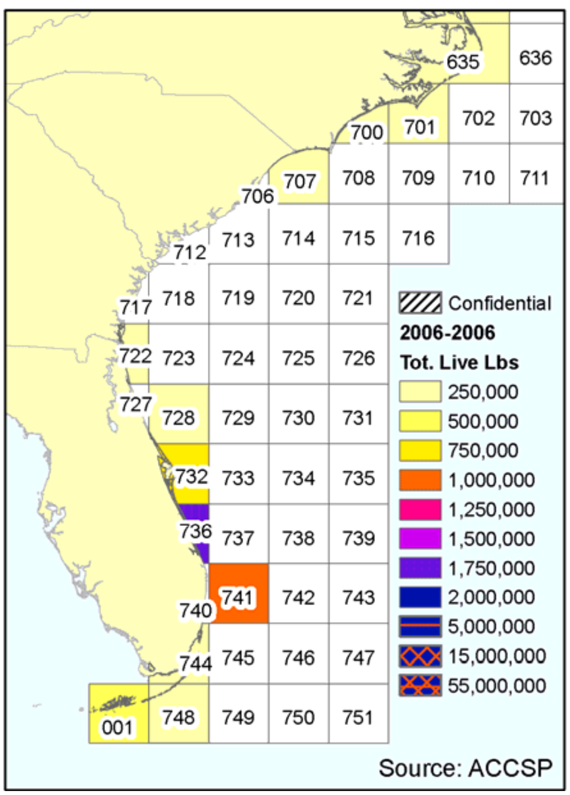


Logbook Catch: MACKEREL, KING
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	5,585.59	328.56	286.01
635	8,584.40	504.96	367.40
700	4.19	0.25	Conf.
701	6,625.89	389.76	0.00
706	Conf.	Conf.	0.00
707	12.90	0.76	0.00
708	1.22	0.07	0.00
713	31.61	1.86	0.00
714	0.50	0.03	0.00
717	1.81	0.11	Conf.
718	Conf.	Conf.	0.15
719	Conf.	Conf.	0.00
722	385.08	22.65	5.44
728	886.65	52.16	40.54
732	6,019.48	354.09	204.39
736	11,724.04	689.65	993.62
741	7,841.89	461.29	1,130.38
744	2,051.40	120.67	104.58
748	540.46	31.79	37.82

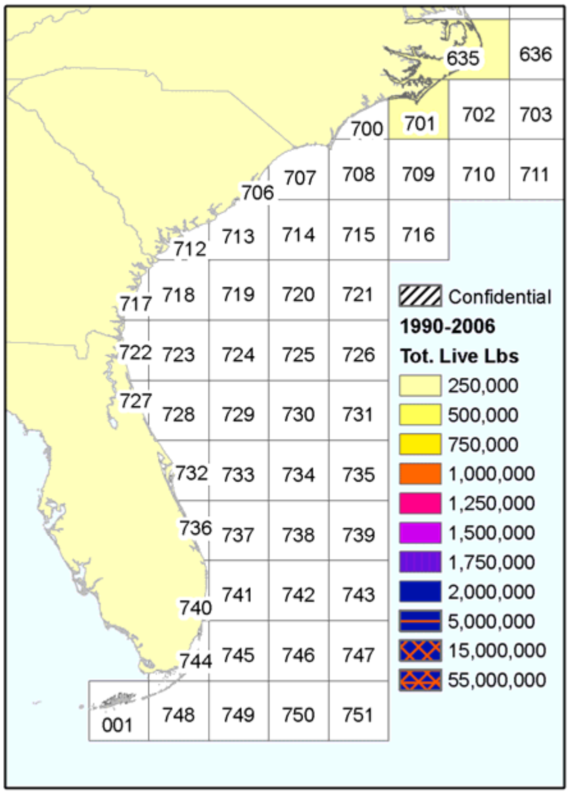


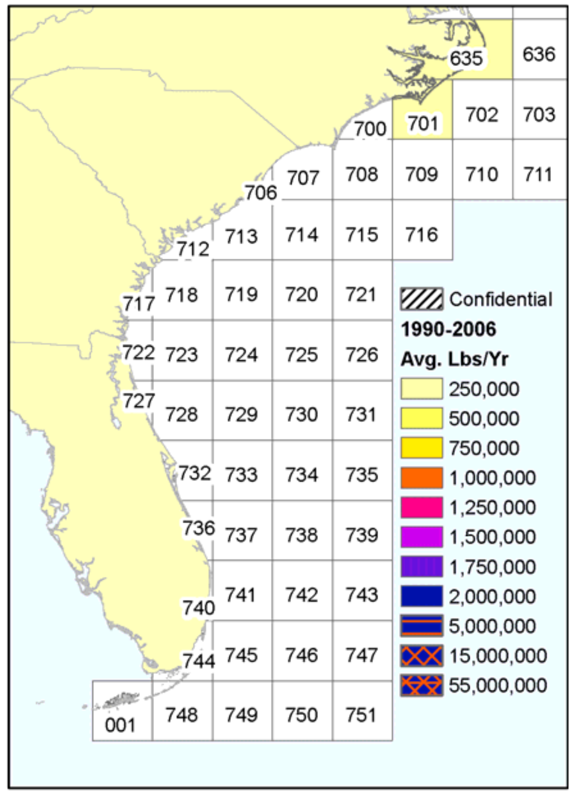


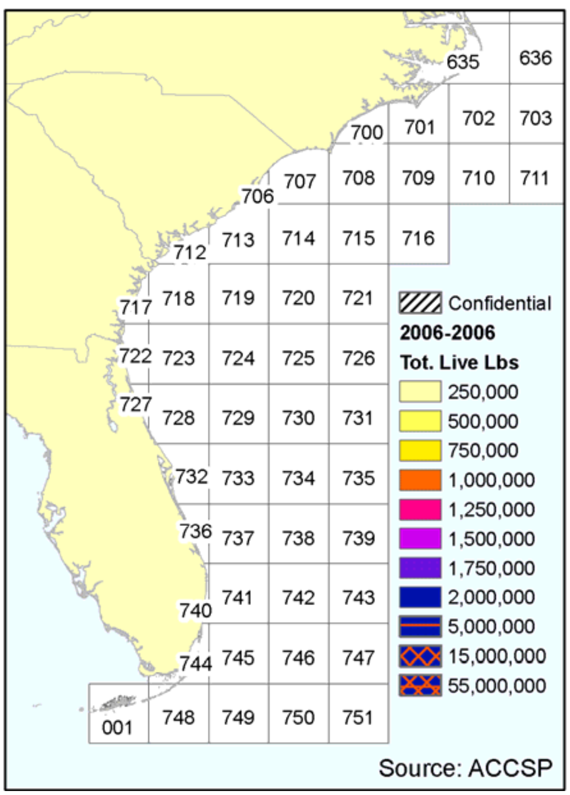


Logbook Catch: MACKEREL, SPANISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	1,560.72	91.81	261.29
635	5,539.03	325.83	50.71
700	174.25	10.25	0.51
701	2,922.69	171.92	1.28
707	0.46	0.03	0.03
712	Conf.	Conf.	0.00
713	Conf.	Conf.	0.00
717	0.12	0.01	0.00
718	0.00	0.00	0.00
722	57.08	3.36	0.11
728	34.19	2.01	5.72
732	8,475.71	498.57	531.67
736	25,079.06	1,475.24	1,647.73
741	3,373.76	198.46	839.83
744	201.60	11.86	12.44
748	466.84	27.46	4.19

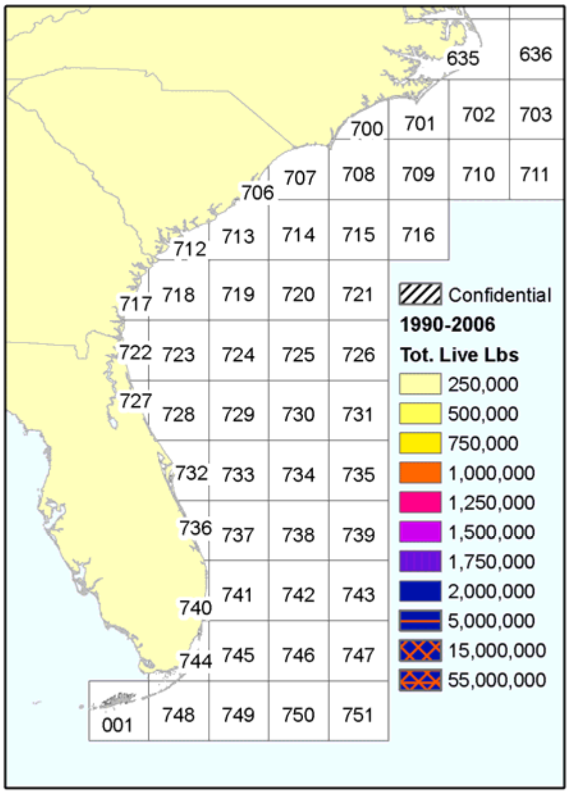


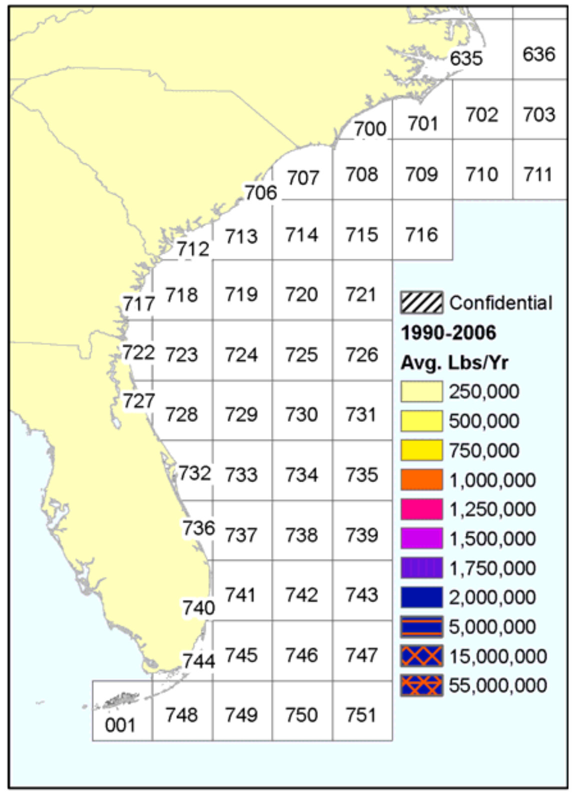


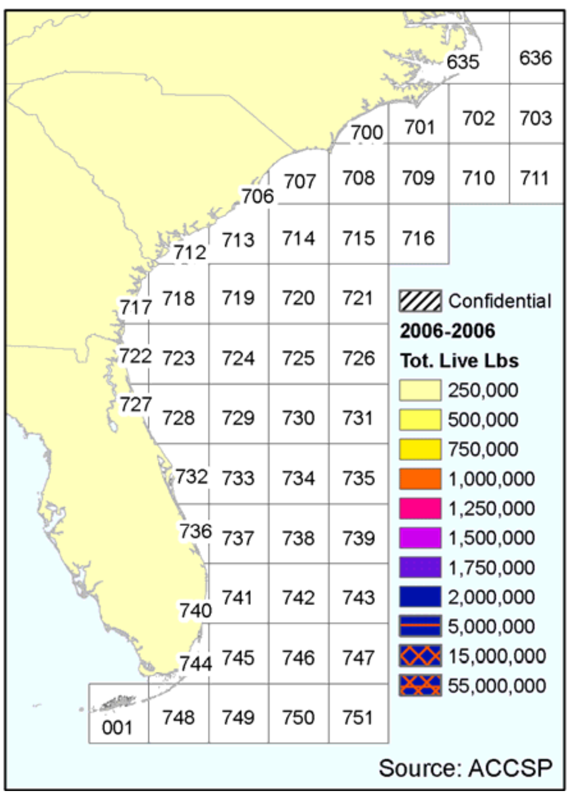


Logbook Catch: MARGATE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
635	0.98	0.06	0.00
701	61.71	3.63	0.00

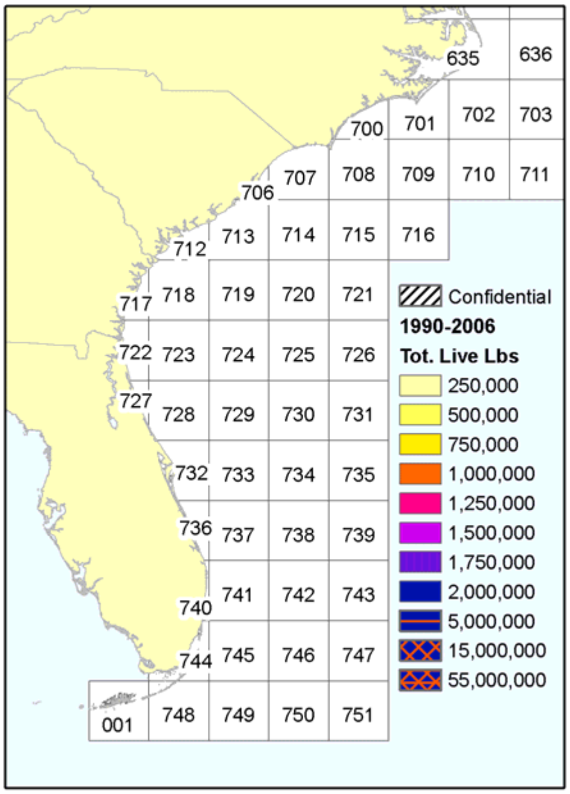


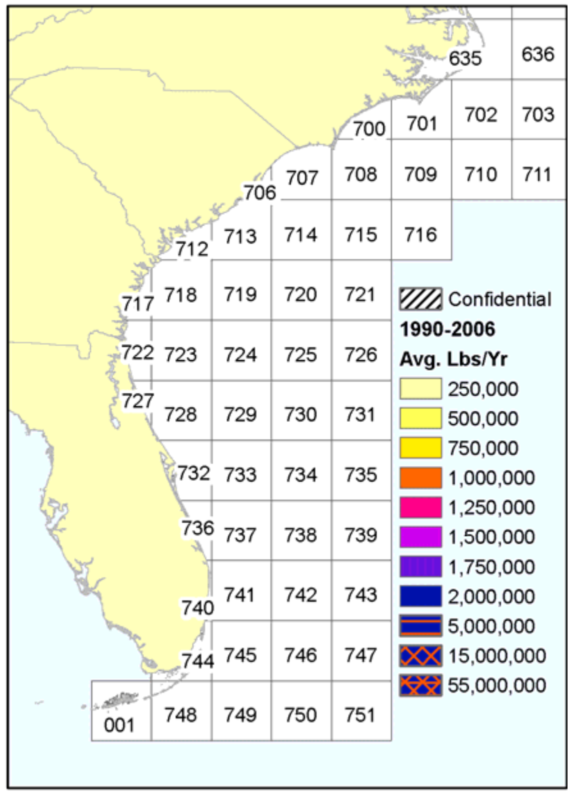


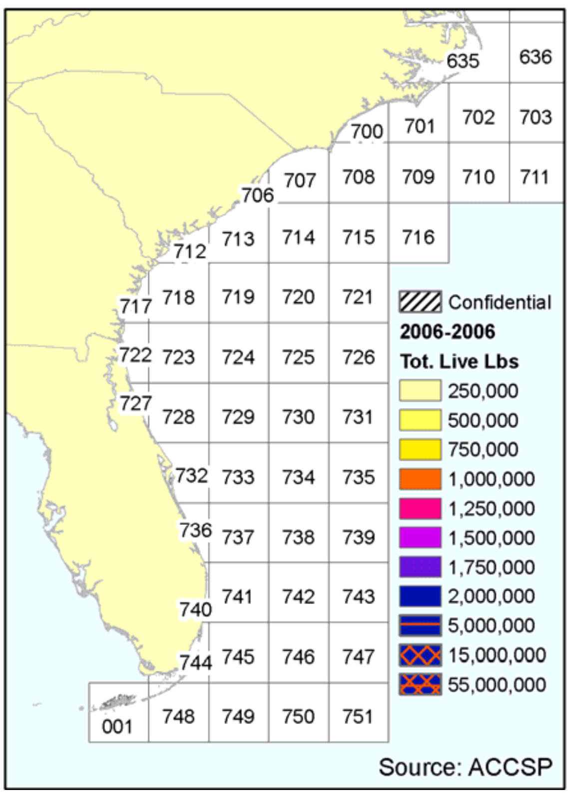


Logbook Catch: MARGATE, BLACK
1990-2006
Pounds in Thousands

No data for this area

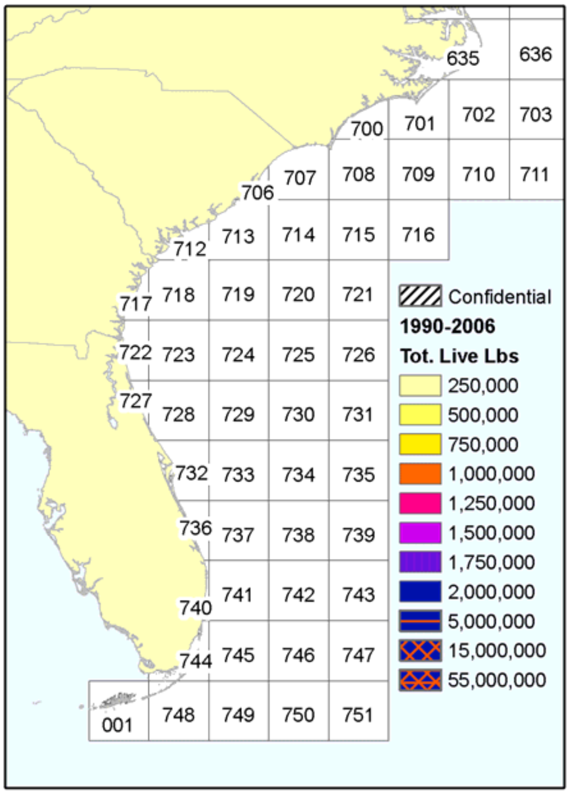


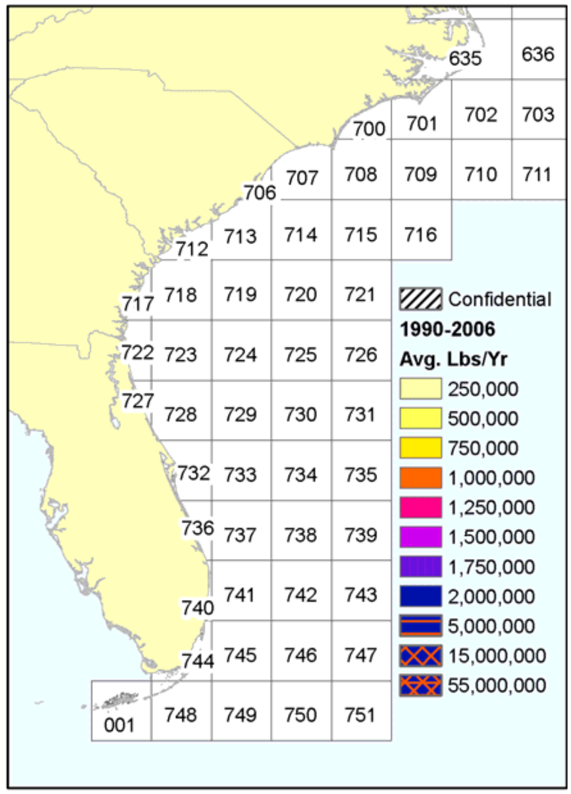


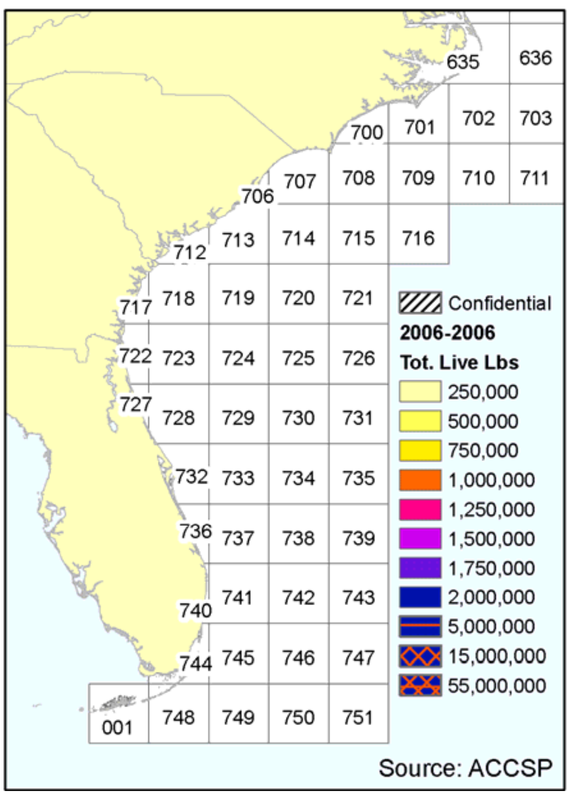


Logbook Catch: MARLIN, BLUE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
0	0.00	0.00	0.00
0	0.00	0.00	0.00

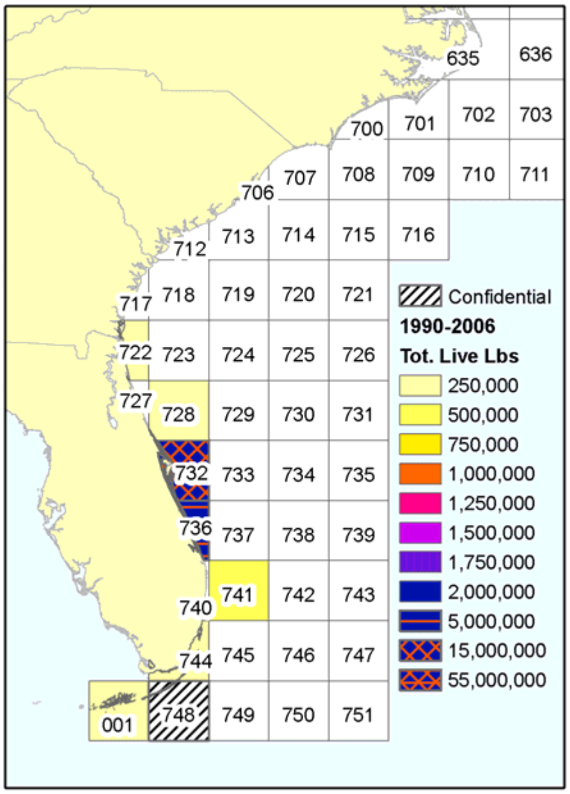


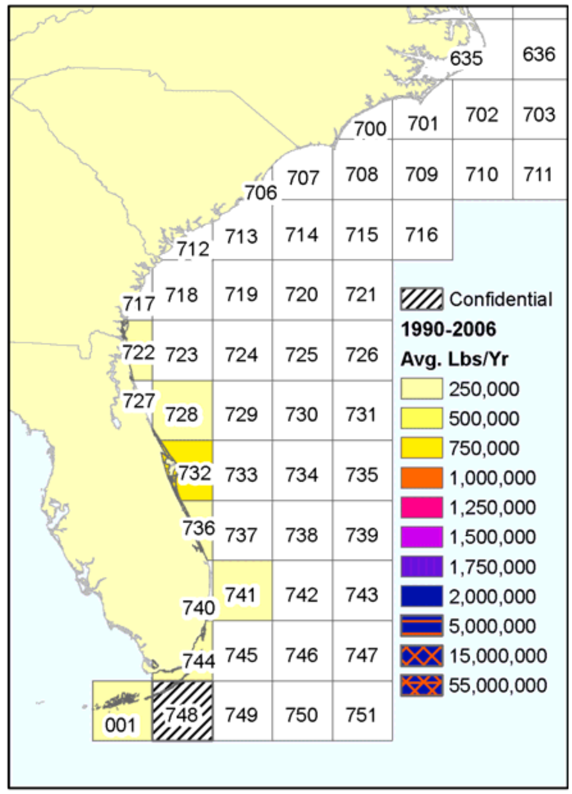


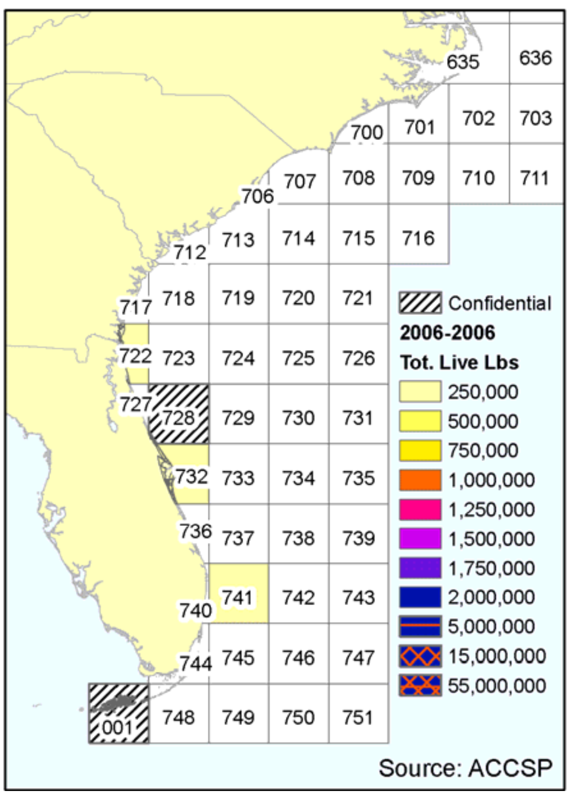


Logbook Catch: MARLIN, WHITE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
0	0.00	0.00	0.00
0	0.00	0.00	0.00

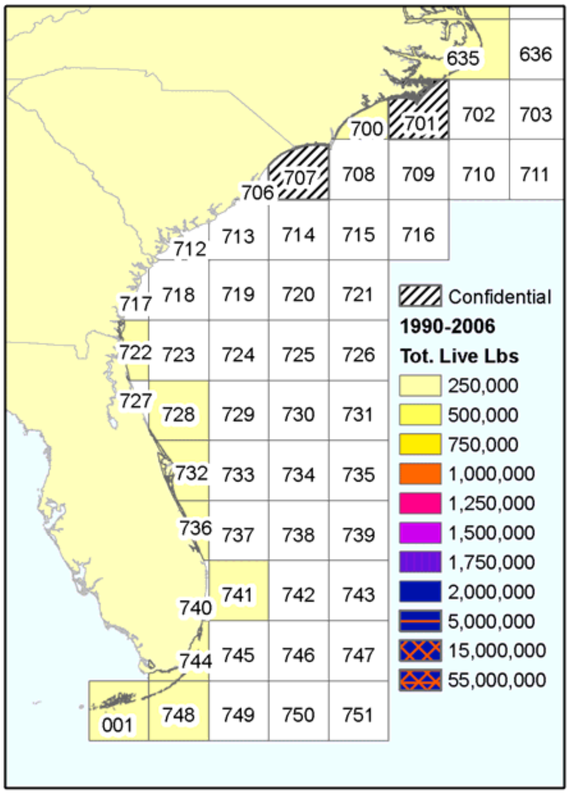


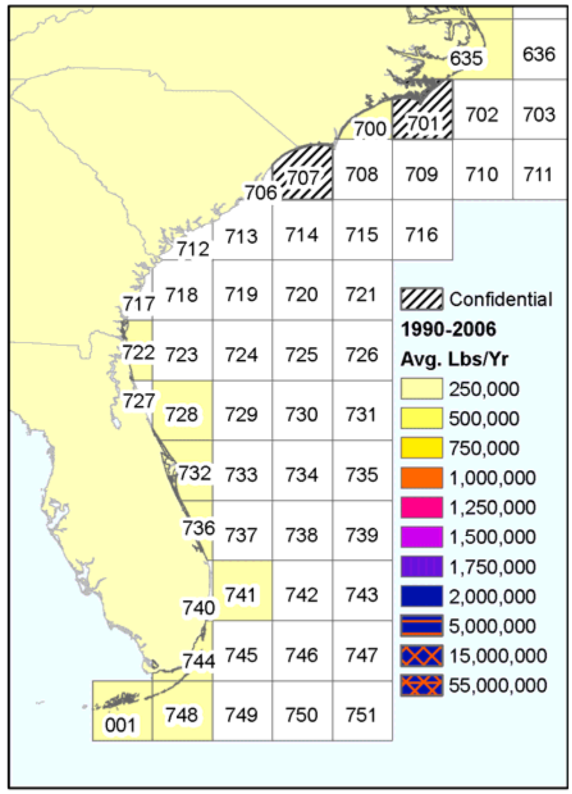


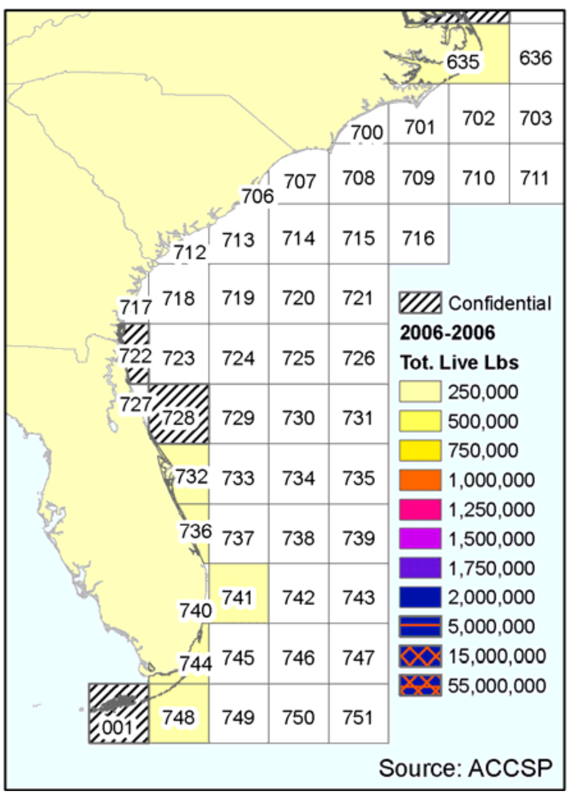


Logbook Catch: MENHADEN, ATLANTIC
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.23	0.01	Conf.
722	195.37	11.49	22.69
728	168.43	9.91	Conf.
732	8,727.39	513.38	80.27
736	3,510.46	206.50	0.00
741	351.31	20.67	3.73
744	13.39	0.79	0.00
748	Conf.	Conf.	0.00

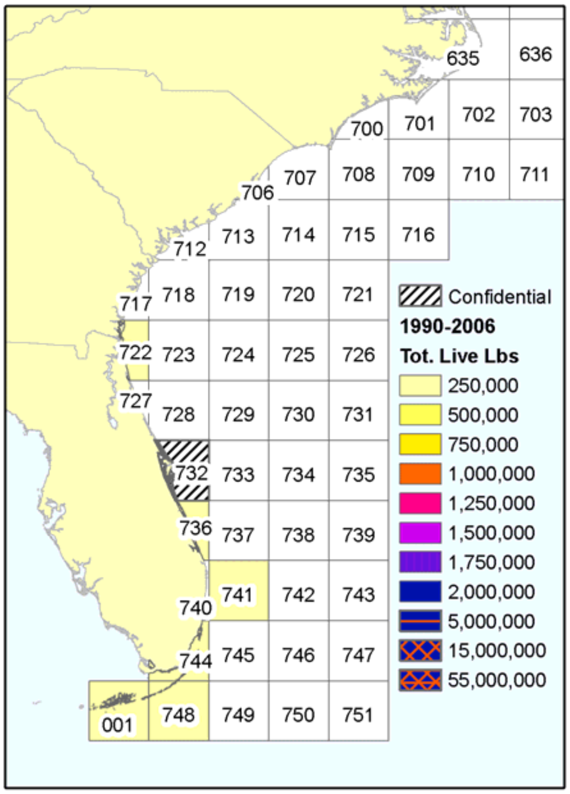


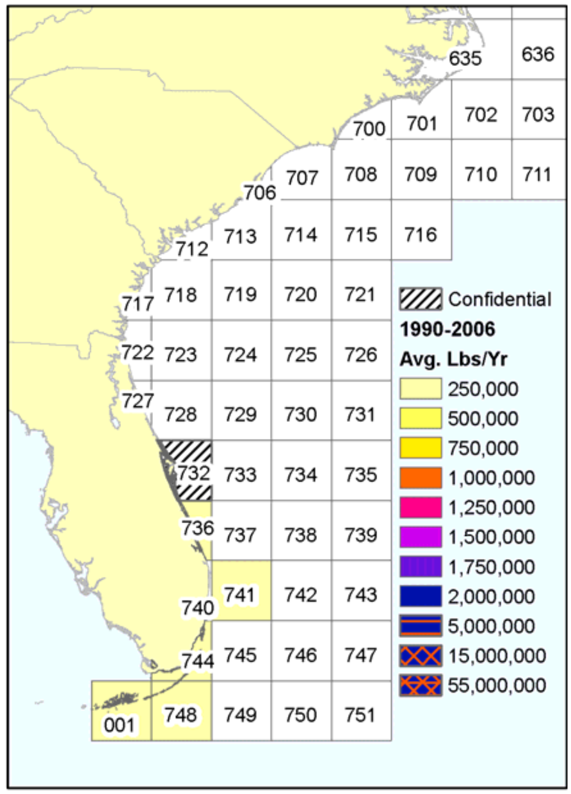


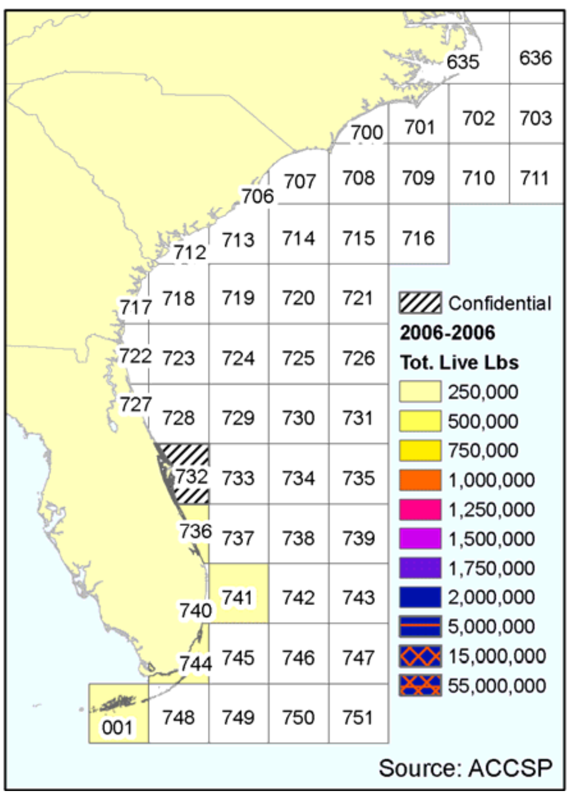


Logbook Catch: PINFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	3.37	0.20	Conf.
635	244.62	14.39	14.54
700	0.53	0.03	0.00
701	Conf.	Conf.	0.00
707	Conf.	Conf.	0.00
722	0.30	0.02	Conf.
728	0.83	0.05	Conf.
732	104.02	6.12	5.46
736	63.97	3.76	4.07
741	2.12	0.12	0.18
744	3.95	0.23	0.89
748	1.44	0.08	1.14

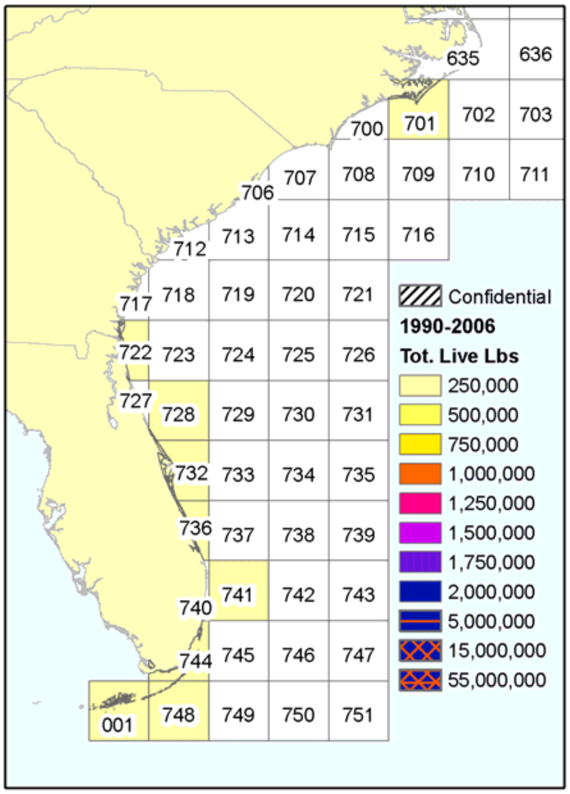


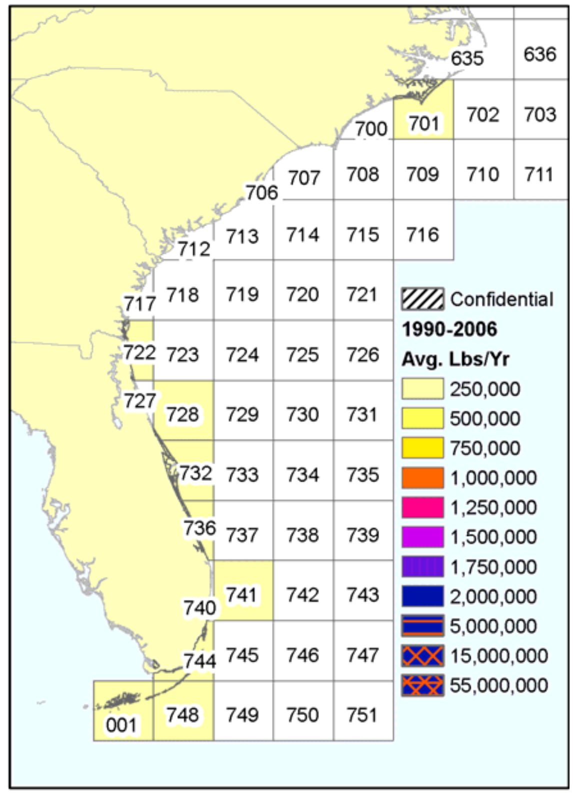


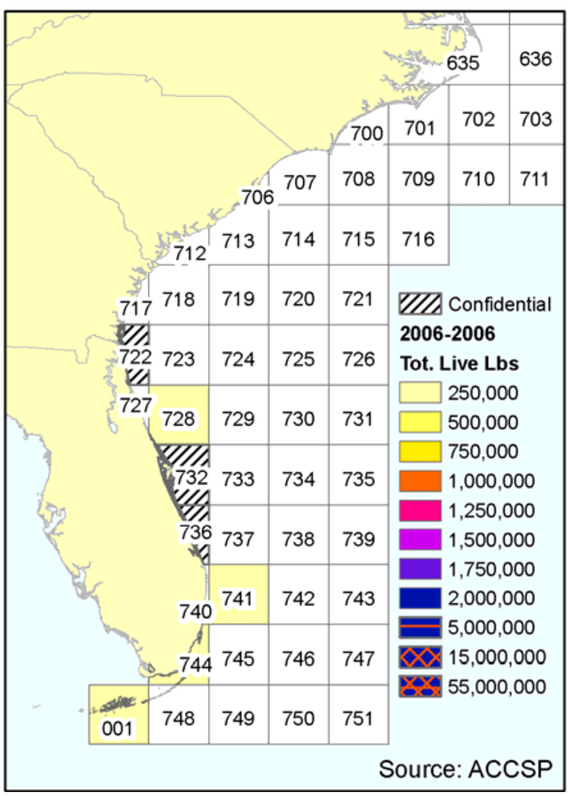


Logbook Catch: PORGY, GRASS
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	3.20	0.19	0.25
722	0.01	0.00	0.00
732	Conf.	Conf.	Conf.
736	0.18	0.01	0.00
741	1.05	0.06	0.52
744	1.25	0.07	0.20
748	0.41	0.02	0.00

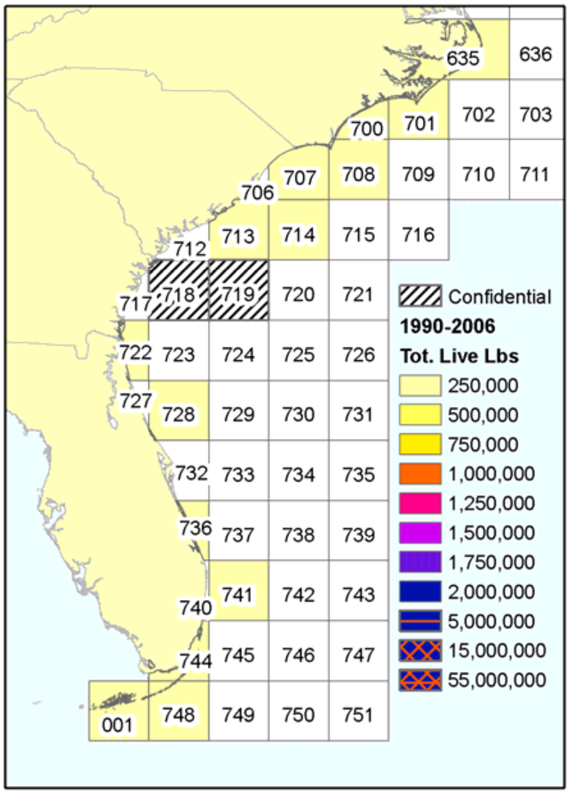


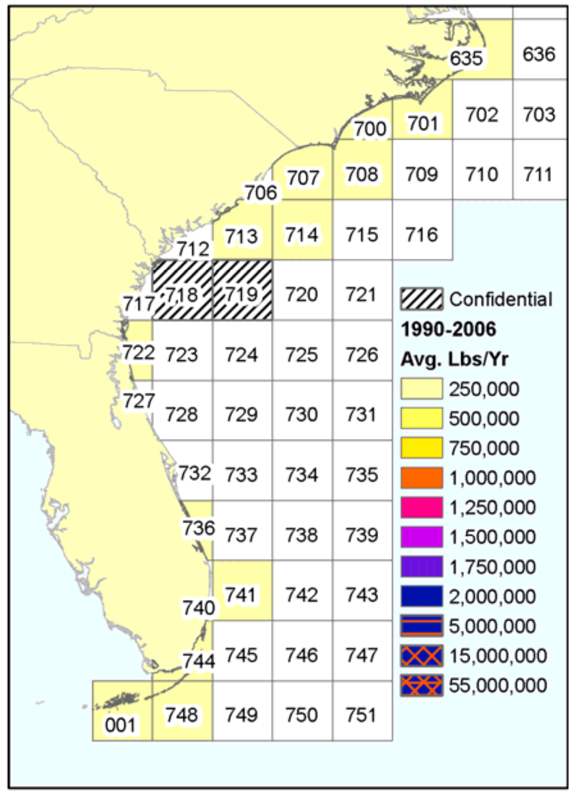


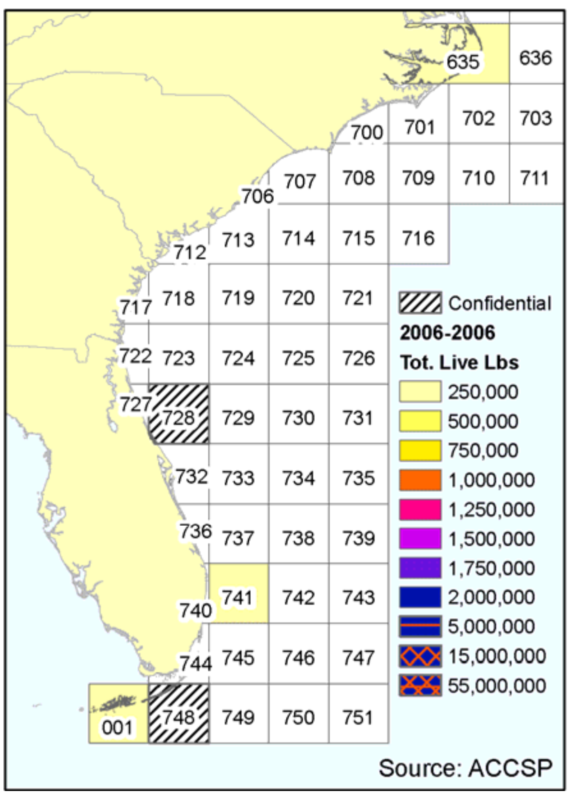


Logbook Catch: PORGY, JOLTHEAD
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	6.83	0.40	1.06
701	2.49	0.15	0.00
722	1.36	0.08	Conf.
728	0.23	0.01	0.06
732	0.09	0.01	Conf.
736	0.52	0.03	Conf.
741	2.08	0.12	0.53
744	3.46	0.20	0.28
748	6.71	0.39	0.00

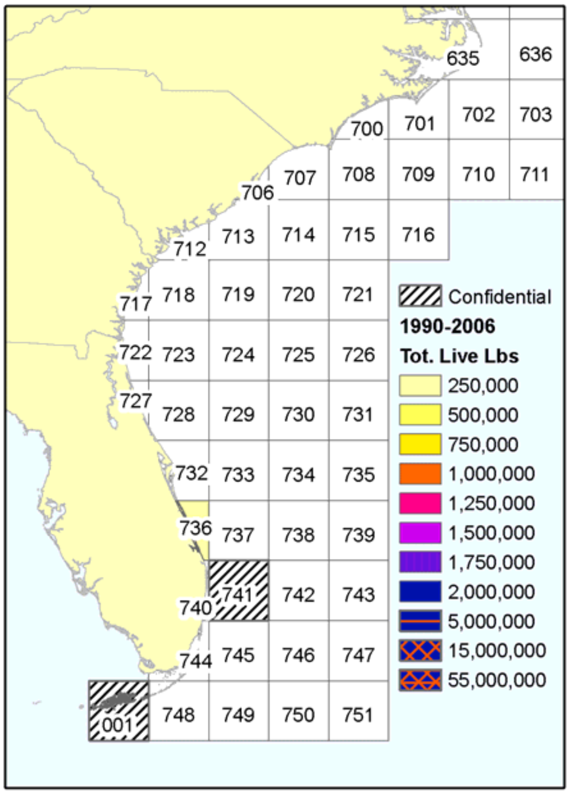


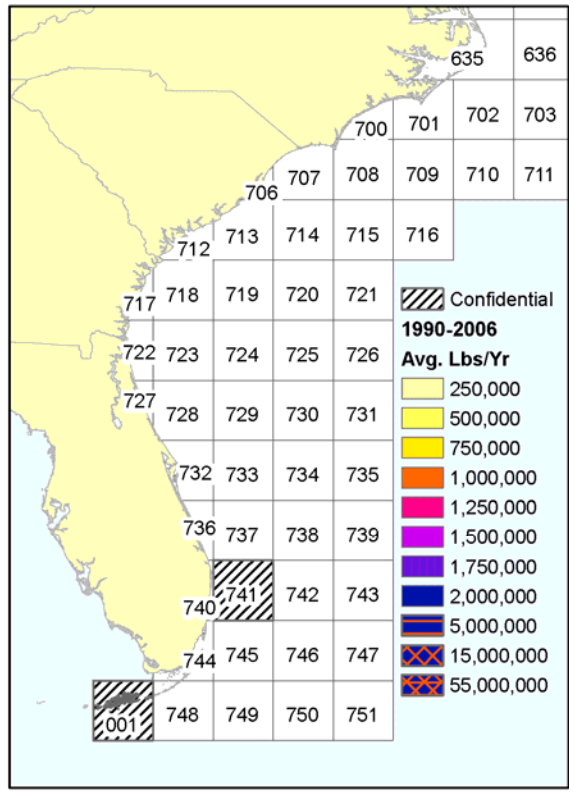


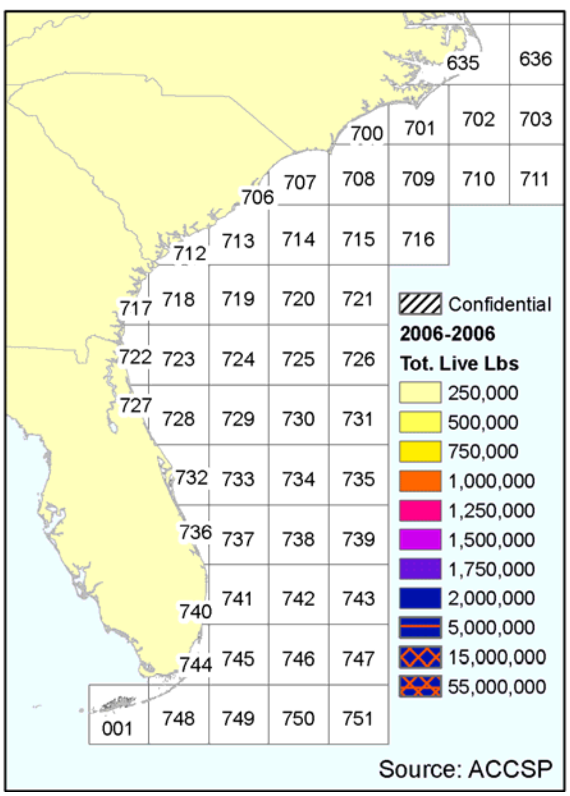


Logbook Catch: PORGY, KNOBBED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.98	0.06	0.30
635	171.95	10.11	11.69
700	1.72	0.10	0.00
701	224.61	13.21	0.00
707	5.60	0.33	0.00
708	0.48	0.03	0.00
713	3.21	0.19	0.00
714	0.27	0.02	0.00
718	Conf.	Conf.	0.00
719	Conf.	Conf.	0.00
722	0.07	0.00	0.00
728	0.02	0.00	Conf.
736	0.17	0.01	0.00
741	0.76	0.04	0.12
744	0.17	0.01	0.00
748	0.81	0.05	Conf.

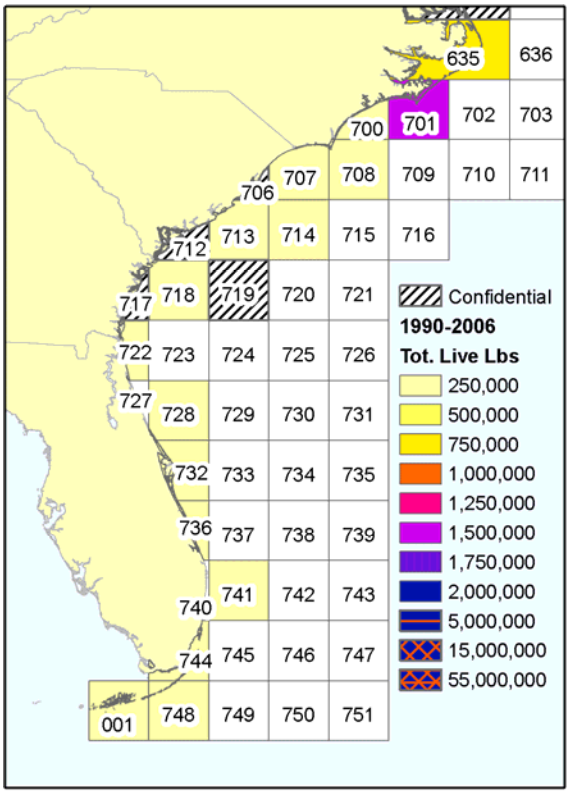


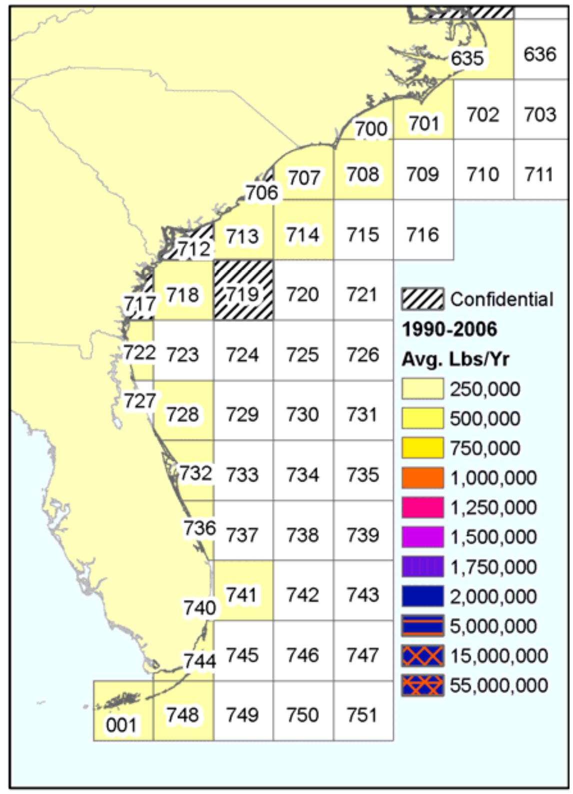


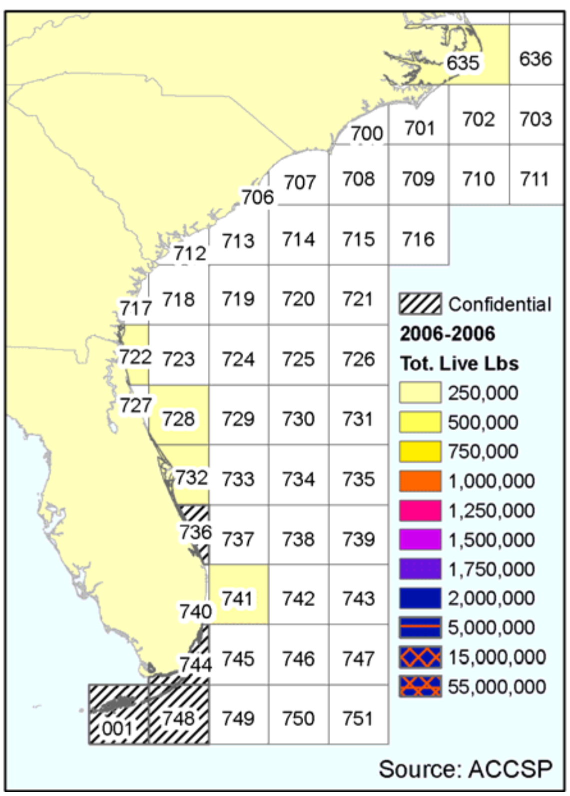


Logbook Catch: PORGY, LONGSPINE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	Conf.	Conf.	0.00
736	0.04	0.00	0.00
741	Conf.	Conf.	0.00

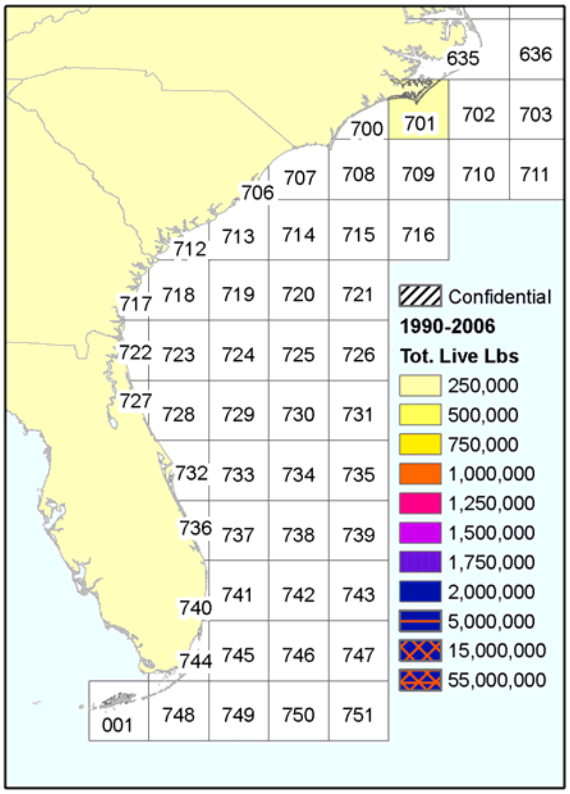


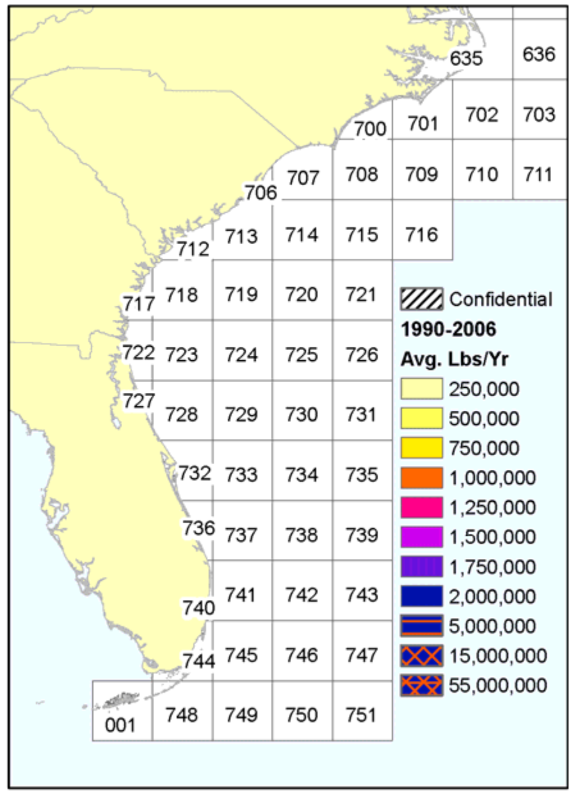


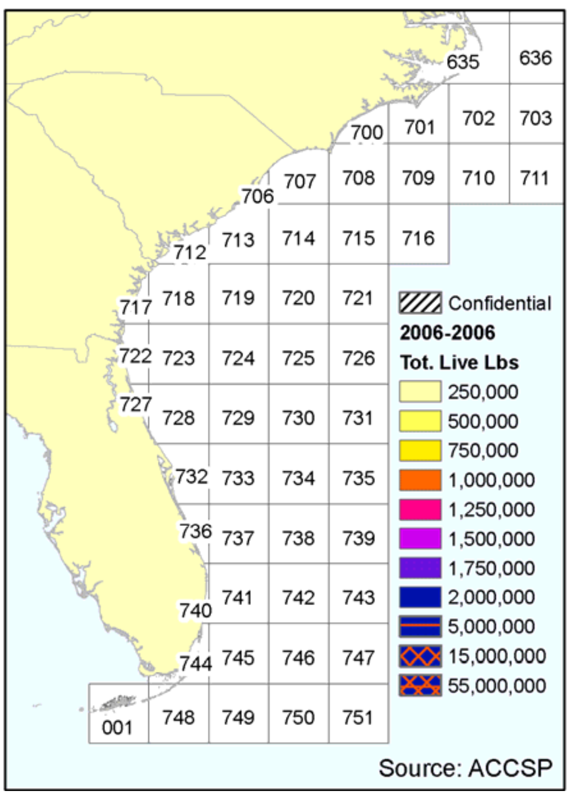


Logbook Catch: PORGY, RED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.10	0.01	Conf.
635	661.34	38.90	34.18
700	0.95	0.06	0.00
701	1,476.01	86.82	0.00
706	Conf.	Conf.	0.00
707	14.26	0.84	0.00
708	1.19	0.07	0.00
712	Conf.	Conf.	0.00
713	9.22	0.54	0.00
714	0.73	0.04	0.00
717	Conf.	Conf.	0.00
718	0.32	0.02	0.00
719	Conf.	Conf.	0.00
722	149.45	8.79	5.48
728	36.18	2.13	2.43
732	18.49	1.09	0.08
736	1.45	0.09	Conf.
741	2.85	0.17	0.44
744	1.05	0.06	Conf.
748	0.65	0.04	Conf.

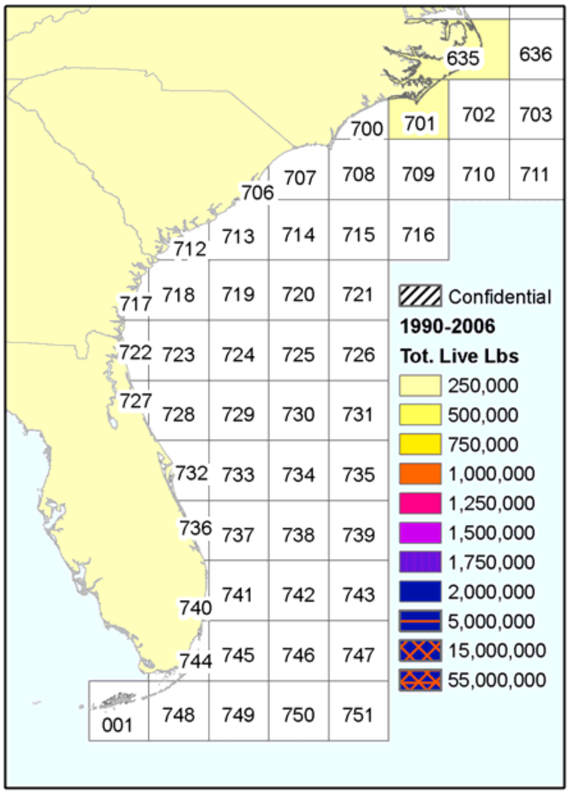


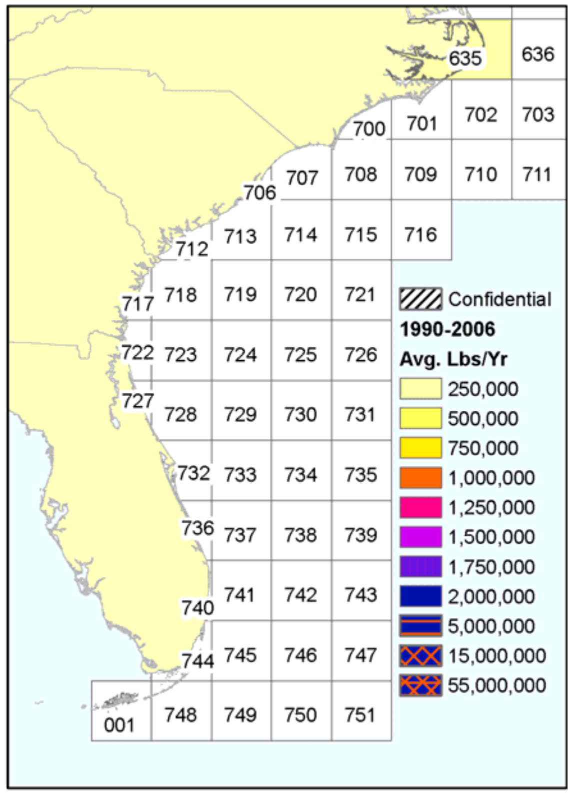


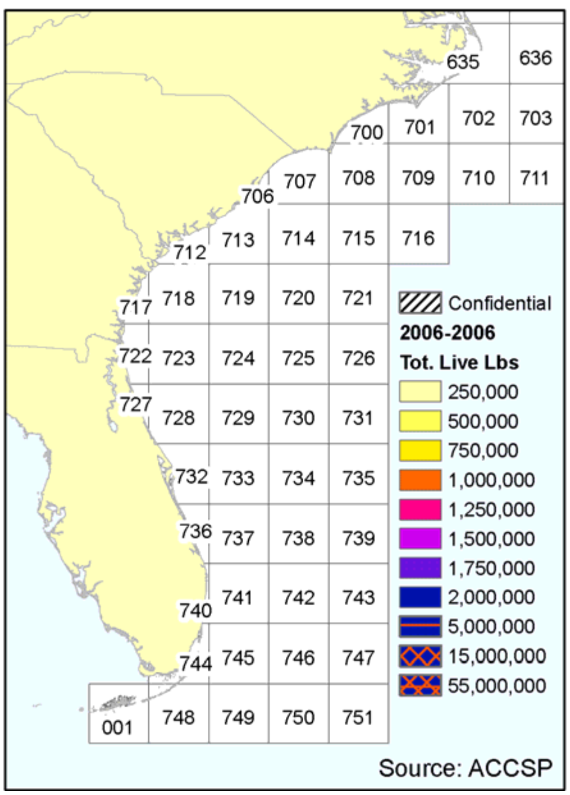


Logbook Catch: PORGY, SAUCEREYE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
701	0.01	0.00	0.00
0	0.00	0.00	0.00

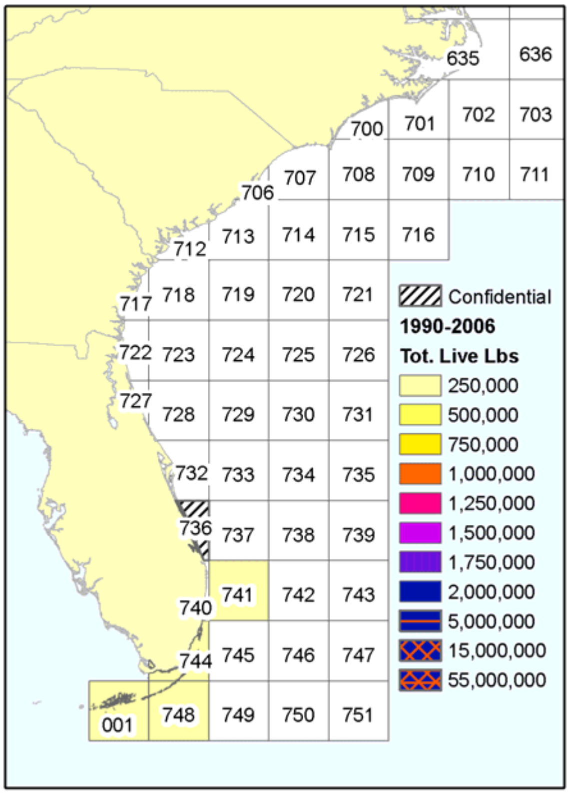


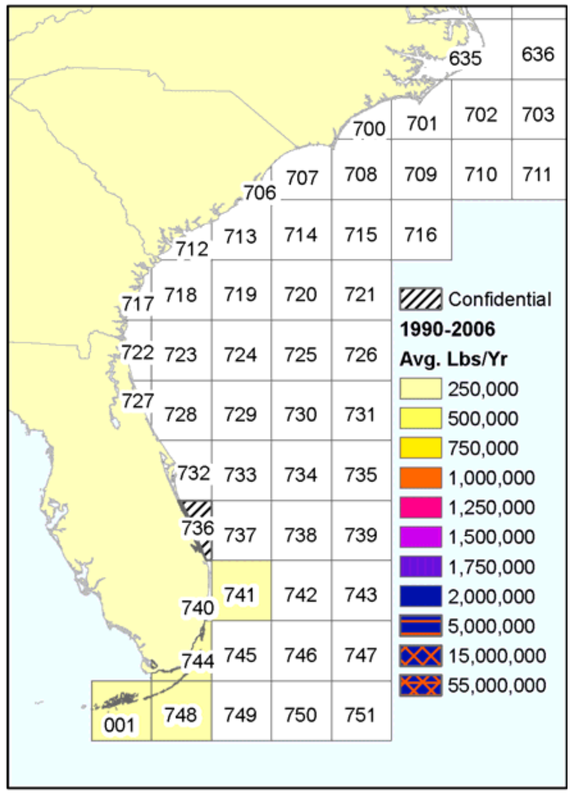


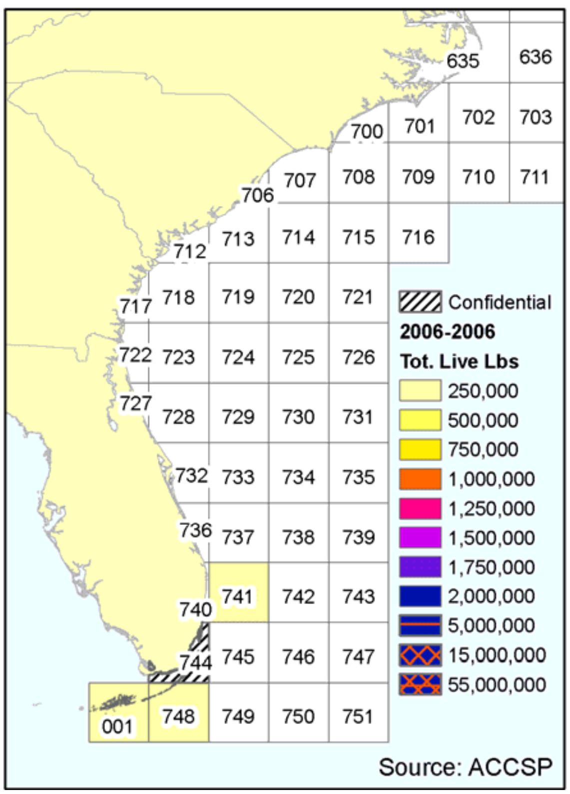


Logbook Catch: PORGY, WHITEBONE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
635	0.40	0.02	0.00
701	0.04	0.00	0.00

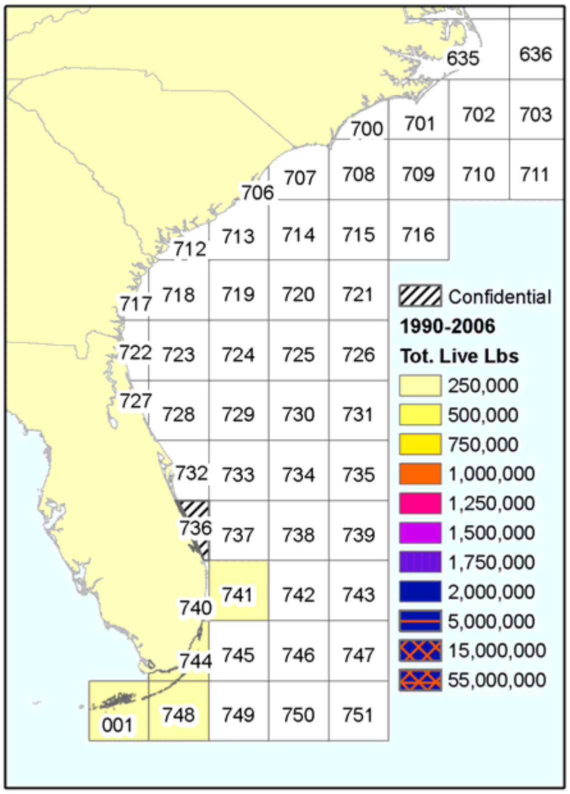


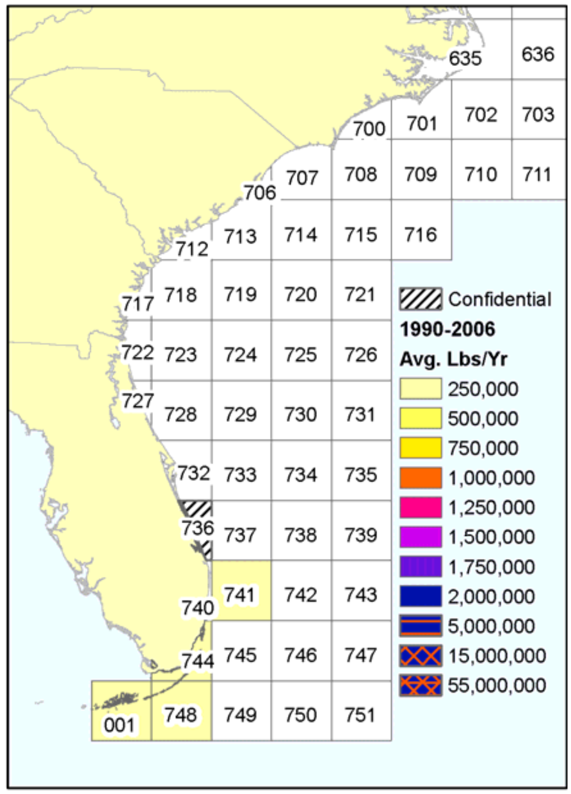


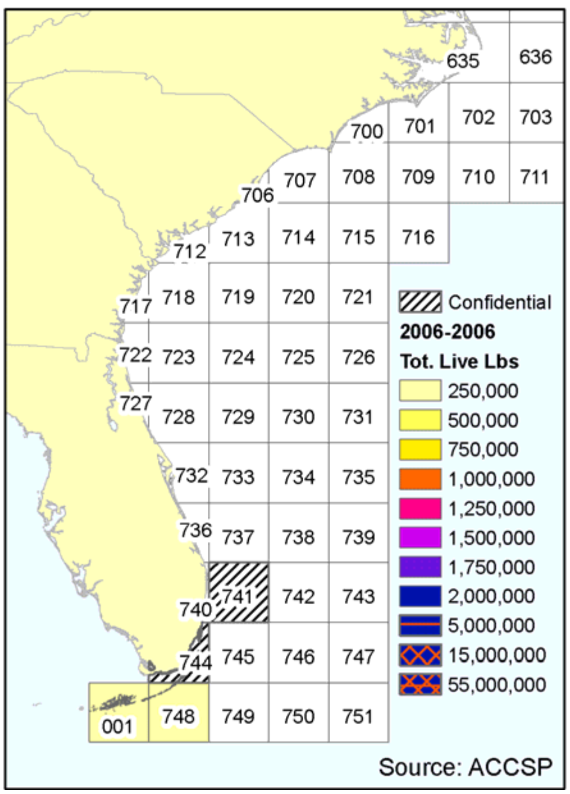


Logbook Catch: PORKFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	36.11	2.12	1.27
736	Conf.	Conf.	0.00
741	9.26	0.54	0.40
744	6.58	0.39	Conf.
748	57.53	3.38	1.37

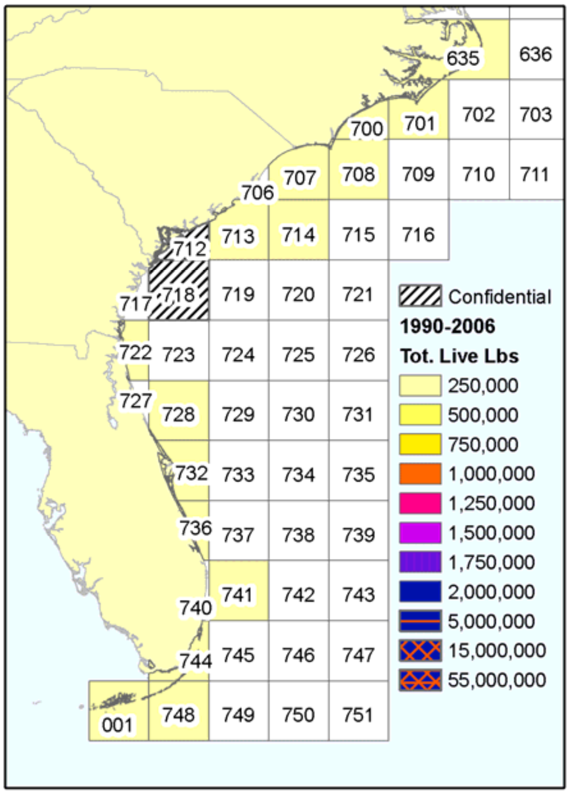


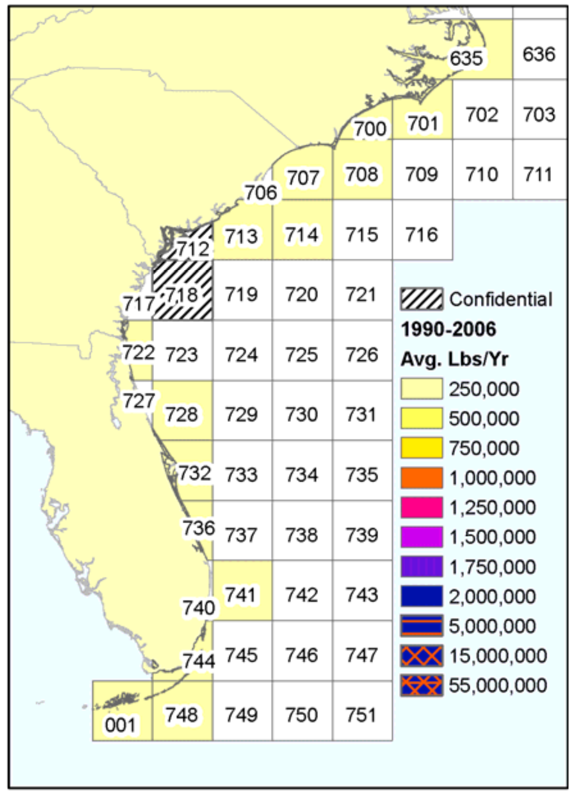


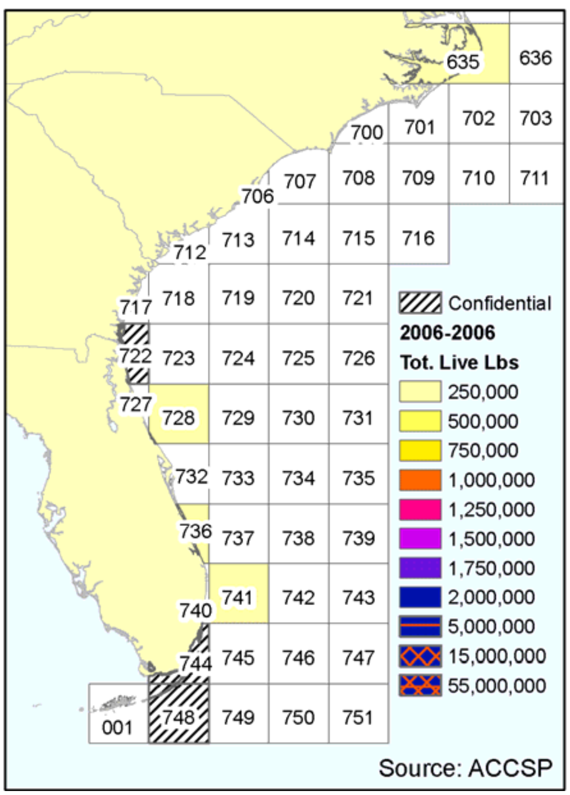


Logbook Catch: PUDDINGWIFE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.63	0.04	0.01
736	Conf.	Conf.	0.00
741	0.46	0.03	Conf.
744	0.46	0.03	Conf.
748	1.57	0.09	0.06

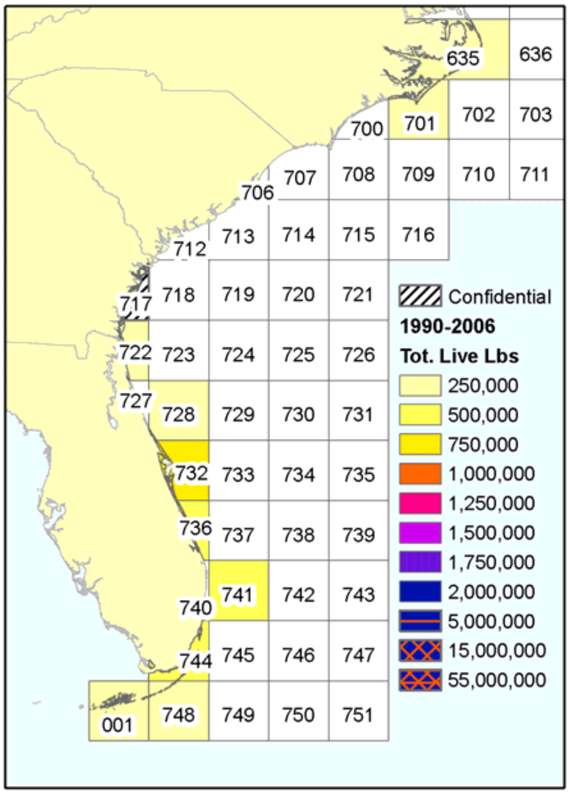


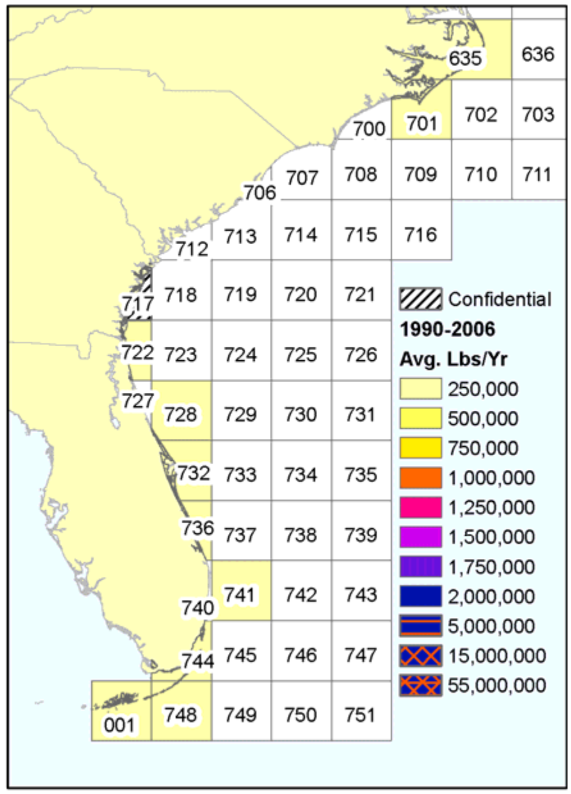


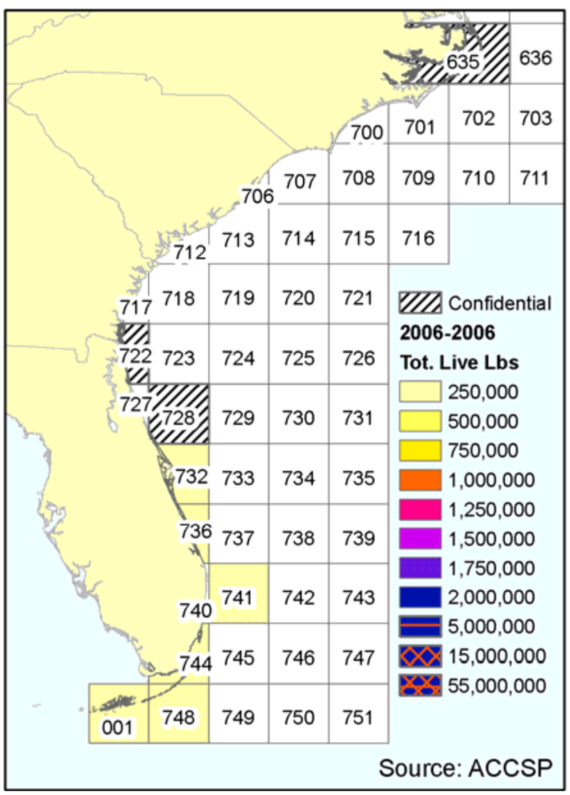


Logbook Catch: RUDDERFISH, BANDED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	2.72	0.16	0.00
635	24.49	1.44	3.99
700	1.02	0.06	0.00
701	3.46	0.20	0.00
707	10.64	0.63	0.00
708	2.24	0.13	0.00
712	Conf.	Conf.	0.00
713	13.27	0.78	0.00
714	0.86	0.05	0.00
718	Conf.	Conf.	0.00
722	20.25	1.19	Conf.
728	14.50	0.85	0.63
732	7.30	0.43	0.00
736	41.64	2.45	0.26
741	82.83	4.87	1.98
744	57.51	3.38	Conf.
748	11.54	0.68	Conf.

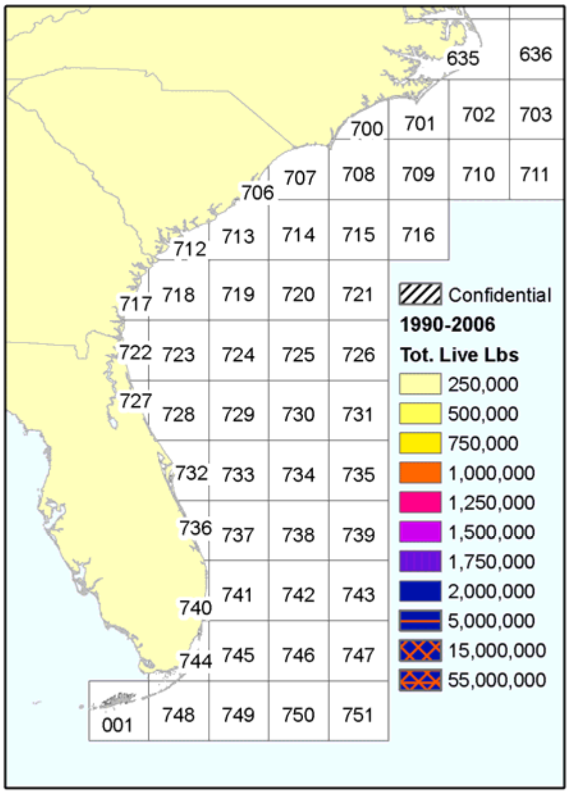


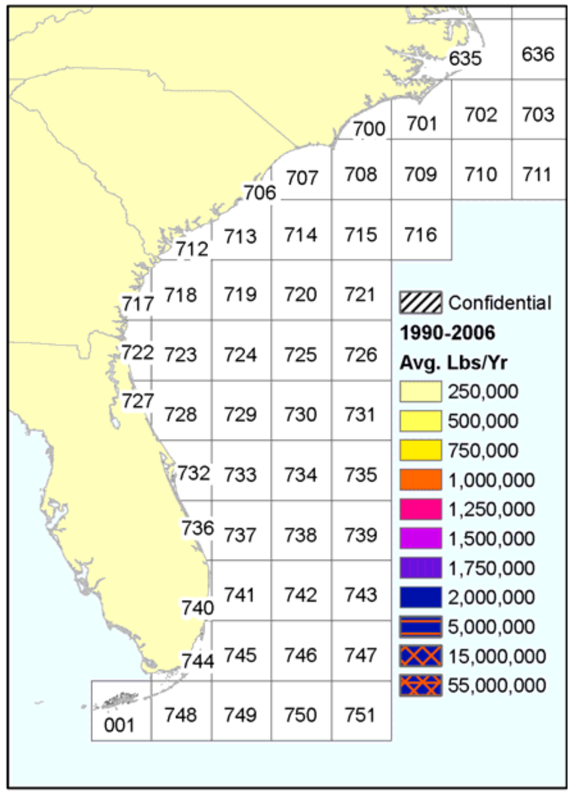


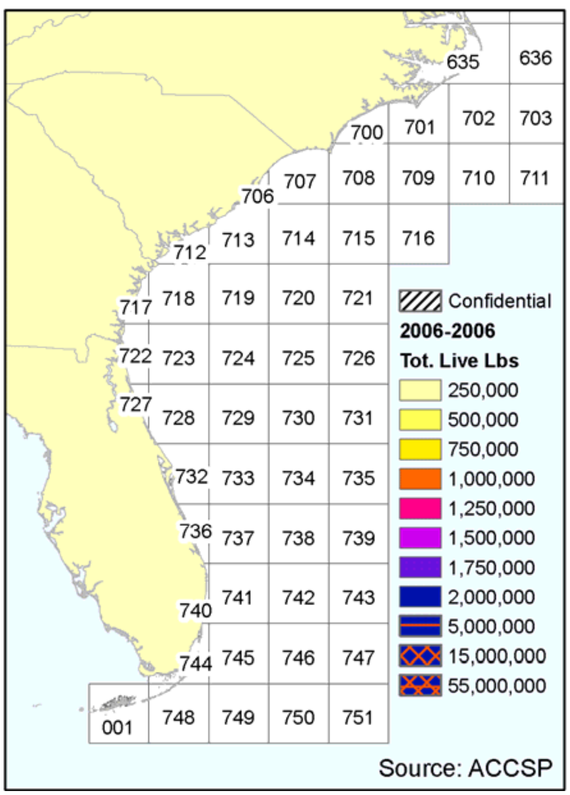


Logbook Catch: RUNNER, BLUE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	177.80	10.46	7.41
635	17.37	1.02	Conf.
701	14.72	0.87	0.00
717	Conf.	Conf.	0.00
722	4.49	0.26	Conf.
728	1.97	0.12	Conf.
732	511.58	30.09	36.86
736	407.81	23.99	37.00
741	274.97	16.17	36.70
744	320.73	18.87	11.86
748	75.52	4.44	9.74

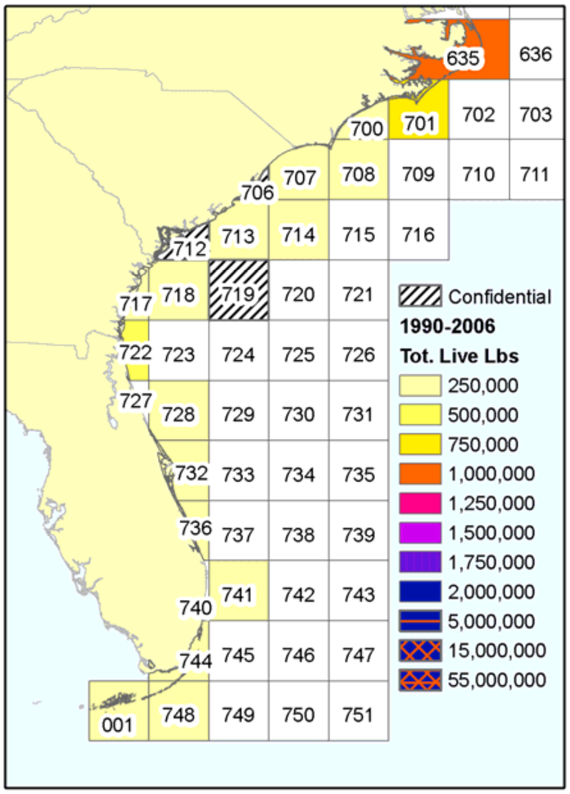


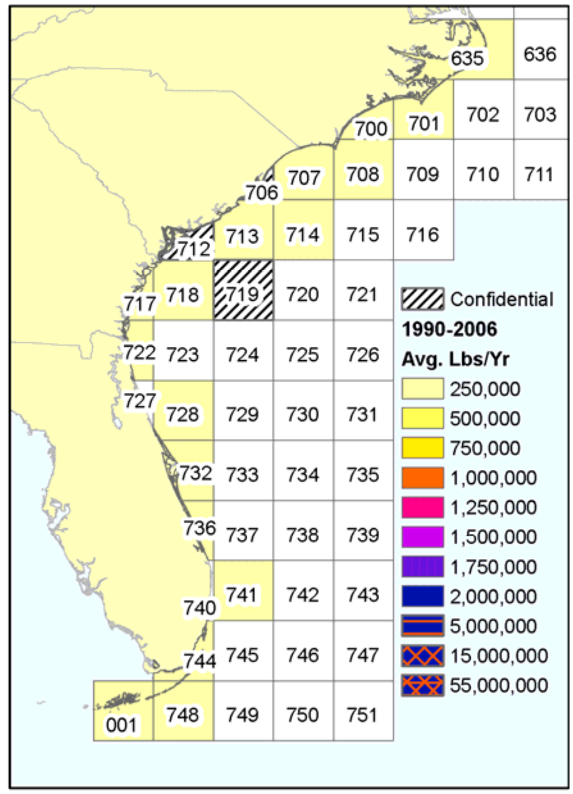


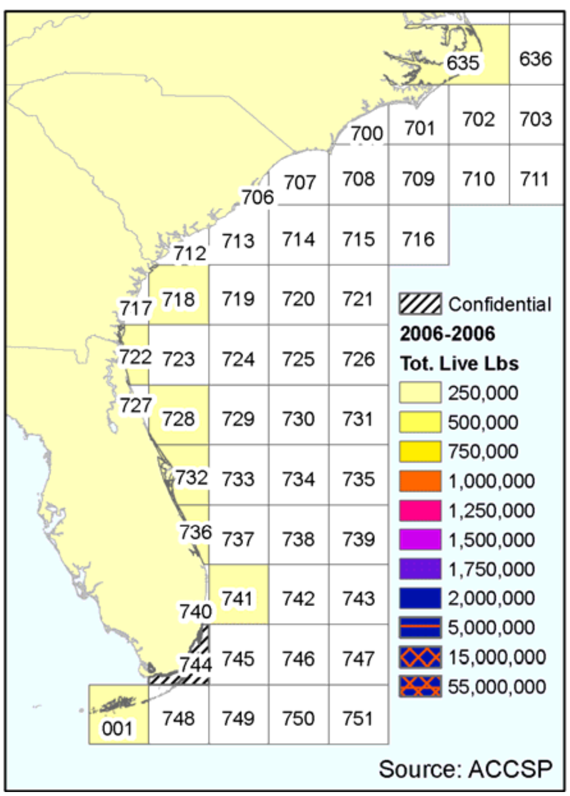


Logbook Catch: SAILFISH
1990-2006
Pounds in Thousands

No data for this area

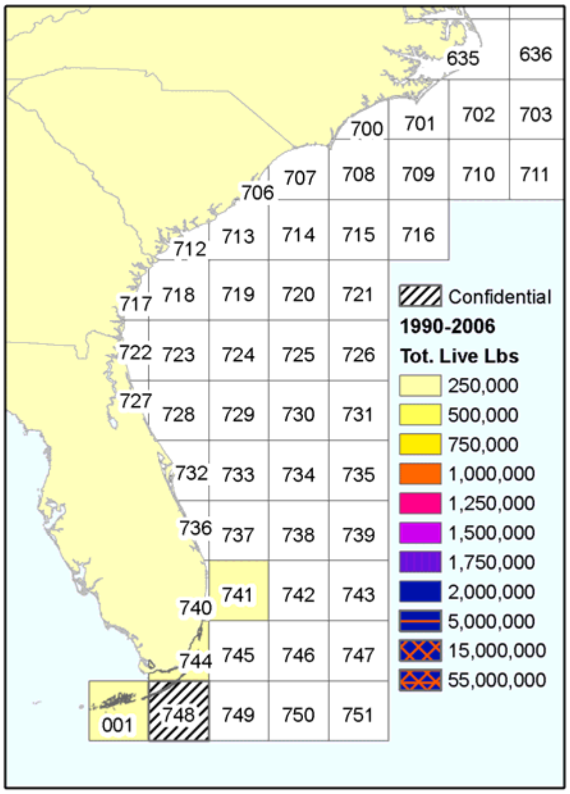


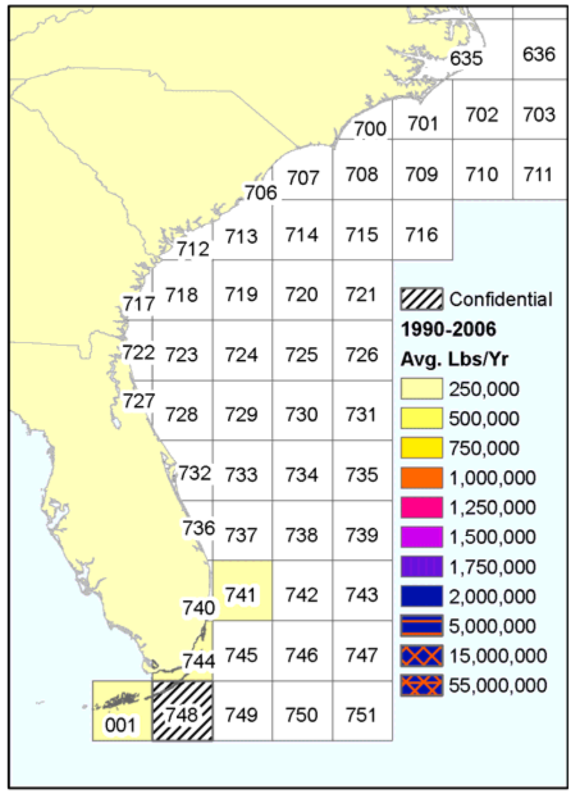


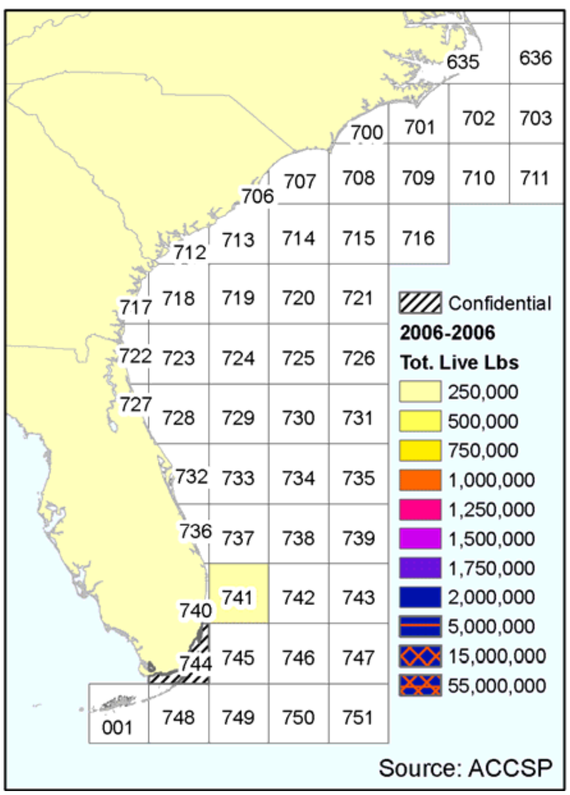


Logbook Catch: SCAMP
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	26.47	1.56	0.61
635	900.00	52.94	92.22
700	14.09	0.83	0.00
701	706.00	41.53	0.00
706	Conf.	Conf.	0.00
707	163.69	9.63	0.00
708	21.83	1.28	0.00
712	Conf.	Conf.	0.00
713	94.22	5.54	0.00
714	10.72	0.63	0.00
717	0.94	0.06	0.00
718	2.45	0.14	0.04
719	Conf.	Conf.	0.00
722	310.31	18.25	5.49
728	143.19	8.42	5.37
732	32.95	1.94	1.09
736	15.60	0.92	0.36
741	5.78	0.34	0.13
744	3.27	0.19	Conf.
748	1.09	0.06	0.00

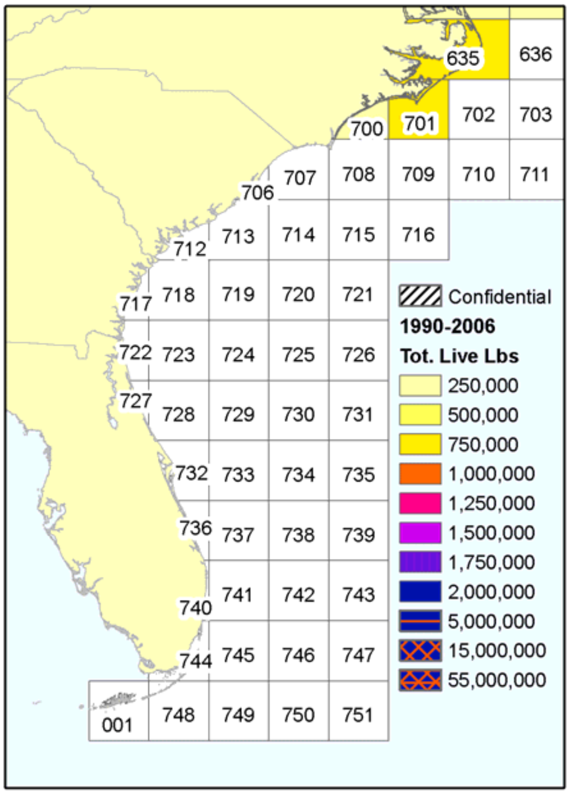


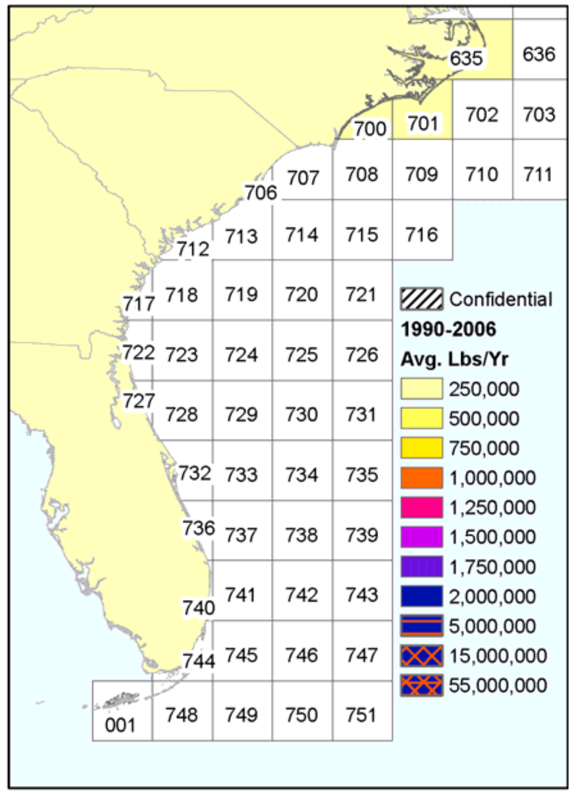


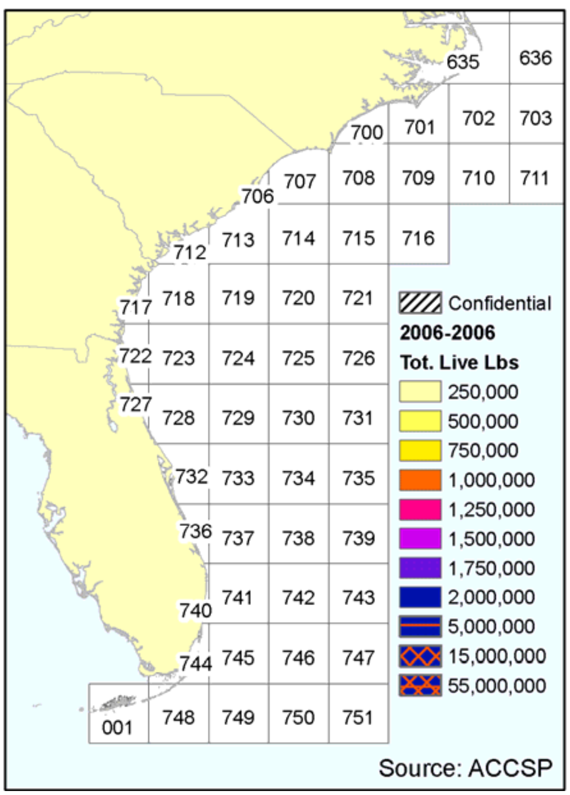


Logbook Catch: SCHOOLMASTER
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.21	0.01	0.00
741	0.16	0.01	0.01
744	0.15	0.01	Conf.
748	Conf.	Conf.	0.00

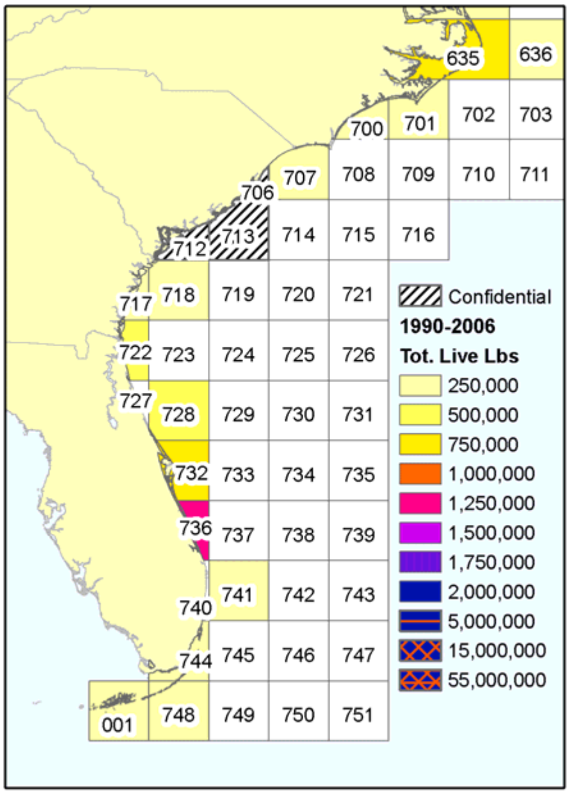


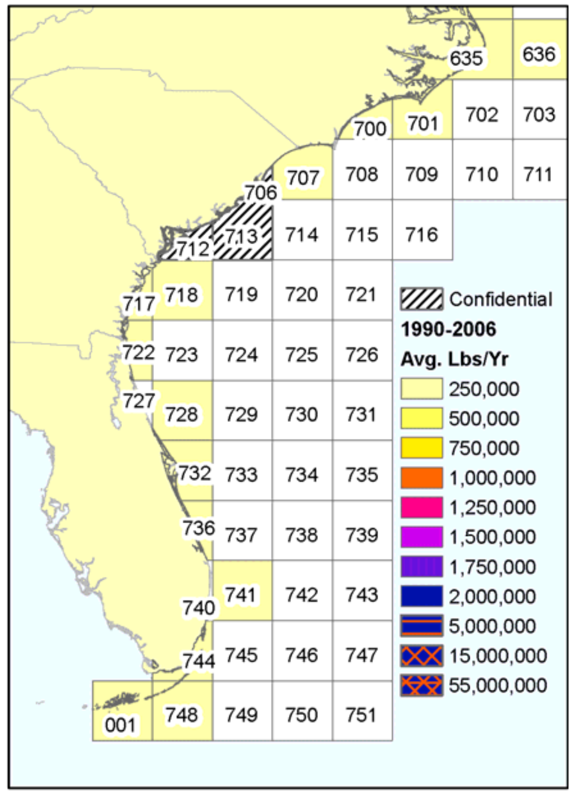


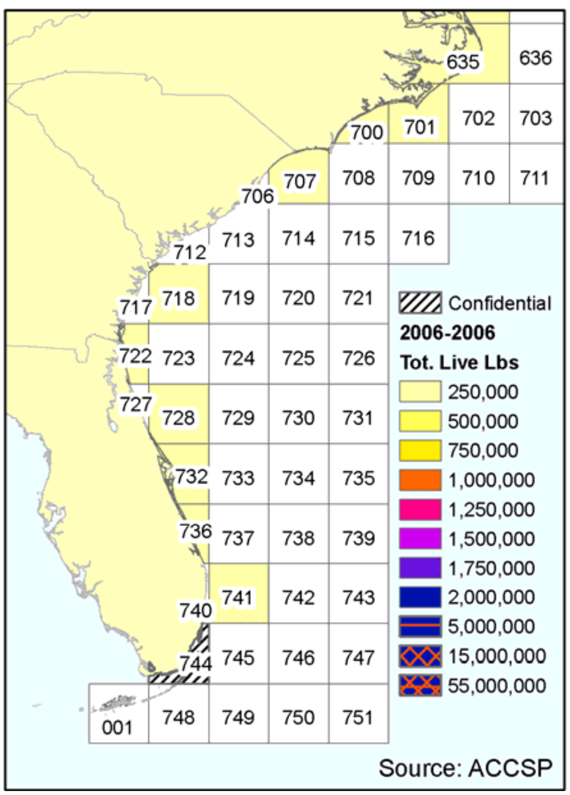


Logbook Catch: SCUP
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
635	731.64	43.04	0.00
700	0.15	0.01	0.00
701	590.35	34.73	0.00

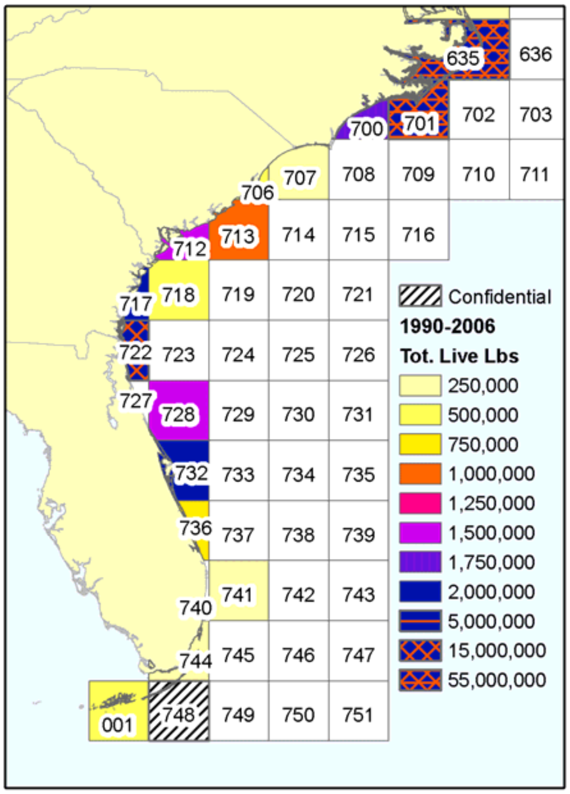


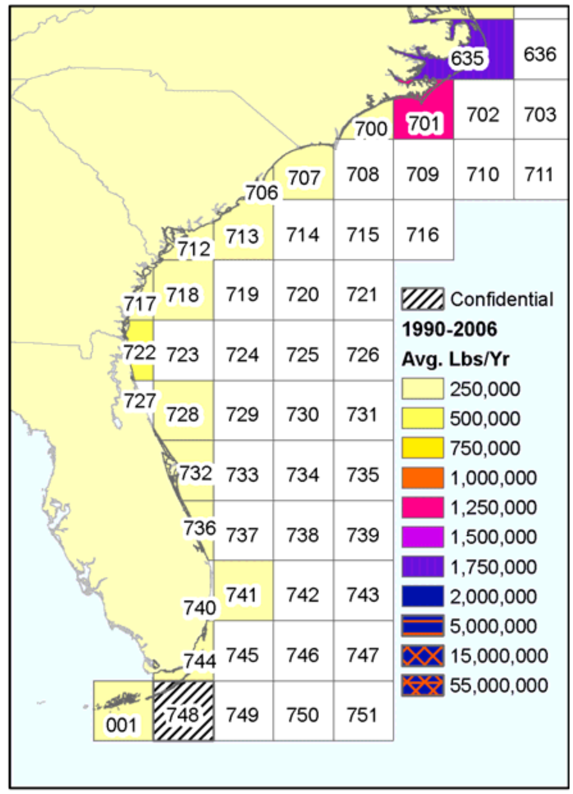


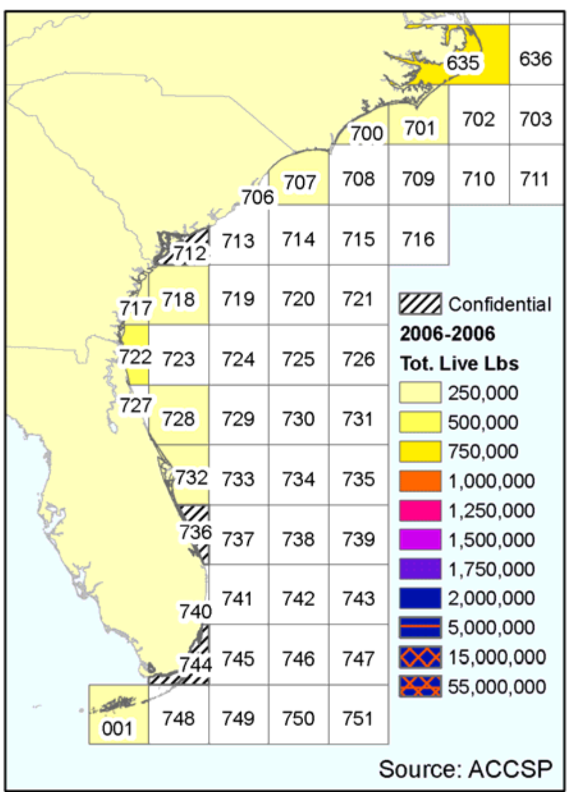


Logbook Catch: SHEEPSHEAD
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	4.54	0.27	0.00
635	686.19	40.36	11.04
636	0.07	0.00	0.00
700	37.76	2.22	1.17
701	209.59	12.33	7.37
706	Conf.	Conf.	0.00
707	0.25	0.01	0.05
712	Conf.	Conf.	0.00
713	Conf.	Conf.	0.00
717	0.17	0.01	0.00
718	0.31	0.02	0.14
722	309.60	18.21	19.88
728	418.02	24.59	23.74
732	657.98	38.70	33.47
736	1,045.19	61.48	64.69
741	130.36	7.67	16.22
744	1.75	0.10	Conf.
748	2.58	0.15	0.00

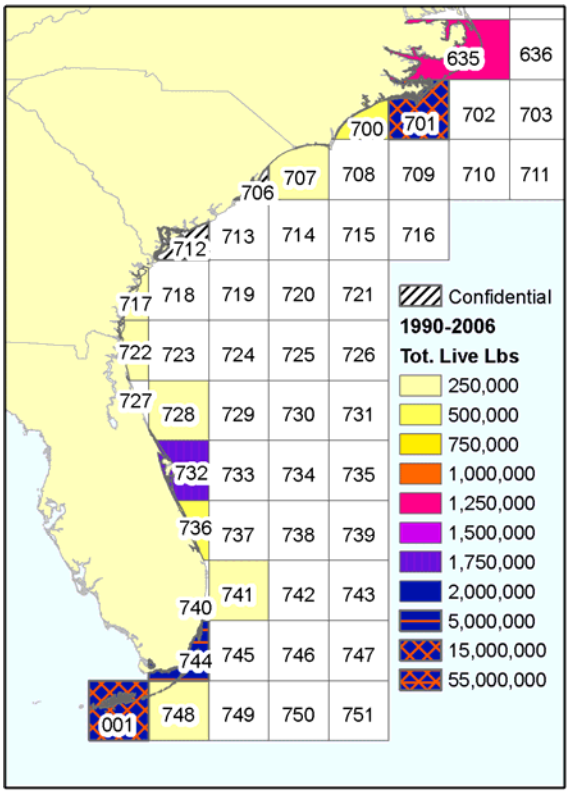


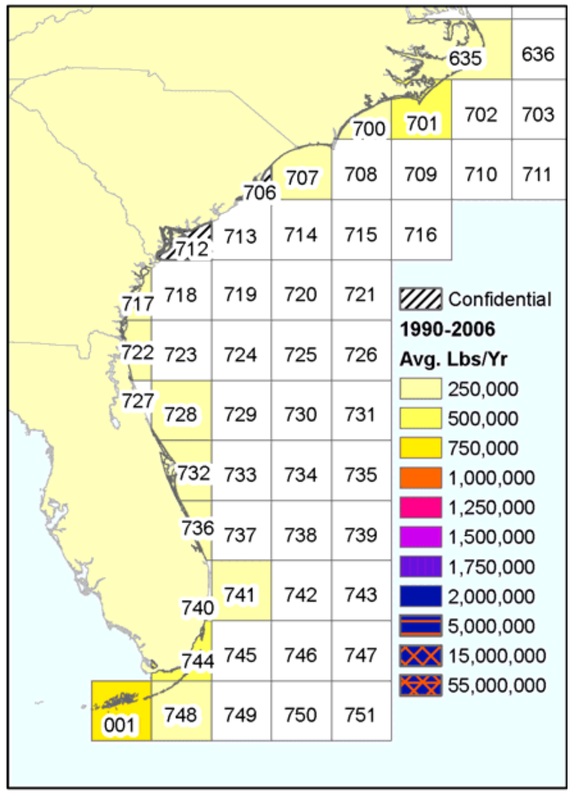


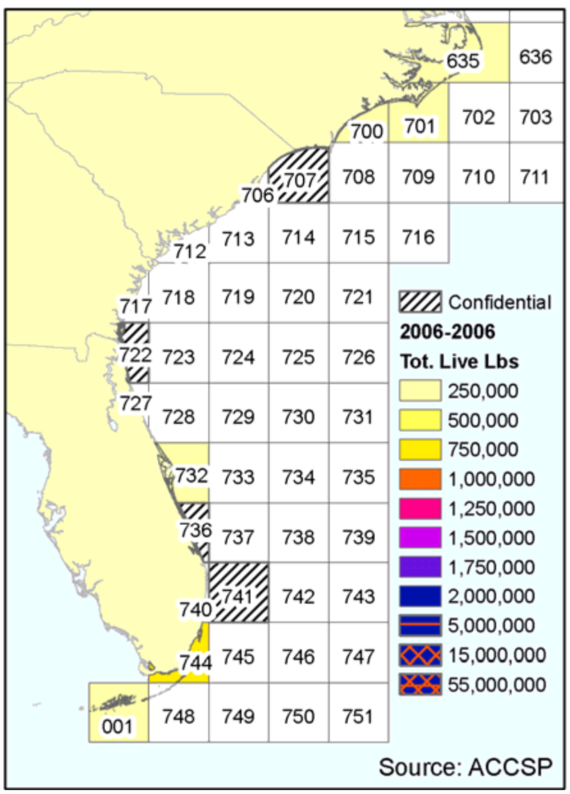


Logbook Catch: SHRIMP, NORTHERN BROWN
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	300.42	17.67	19.46
635	25,967.92	1,527.52	744.68
700	1,505.53	88.56	55.71
701	19,615.16	1,153.83	92.90
706	489.64	28.80	0.00
707	22.46	1.32	4.27
712	1,444.55	84.97	Conf.
713	867.64	51.04	0.00
717	1,780.88	104.76	132.11
718	262.20	15.42	0.96
722	5,590.76	328.87	332.45
728	1,427.47	83.97	61.95
732	1,993.55	117.27	76.57
736	641.57	37.74	Conf.
741	145.47	8.56	0.00
744	3.81	0.22	Conf.
748	Conf.	Conf.	0.00

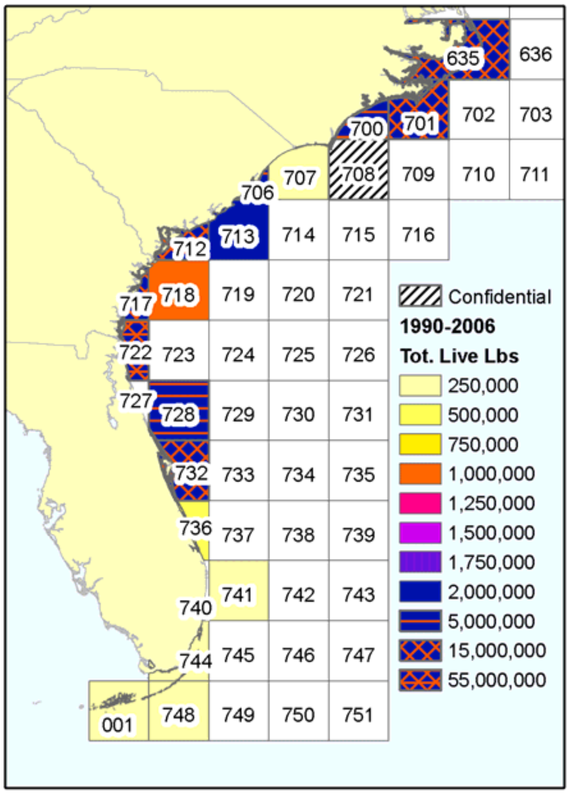


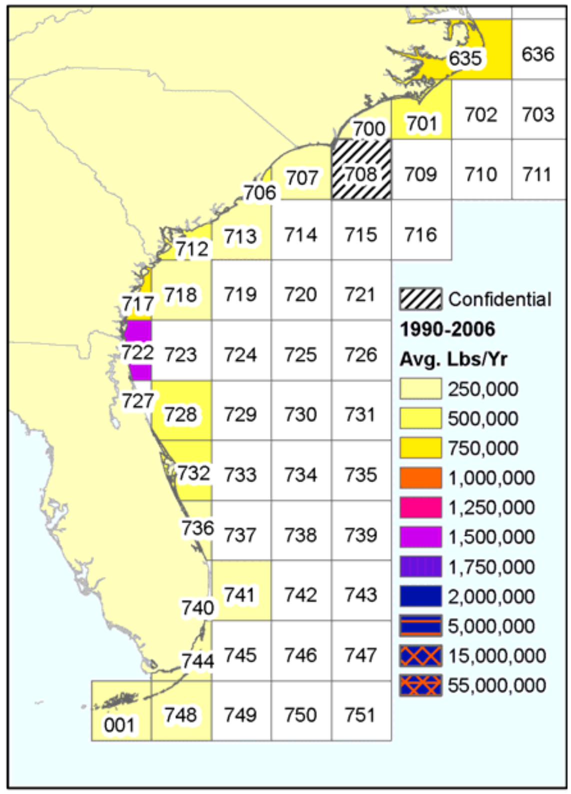


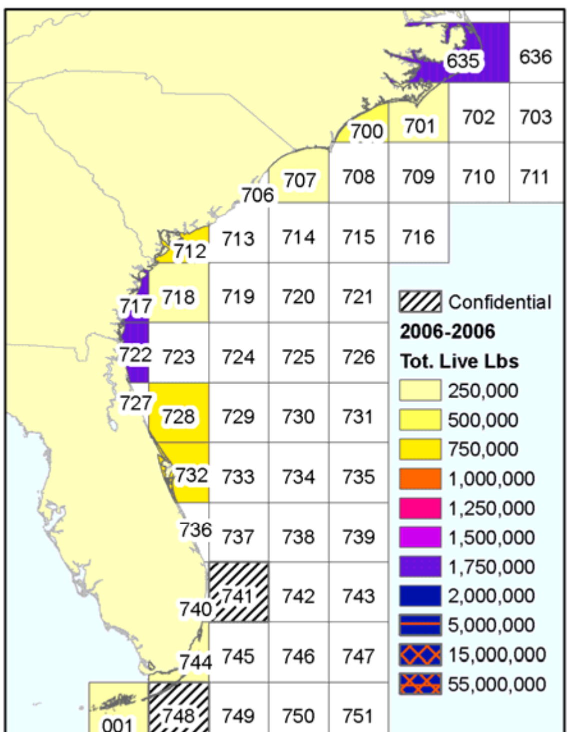


Logbook Catch: SHRIMP, NORTHERN PINK
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	10,458.49	615.21	190.24
635	1,178.27	69.31	20.41
700	271.79	15.99	2.14
701	7,595.11	446.77	26.25
706	Conf.	Conf.	0.00
707	0.41	0.02	Conf.
712	Conf.	Conf.	0.00
717	32.55	1.91	0.00
722	112.94	6.64	Conf.
728	55.80	3.28	0.00
732	1,621.69	95.39	35.07
736	359.92	21.17	Conf.
741	193.80	11.40	Conf.
744	4,796.86	282.17	539.41
748	147.66	8.69	0.00



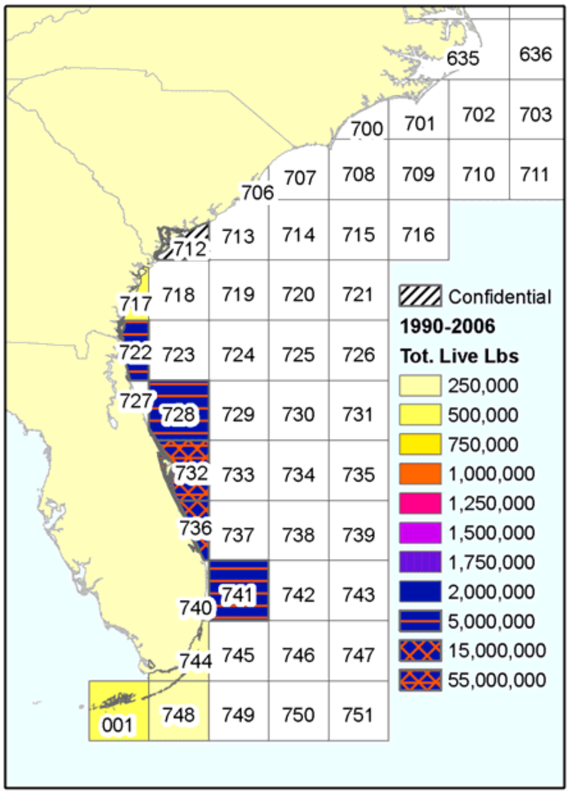


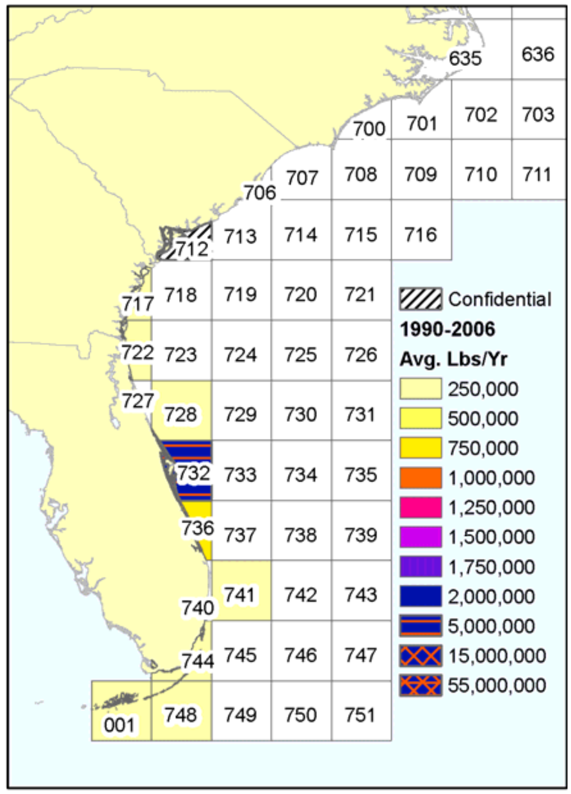


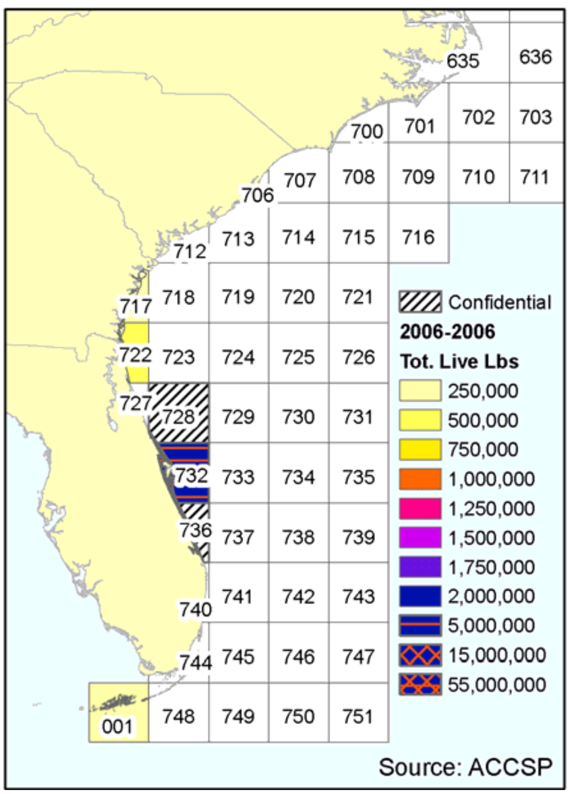
Source: ACCSP

Logbook Catch: SHRIMP, NORTHERN WHITE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	48.79	2.87	6.18
635	11,285.54	663.86	1,633.48
700	3,278.56	192.86	305.69
701	6,355.52	373.85	204.20
706	4,348.57	255.80	0.00
707	127.56	7.50	3.23
708	Conf.	Conf.	0.00
712	6,109.20	359.36	540.67
713	1,983.46	116.67	0.00
717	9,725.56	572.09	1,585.06
718	917.15	53.95	140.50
722	22,794.18	1,340.83	1,740.44
728	4,602.29	270.72	589.27
732	6,313.56	371.39	528.66
736	260.86	15.34	0.00
741	32.13	1.89	Conf.
744	173.35	10.20	116.43
748	6.97	0.41	Conf.

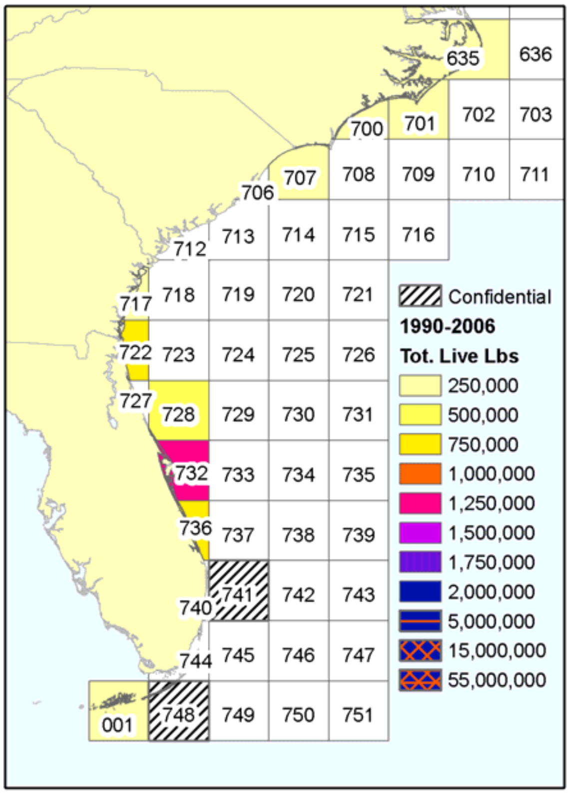


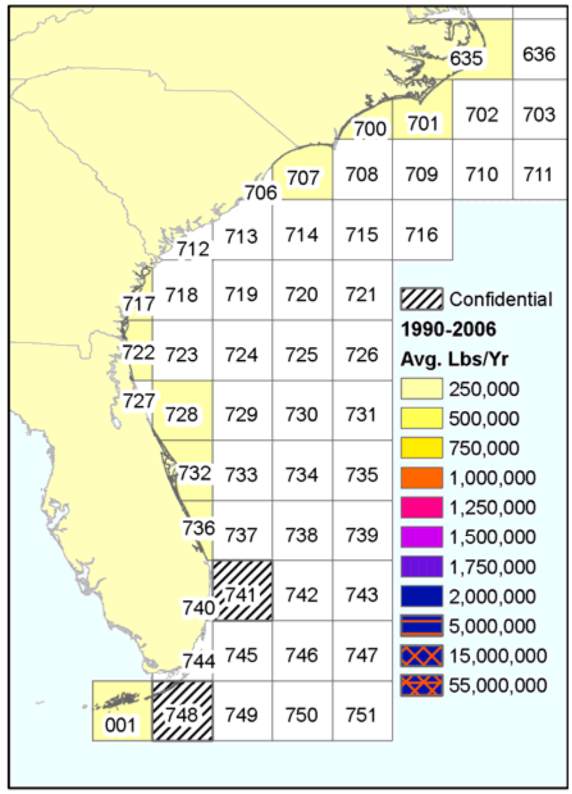


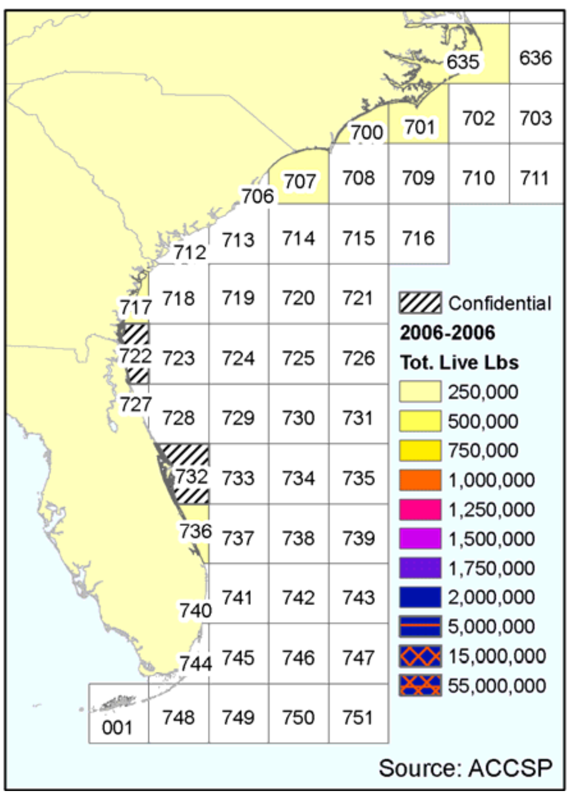


Logbook Catch: SHRIMP, ROCK
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	360.59	21.21	13.12
712	Conf.	Conf.	0.00
717	266.45	15.67	155.34
722	2,427.36	142.79	445.66
728	2,143.15	126.07	Conf.
732	50,286.93	2,958.05	2,307.82
736	11,121.82	654.22	Conf.
741	2,776.69	163.33	0.00
744	10.81	0.64	0.00
748	76.03	4.47	0.00

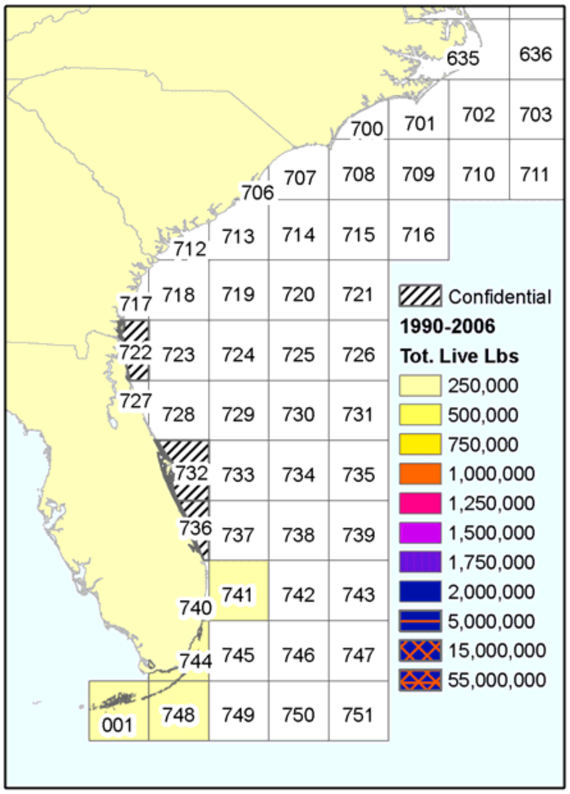


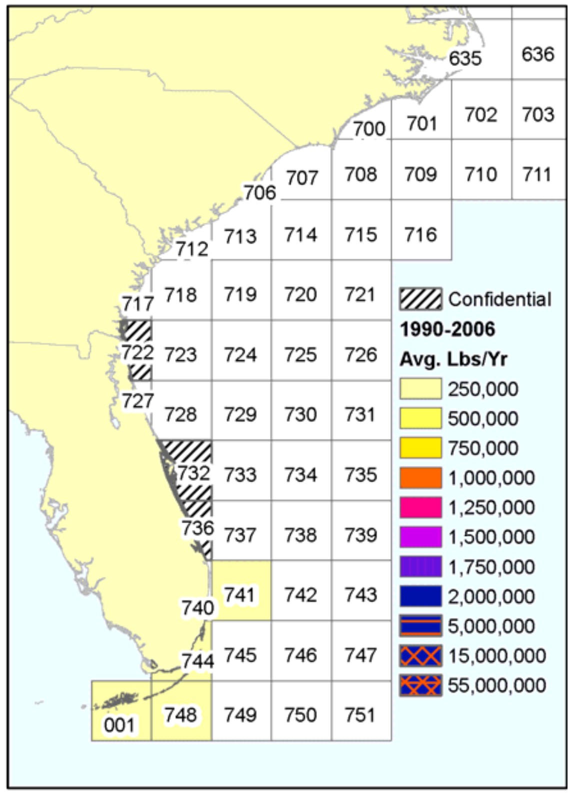


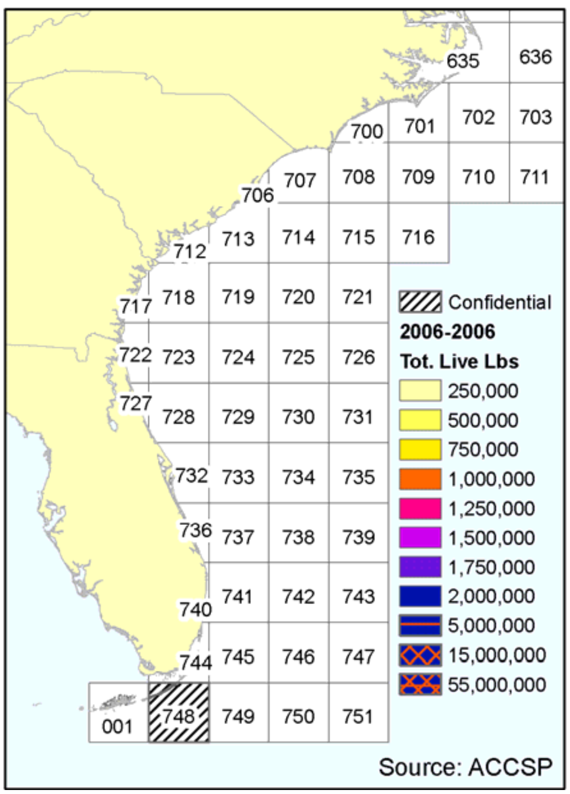


Logbook Catch: SHRIMP, ROYAL RED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	211.48	12.44	0.00
635	66.30	3.90	65.48
700	2.68	0.16	2.68
701	17.19	1.01	17.19
707	0.57	0.03	0.57
717	8.75	0.51	1.32
722	611.27	35.96	Conf.
728	301.52	17.74	0.00
732	1,188.18	69.89	Conf.
736	504.13	29.65	62.96
741	Conf.	Conf.	0.00
748	Conf.	Conf.	0.00

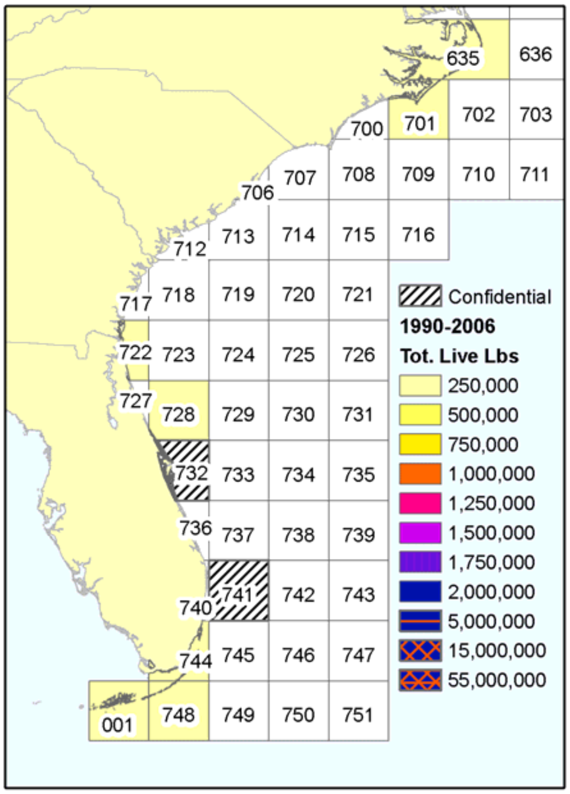


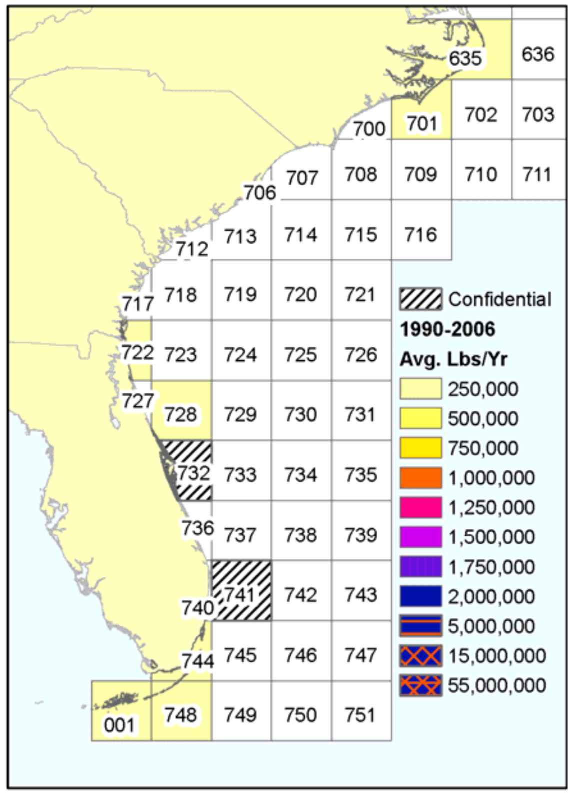


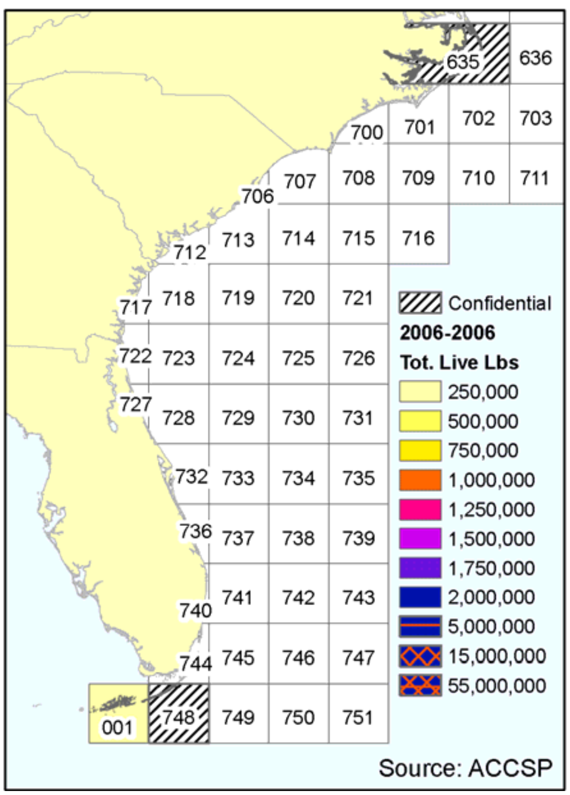


Logbook Catch: SNAPPER, BLACK
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.19	0.01	0.00
722	Conf.	Conf.	0.00
732	Conf.	Conf.	0.00
736	Conf.	Conf.	0.00
741	0.13	0.01	0.00
744	5.75	0.34	0.00
748	0.87	0.05	Conf.

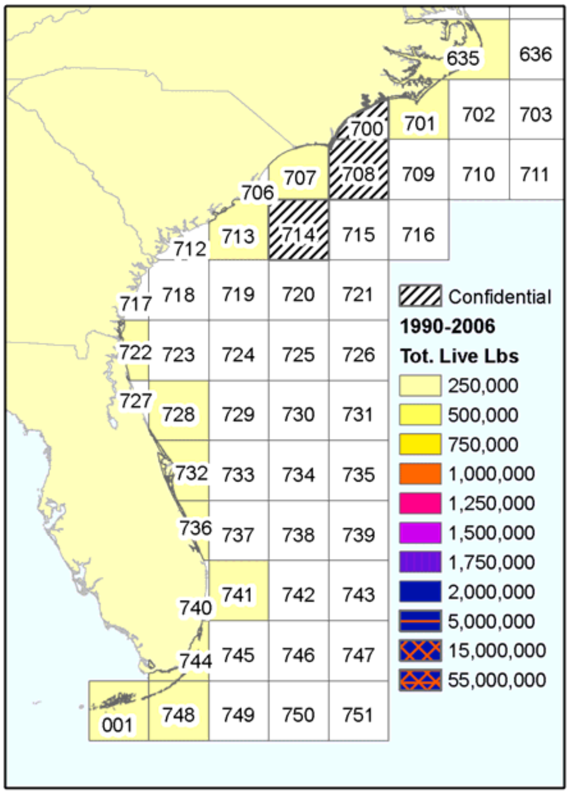


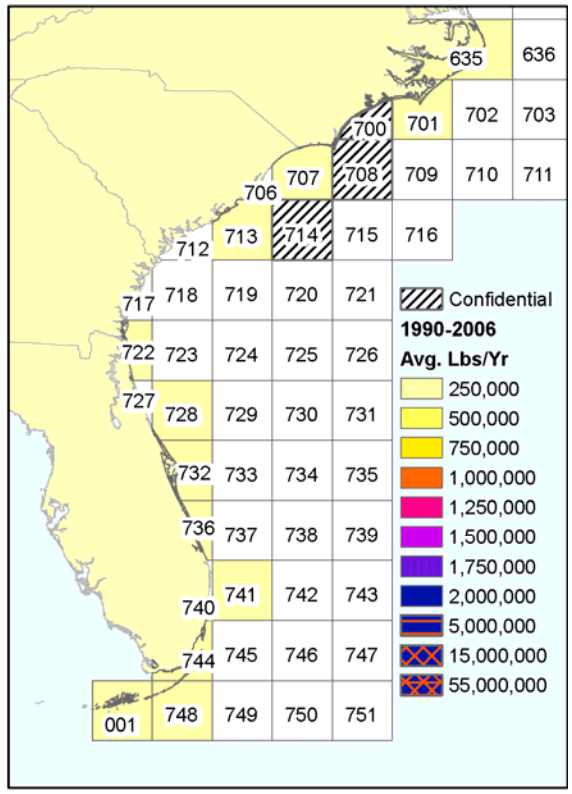


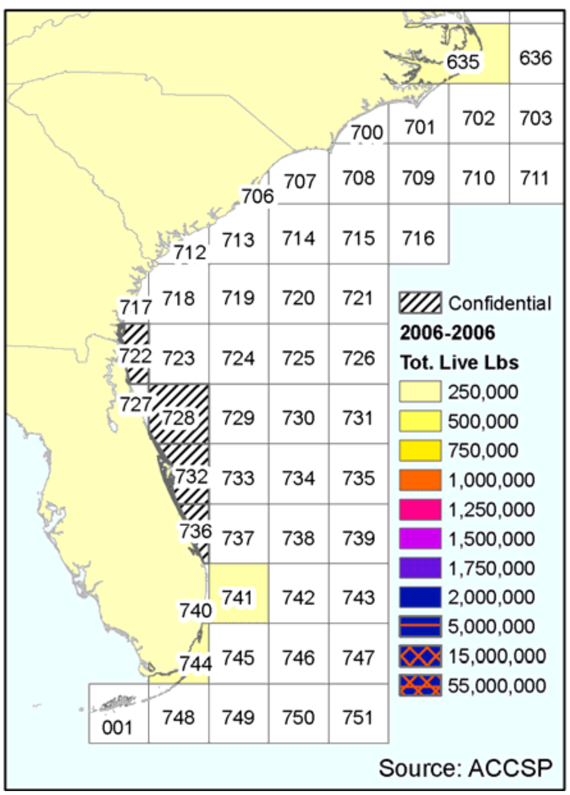


Logbook Catch: SNAPPER, BLACKFIN
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	2.43	0.14	0.08
635	0.53	0.03	Conf.
701	0.07	0.00	0.00
722	0.30	0.02	0.00
728	0.20	0.01	0.00
732	Conf.	Conf.	0.00
741	Conf.	Conf.	0.00
744	0.76	0.04	0.00
748	0.17	0.01	Conf.

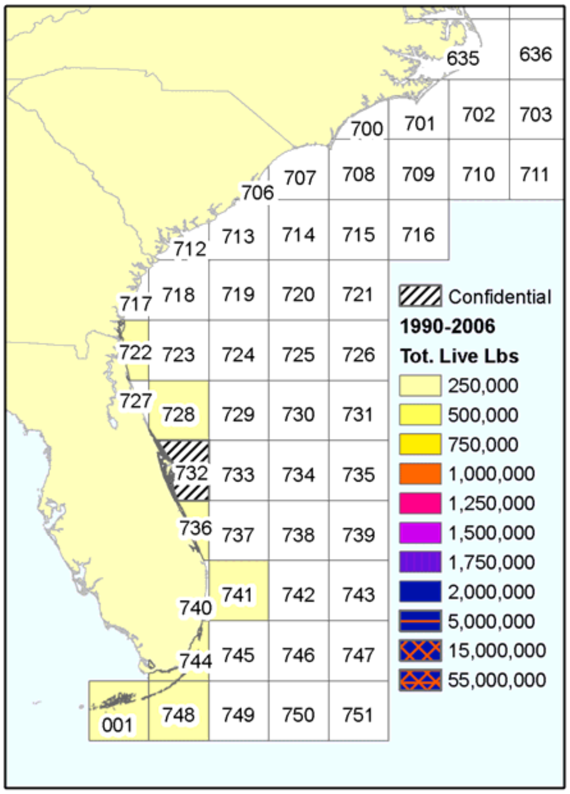


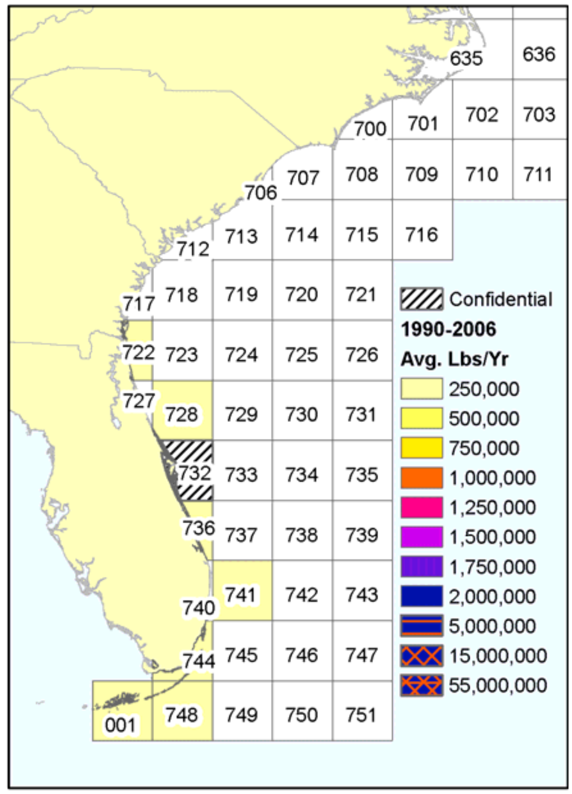


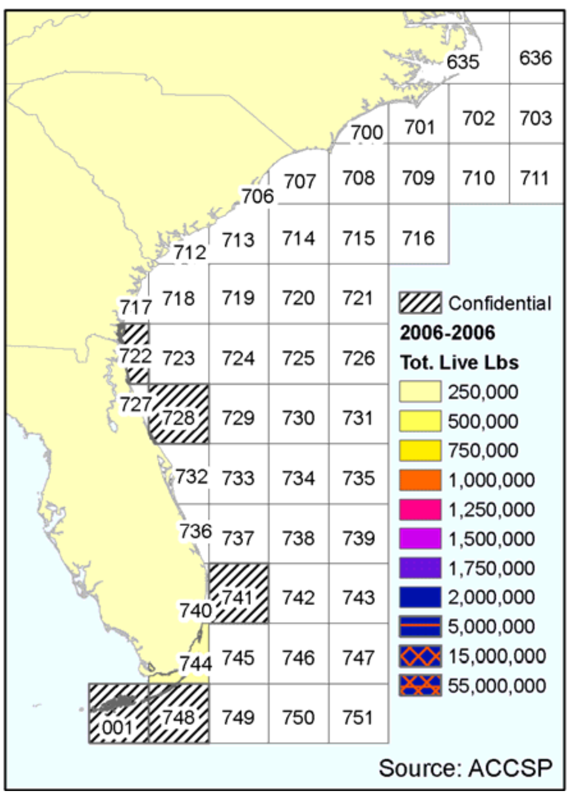


Logbook Catch: SNAPPER, CUBERA
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	1.65	0.10	0.00
635	1.20	0.07	0.24
700	Conf.	Conf.	0.00
701	1.89	0.11	0.00
707	0.28	0.02	0.00
708	Conf.	Conf.	0.00
713	0.27	0.02	0.00
714	Conf.	Conf.	0.00
722	11.14	0.66	Conf.
728	2.34	0.14	Conf.
732	11.36	0.67	Conf.
736	1.60	0.09	Conf.
741	4.24	0.25	0.15
744	9.86	0.58	0.27
748	1.58	0.09	0.00

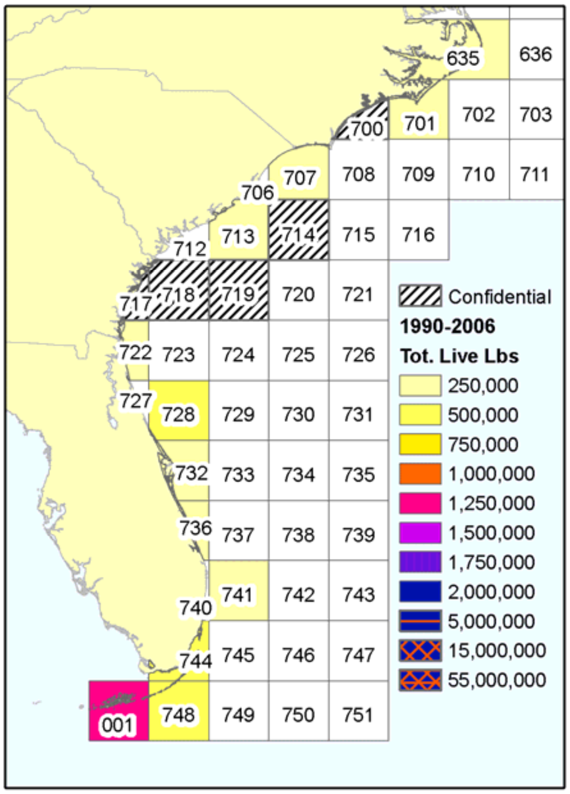


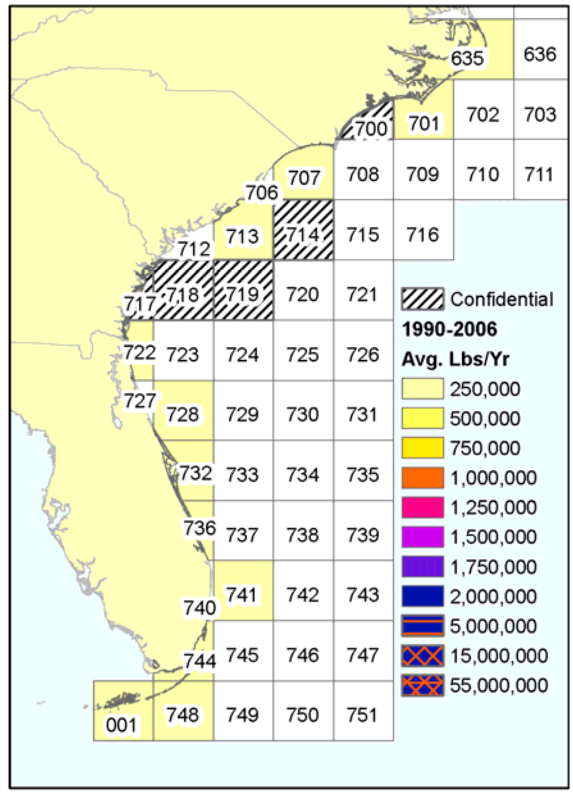


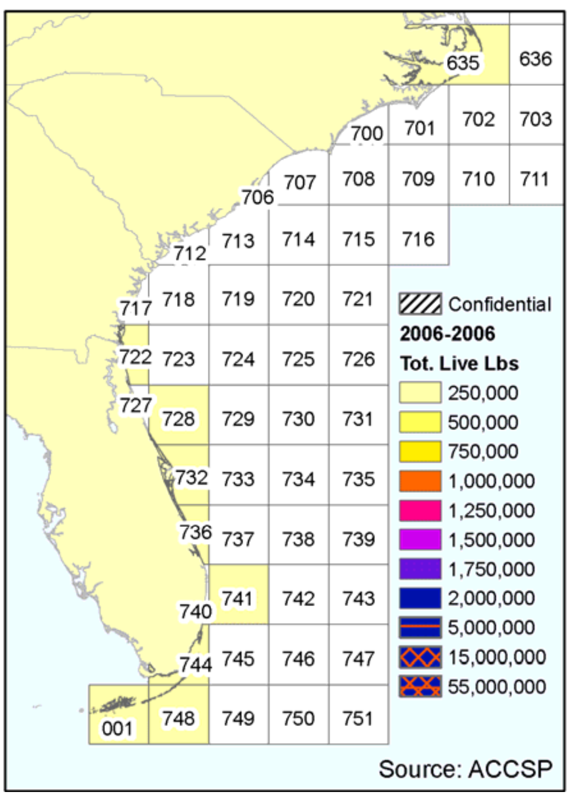


Logbook Catch: SNAPPER, DOG
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	2.26	0.13	Conf.
722	0.78	0.05	Conf.
728	0.12	0.01	Conf.
732	Conf.	Conf.	0.00
736	0.19	0.01	0.00
741	1.77	0.10	Conf.
744	1.96	0.12	0.07
748	0.31	0.02	Conf.

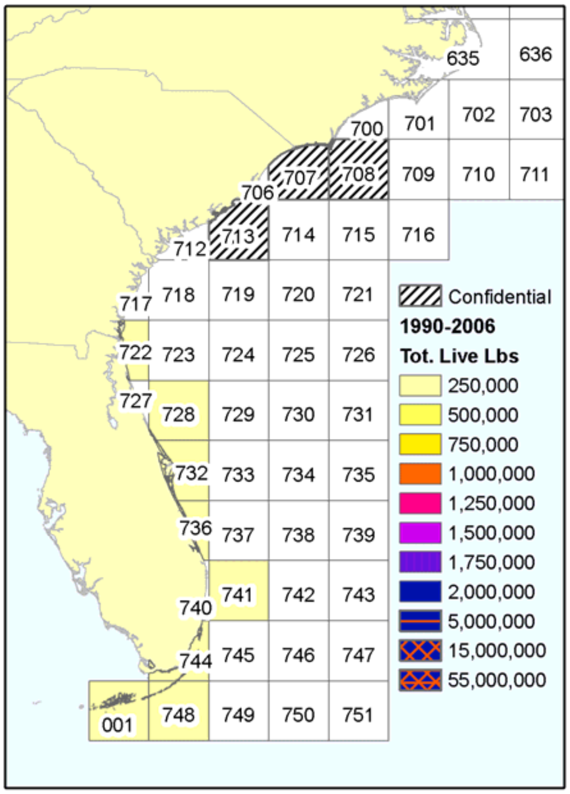


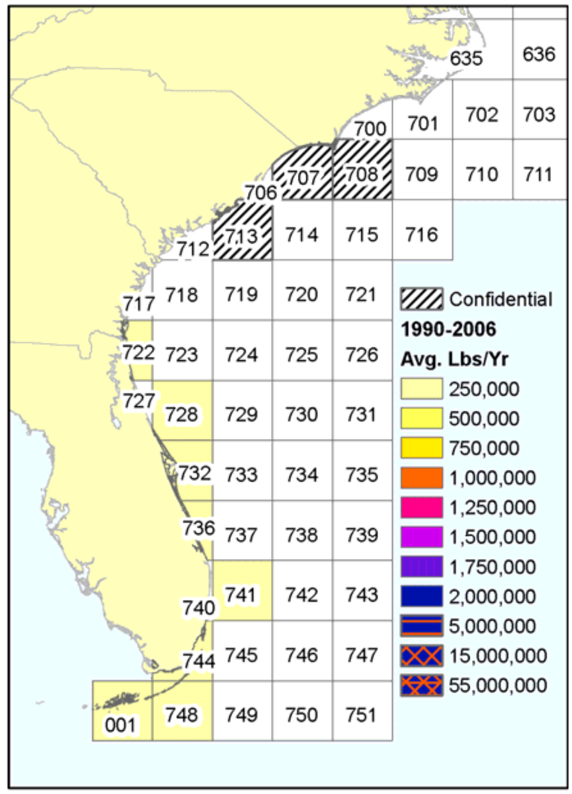


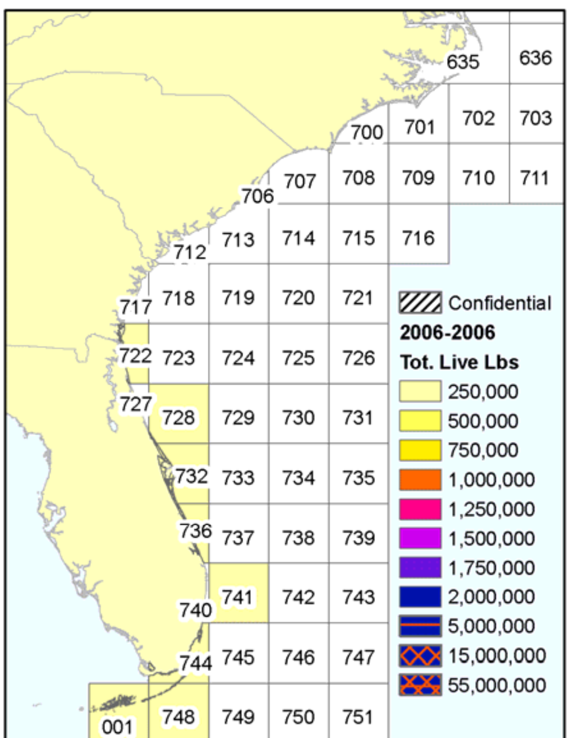


Logbook Catch: SNAPPER, GRAY
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	1,131.74	66.57	47.01
635	0.91	0.05	0.26
700	Conf.	Conf.	0.00
701	1.54	0.09	0.00
707	0.43	0.03	0.00
713	0.52	0.03	0.00
714	Conf.	Conf.	0.00
717	Conf.	Conf.	0.00
718	Conf.	Conf.	0.00
719	Conf.	Conf.	0.00
722	106.23	6.25	1.20
728	266.39	15.67	5.01
732	141.05	8.30	2.22
736	92.03	5.41	1.66
741	88.08	5.18	3.88
744	314.45	18.50	11.03
748	492.69	28.98	11.18



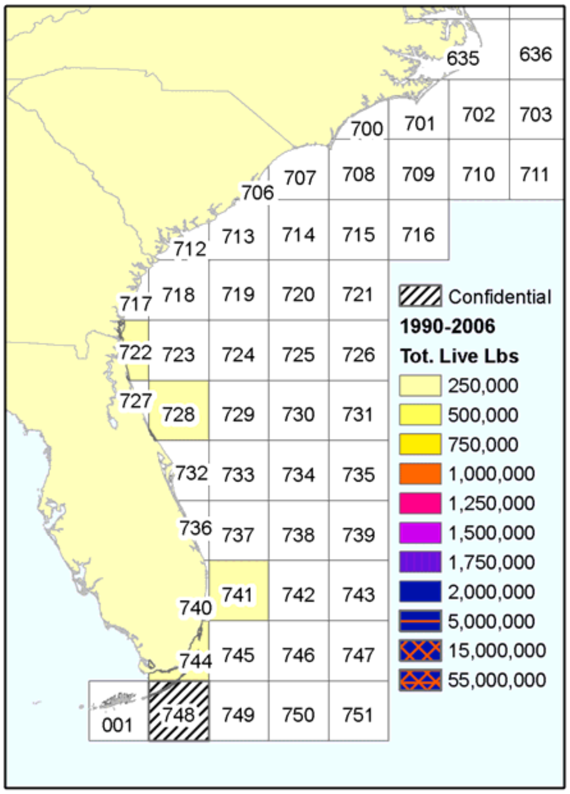


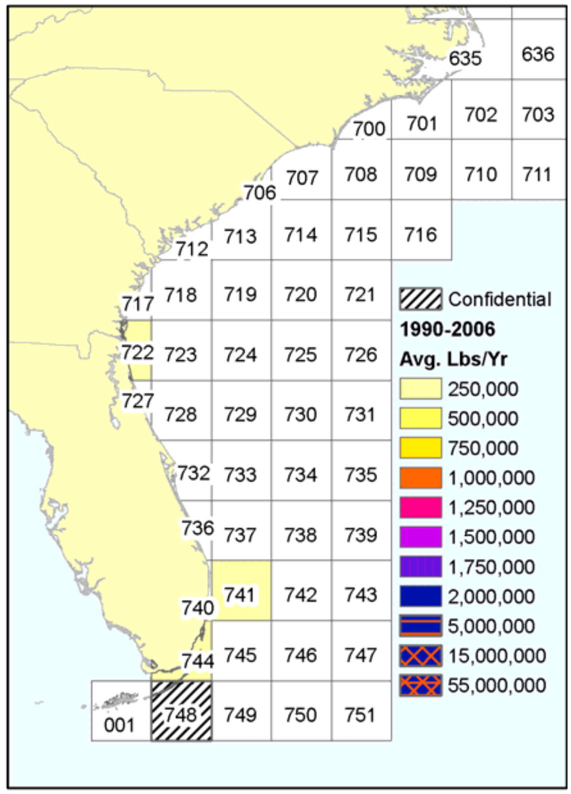


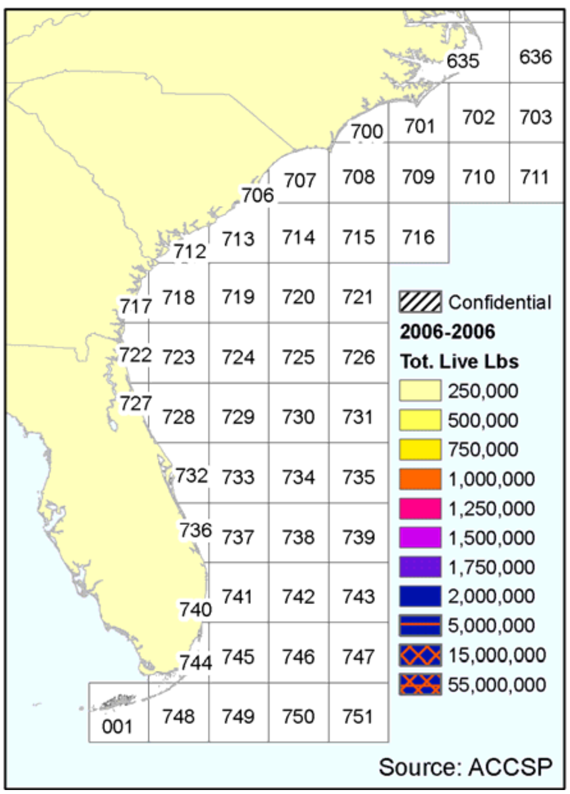
Source: ACCSP

Logbook Catch: SNAPPER, LANE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	142.87	8.40	2.11
707	Conf.	Conf.	0.00
708	Conf.	Conf.	0.00
713	Conf.	Conf.	0.00
722	0.93	0.05	0.01
728	4.78	0.28	0.04
732	5.50	0.32	0.04
736	9.68	0.57	0.13
741	27.64	1.63	2.26
744	25.36	1.49	0.04
748	23.56	1.39	0.32



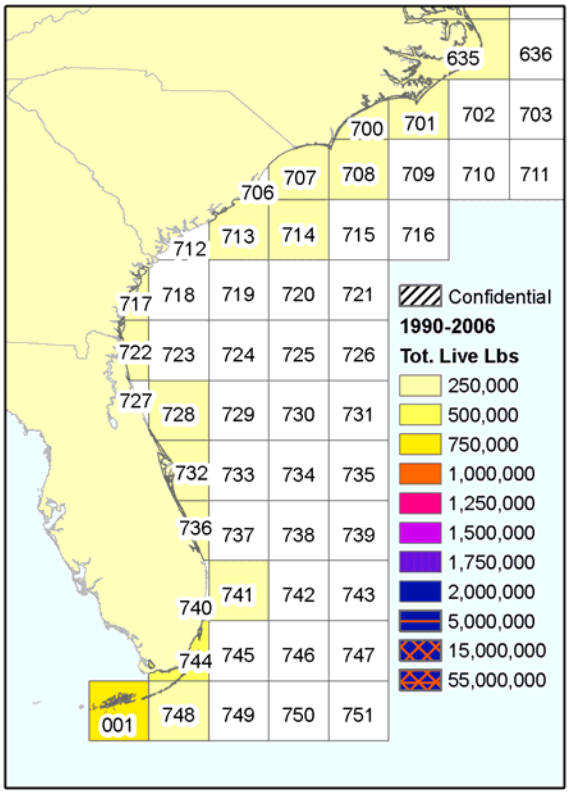


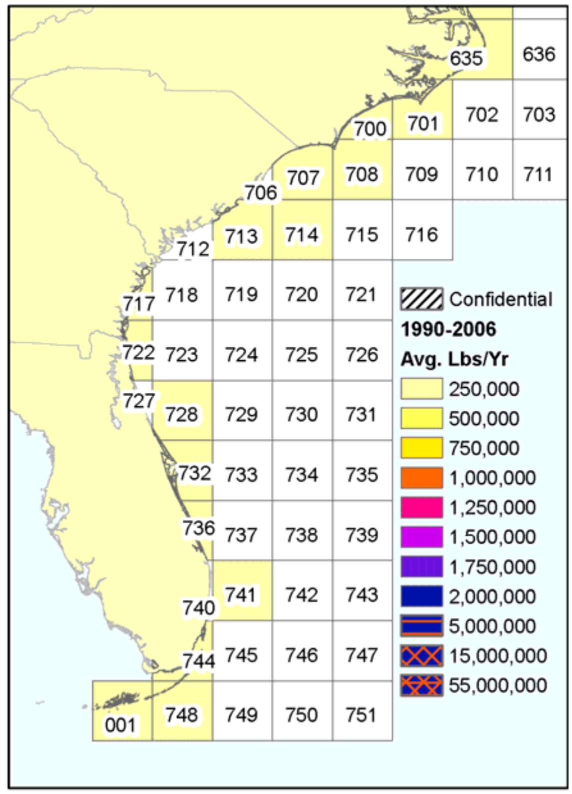


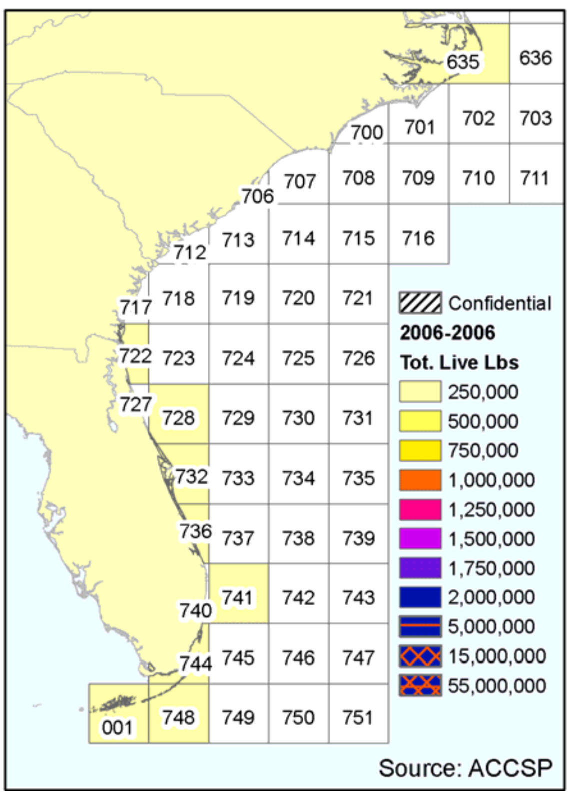
Source: ACCSP

Logbook Catch: SNAPPER, MAHOGANY
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
722	0.22	0.01	0.00
728	0.03	0.00	0.00
741	0.24	0.01	0.00
744	0.09	0.01	0.00
748	Conf.	Conf.	0.00

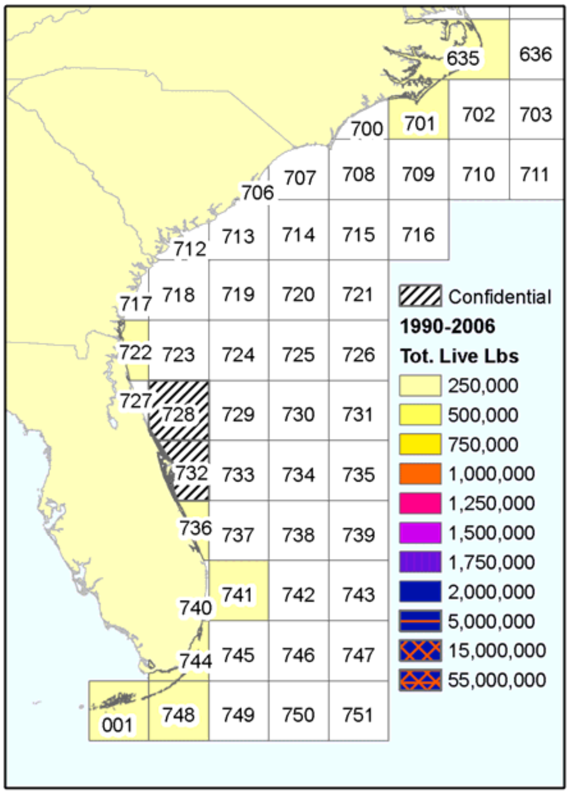


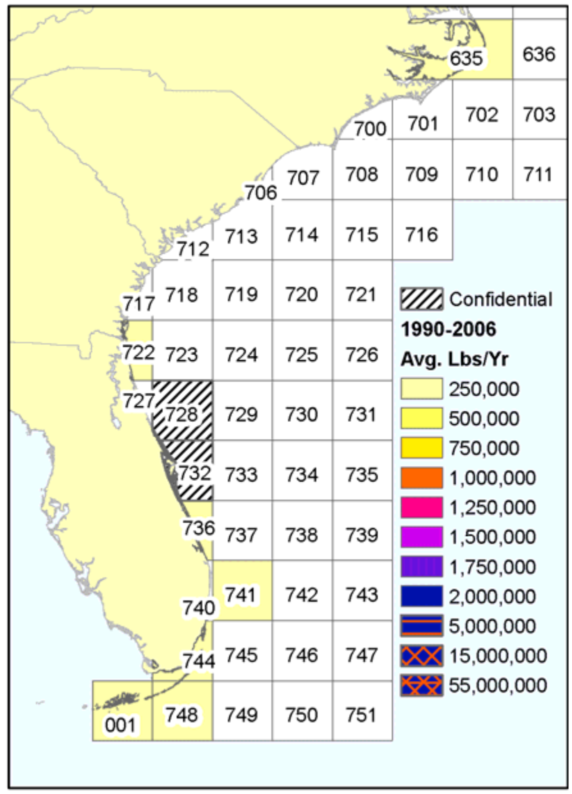


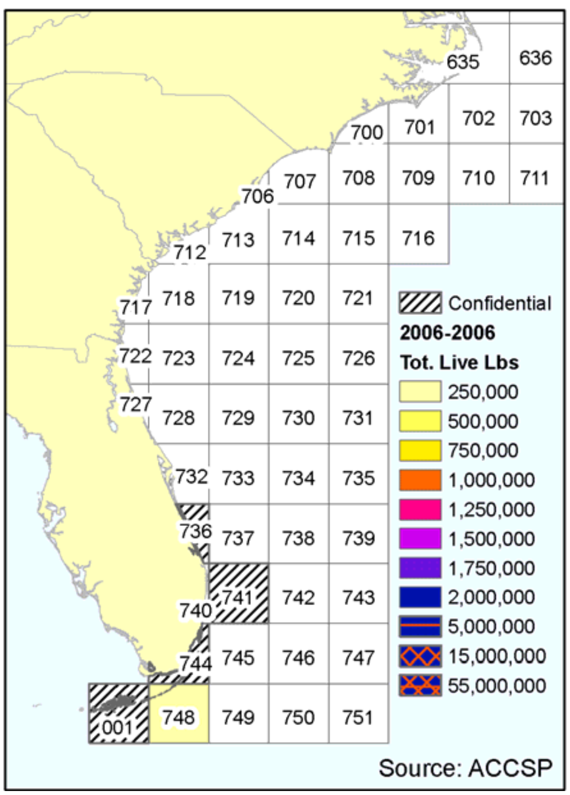


Logbook Catch: SNAPPER, MUTTON
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	630.16	37.07	20.78
635	12.43	0.73	1.09
700	0.66	0.04	0.00
701	12.65	0.74	0.00
707	3.17	0.19	0.00
708	1.64	0.10	0.00
713	2.04	0.12	0.00
714	0.15	0.01	0.00
717	0.89	0.05	0.00
722	67.34	3.96	1.50
728	39.24	2.31	1.51
732	10.35	0.61	0.16
736	32.86	1.93	0.52
741	241.33	14.20	6.02
744	377.37	22.20	13.35
748	206.58	12.15	8.37

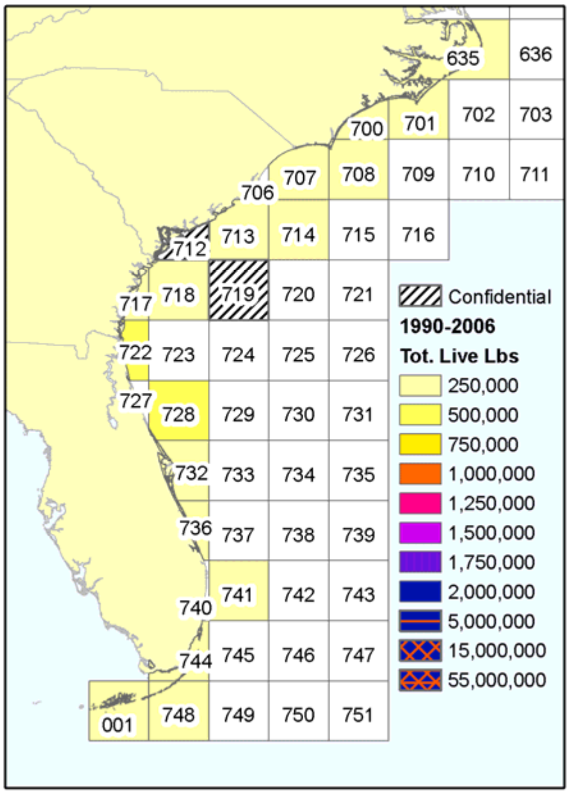


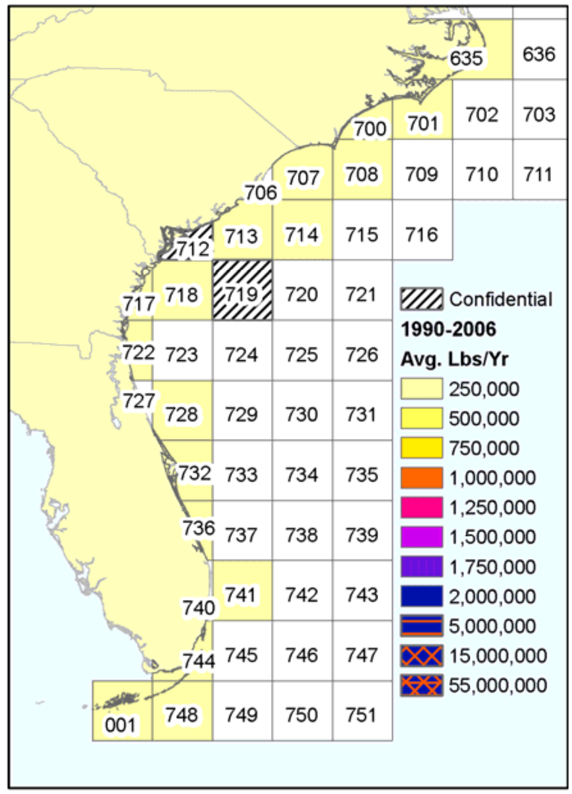


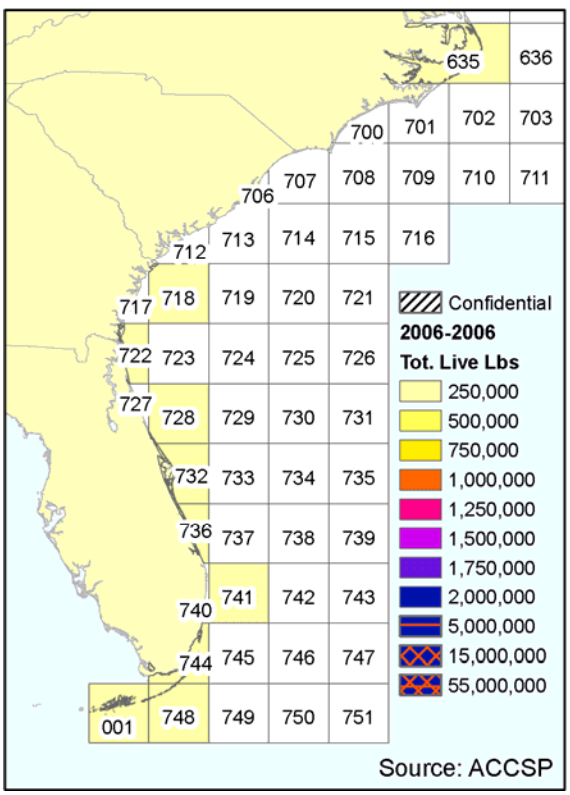


Logbook Catch: SNAPPER, QUEEN
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	24.86	1.46	Conf.
635	0.07	0.00	0.00
701	0.04	0.00	0.00
722	0.10	0.01	0.00
728	Conf.	Conf.	0.00
732	Conf.	Conf.	0.00
736	4.41	0.26	Conf.
741	1.62	0.10	Conf.
744	41.71	2.45	Conf.
748	12.13	0.71	1.83

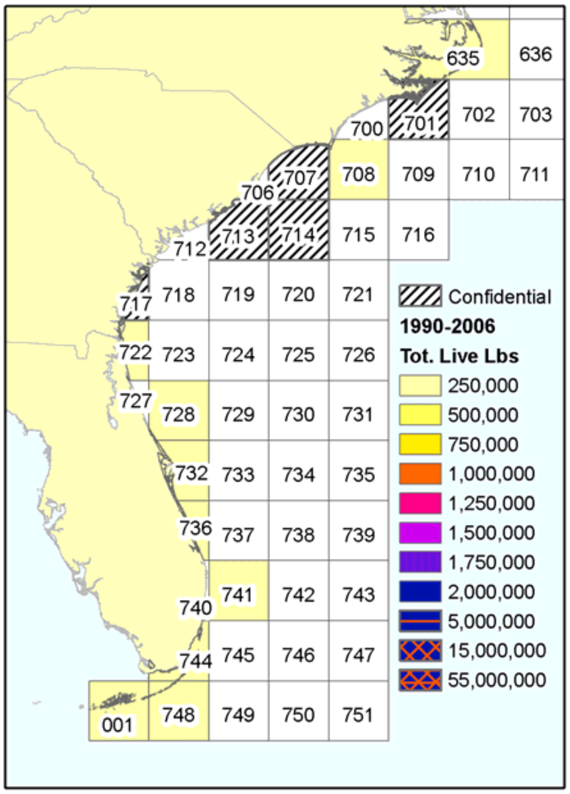


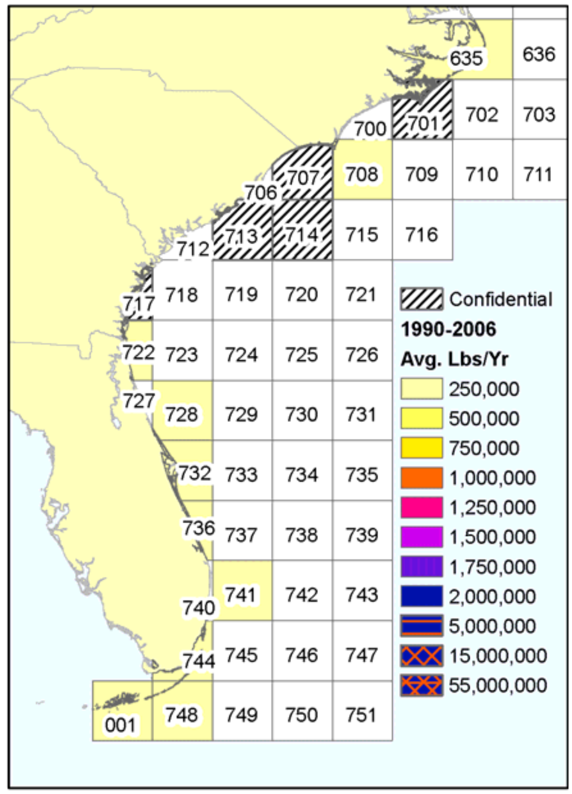


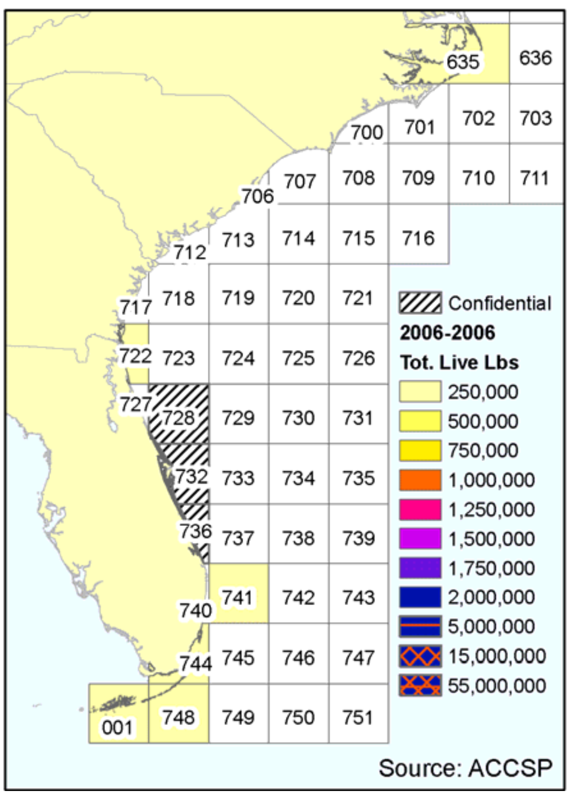


Logbook Catch: SNAPPER, RED
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	45.31	2.67	1.28
635	108.03	6.35	4.65
700	0.80	0.05	0.00
701	169.09	9.95	0.00
707	32.08	1.89	0.00
708	1.40	0.08	0.00
712	Conf.	Conf.	0.00
713	37.73	2.22	0.00
714	6.09	0.36	0.00
717	1.15	0.07	0.00
718	2.08	0.12	0.08
719	Conf.	Conf.	0.00
722	379.75	22.34	8.05
728	469.84	27.64	23.71
732	177.30	10.43	9.63
736	29.93	1.76	1.78
741	7.90	0.46	0.18
744	26.69	1.57	0.26
748	2.79	0.16	0.33

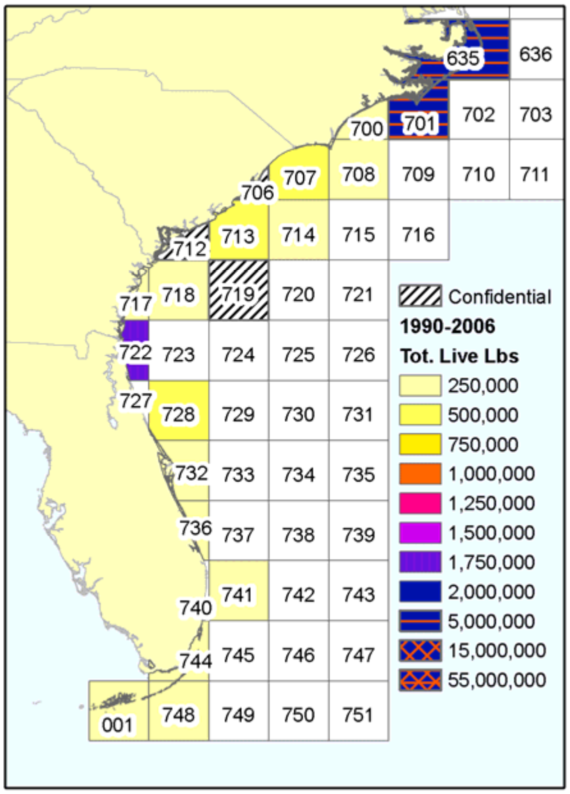


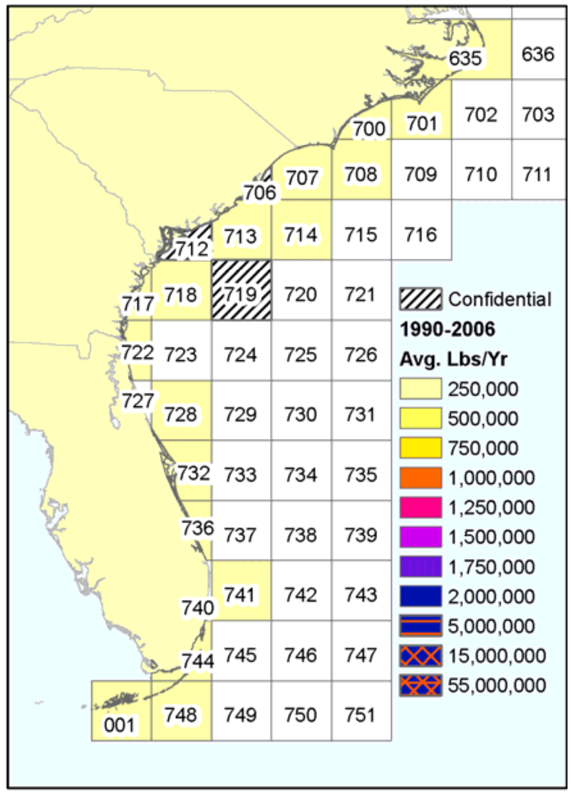


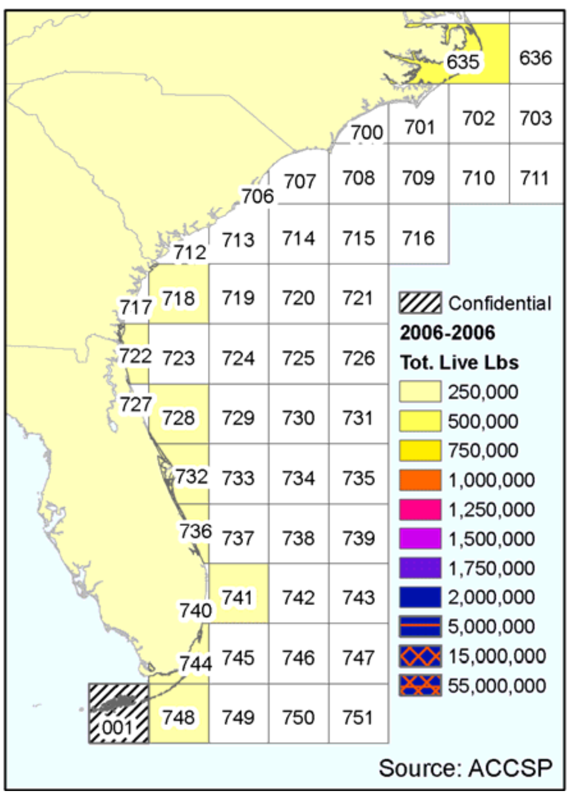


Logbook Catch: SNAPPER, SILK
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	148.69	8.75	0.16
635	12.16	0.72	0.55
701	Conf.	Conf.	0.00
707	Conf.	Conf.	0.00
708	0.25	0.01	0.00
713	Conf.	Conf.	0.00
714	Conf.	Conf.	0.00
717	Conf.	Conf.	0.00
722	6.70	0.39	0.03
728	1.23	0.07	Conf.
732	1.04	0.06	Conf.
736	2.99	0.18	Conf.
741	10.44	0.61	0.09
744	80.90	4.76	1.77
748	19.68	1.16	2.24

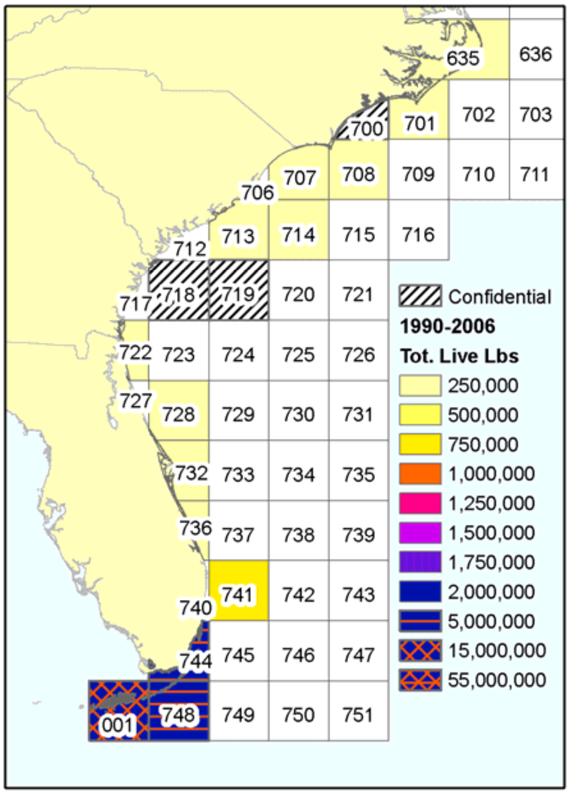


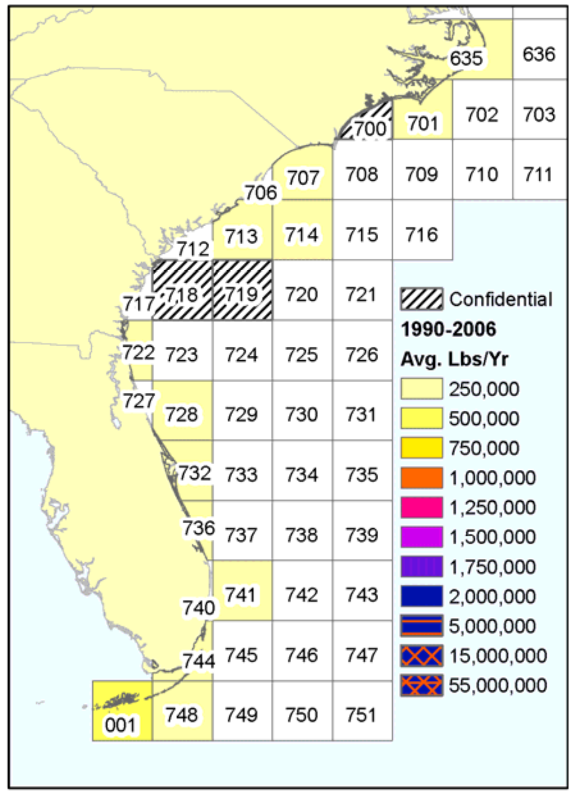


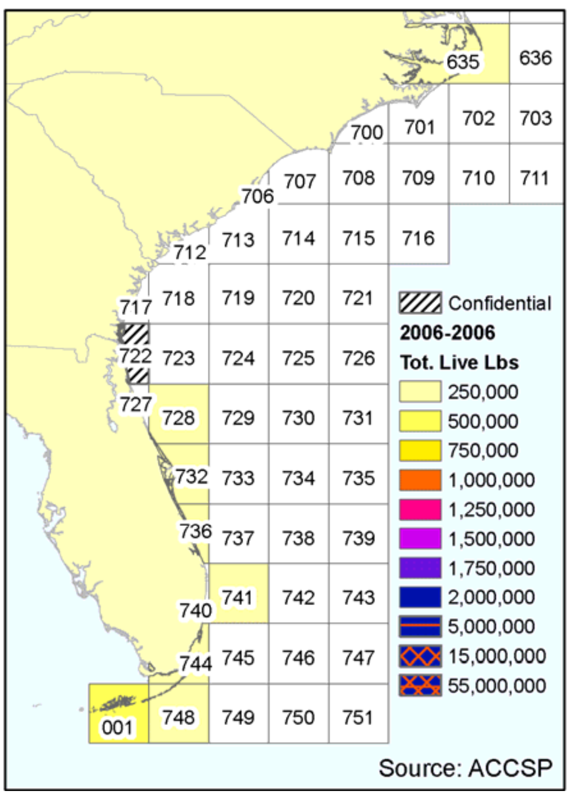


Logbook Catch: SNAPPER, VERMILION
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	32.61	1.92	Conf.
635	3,851.42	226.55	277.21
700	16.10	0.95	0.00
701	2,794.39	164.38	0.00
706	Conf.	Conf.	0.00
707	460.71	27.10	0.00
708	32.03	1.88	0.00
712	Conf.	Conf.	0.00
713	287.54	16.91	0.00
714	22.75	1.34	0.00
717	0.35	0.02	0.00
718	13.46	0.79	0.21
719	Conf.	Conf.	0.00
722	1,544.39	90.85	56.42
728	371.74	21.87	37.77
732	6.97	0.41	0.22
736	41.57	2.45	0.43
741	56.81	3.34	3.68
744	47.68	2.80	0.40
748	5.60	0.33	1.12

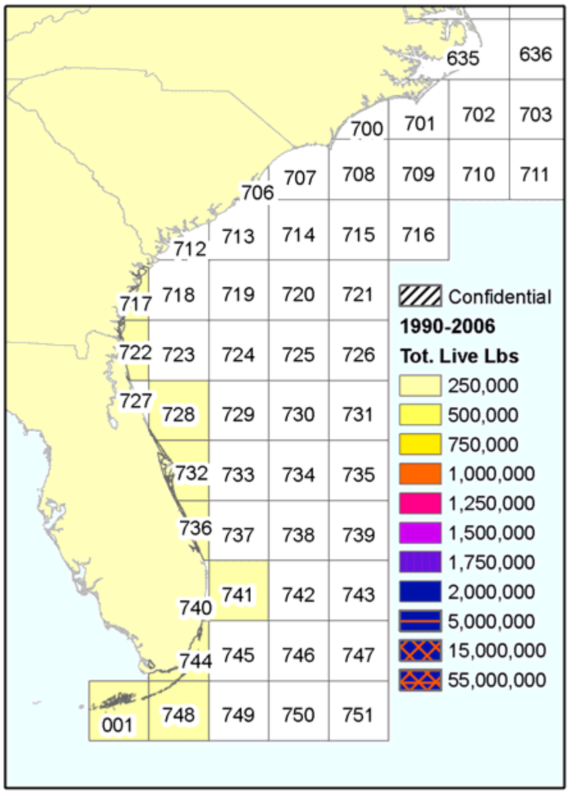


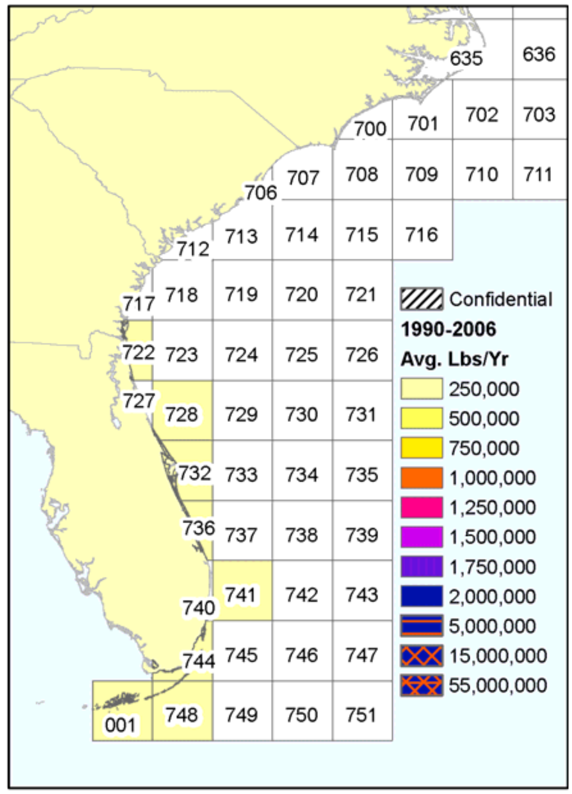


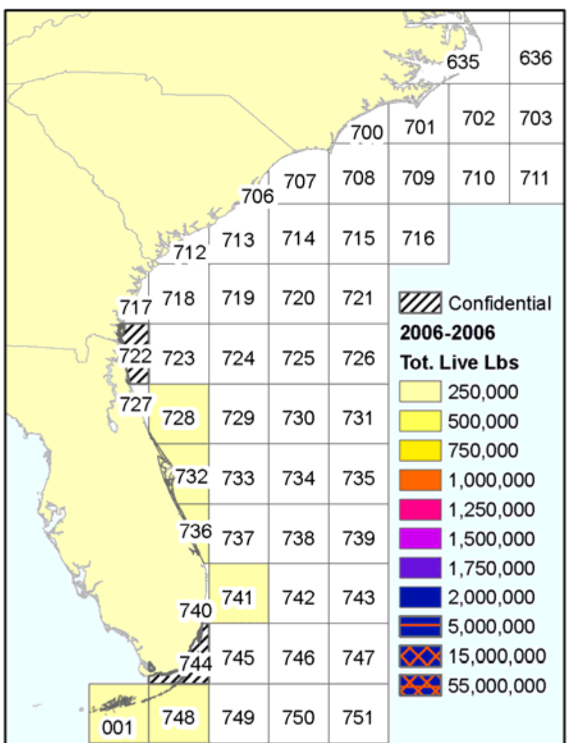


Logbook Catch: SNAPPER, YELLOWTAIL
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	6,834.98	402.06	307.74
635	1.23	0.07	0.02
700	Conf.	Conf.	0.00
701	0.71	0.04	0.00
707	0.48	0.03	0.00
708	0.03	0.00	0.00
713	0.44	0.03	0.00
714	0.12	0.01	0.00
718	Conf.	Conf.	0.00
719	Conf.	Conf.	0.00
722	6.74	0.40	Conf.
728	12.96	0.76	0.04
732	4.59	0.27	0.16
736	11.67	0.69	2.47
741	568.98	33.47	21.14
744	2,657.45	156.32	80.60
748	2,247.87	132.23	137.32



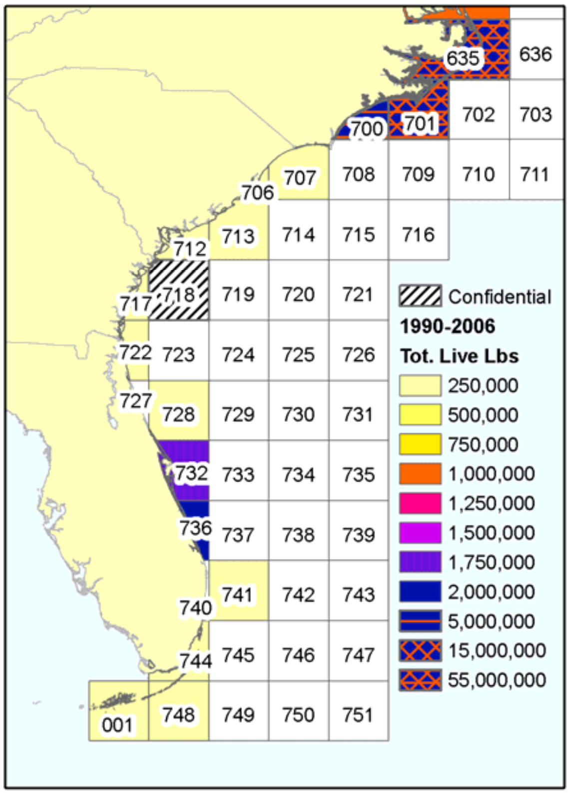


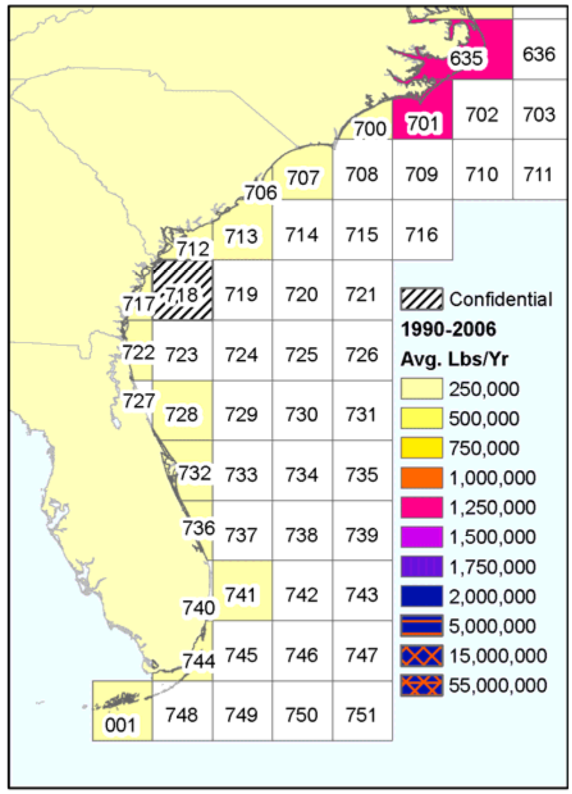


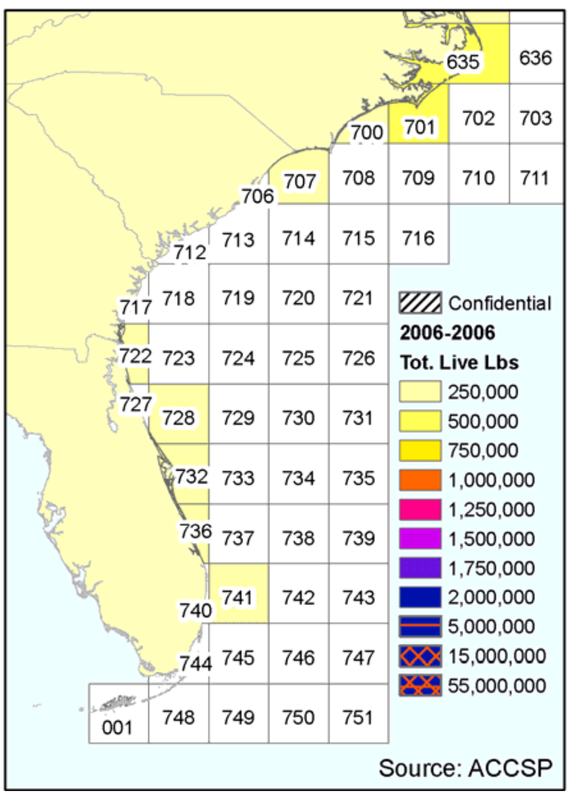
Source: ACCSP

Logbook Catch: SPADEFISH, ATLANTIC
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	1.06	0.06	0.26
717	0.06	0.00	0.00
722	9.09	0.53	Conf.
728	4.12	0.24	0.28
732	16.88	0.99	0.60
736	71.48	4.20	10.21
741	15.19	0.89	3.30
744	0.54	0.03	Conf.
748	5.01	0.29	0.73

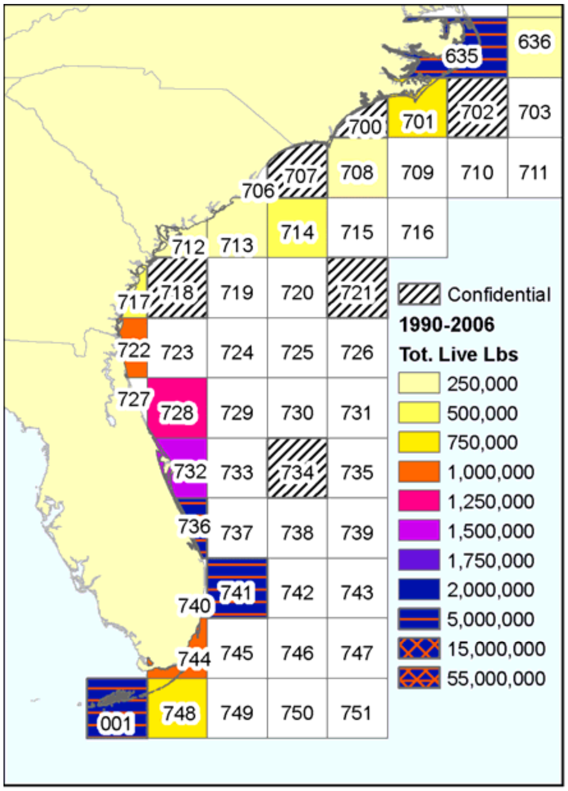


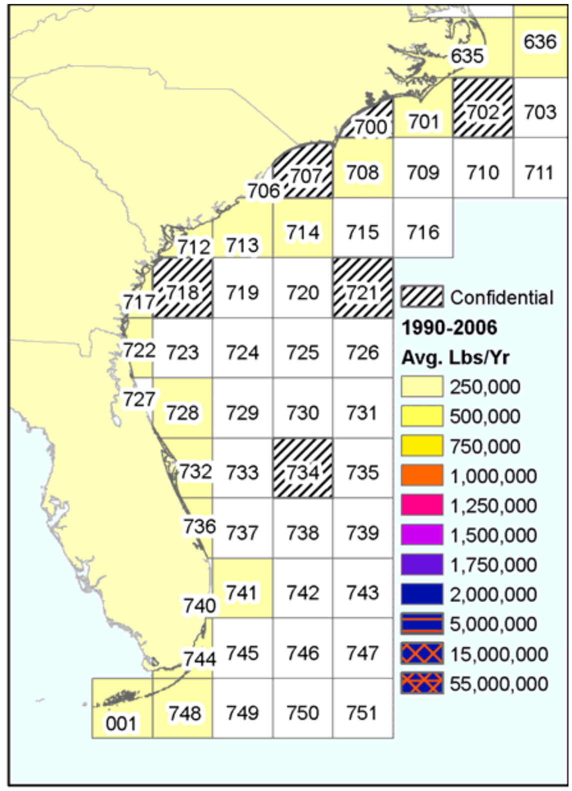


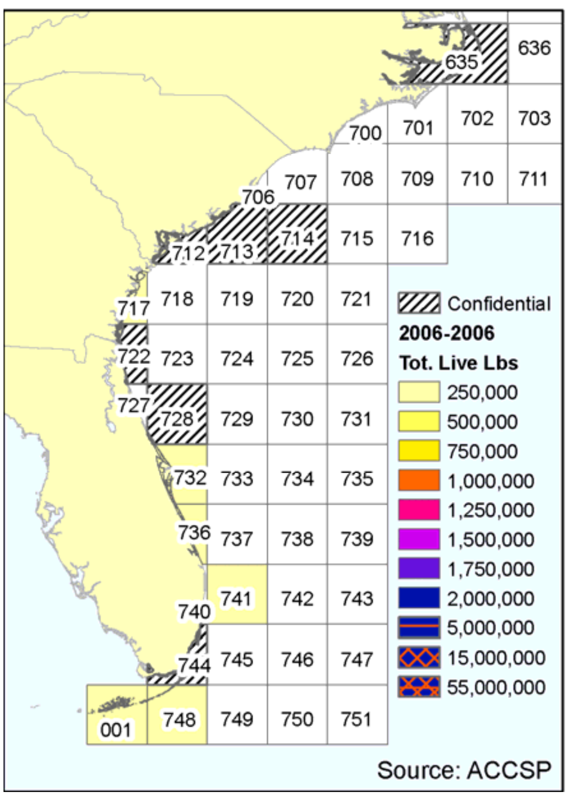


Logbook Catch: SPOT
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.93	0.05	0.00
635	17,279.50	1,016.44	363.89
700	4,241.71	249.51	104.28
701	19,306.95	1,135.70	400.81
706	4.19	0.25	0.00
707	149.58	8.80	9.06
712	0.94	0.06	0.00
713	7.70	0.45	0.00
717	0.13	0.01	0.00
718	Conf.	Conf.	0.00
722	116.56	6.86	0.65
728	39.08	2.30	0.46
732	1,673.55	98.44	7.71
736	1,953.49	114.91	13.04
741	7.31	0.43	0.23
744	3.73	0.22	0.00
748	0.03	0.00	0.00

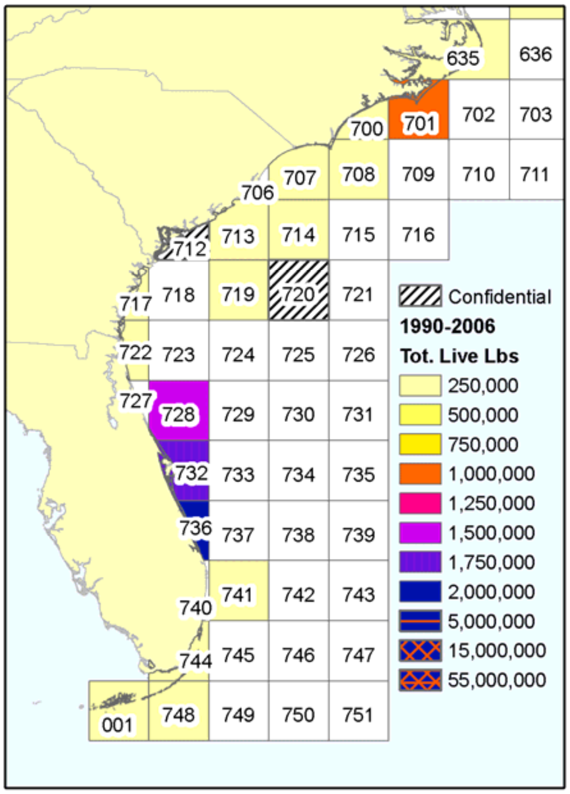


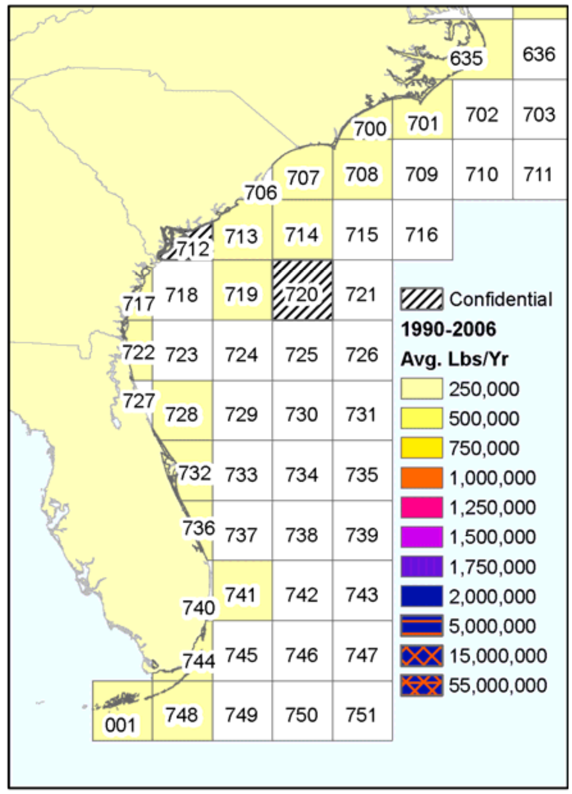


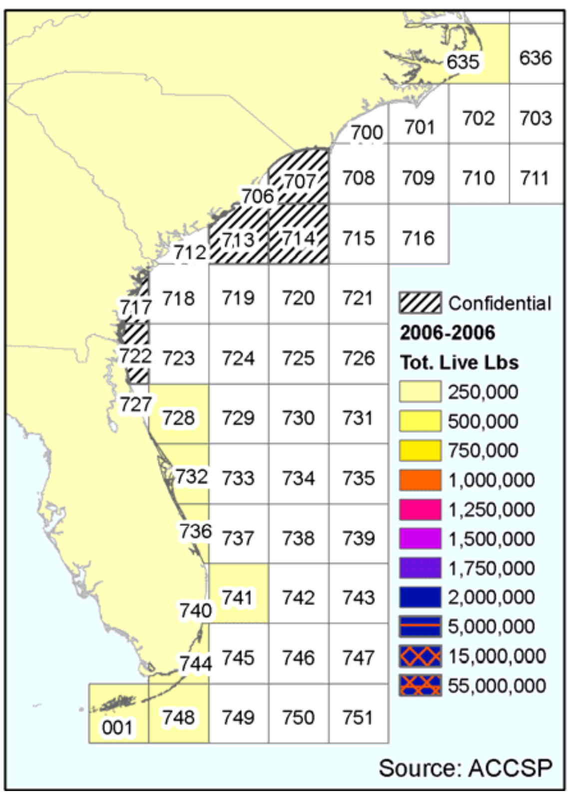


Logbook Catch: SWORDFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	3,446.54	202.74	3.98
635	3,516.31	206.84	Conf.
636	0.90	0.05	0.00
700	Conf.	Conf.	0.00
701	581.74	34.22	0.00
702	Conf.	Conf.	0.00
707	Conf.	Conf.	0.00
708	10.63	0.63	0.00
712	112.02	6.59	Conf.
713	206.01	12.12	Conf.
714	312.07	18.36	Conf.
717	397.52	23.38	98.42
718	Conf.	Conf.	0.00
721	Conf.	Conf.	0.00
722	844.50	49.68	Conf.
728	1,155.03	67.94	Conf.
732	1,318.33	77.55	125.64
734	Conf.	Conf.	0.00
736	2,590.45	152.38	17.07
741	4,136.09	243.30	69.57
744	919.59	54.09	Conf.
748	659.36	38.79	0.24

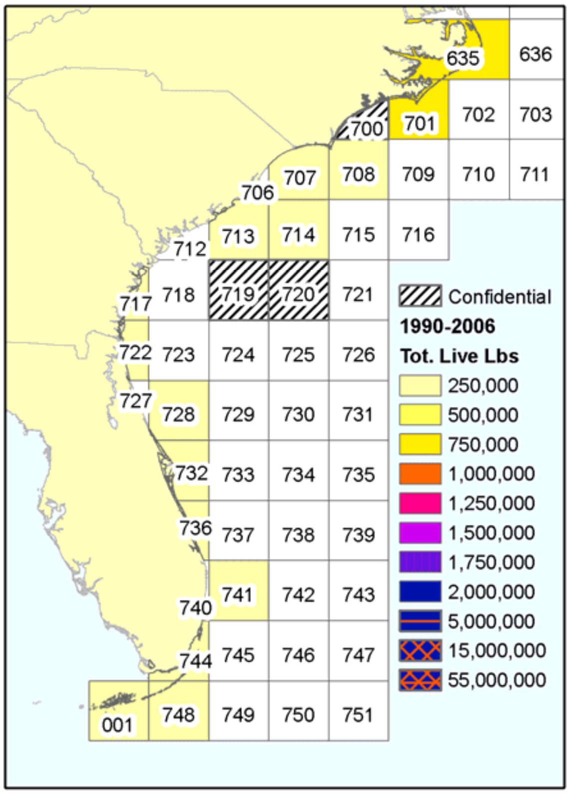


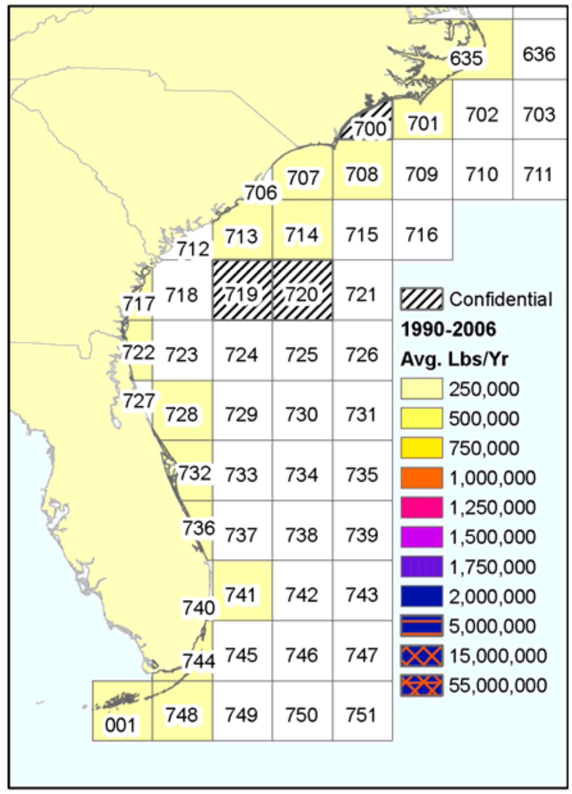


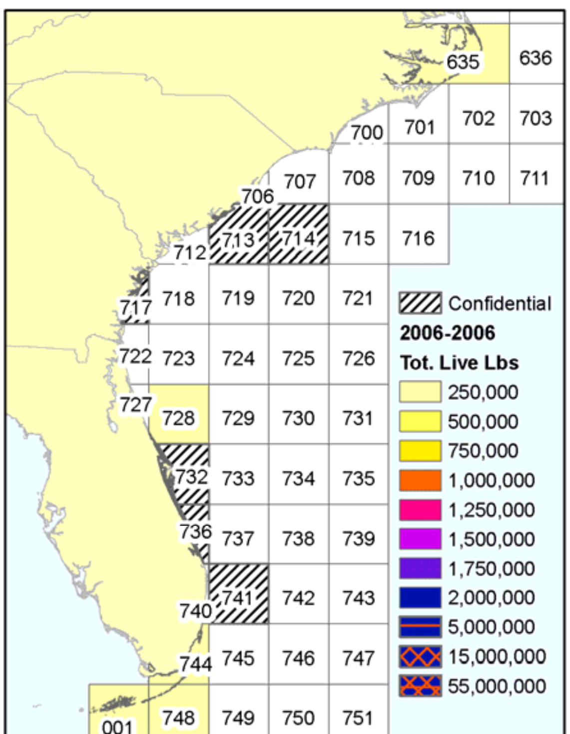


Logbook Catch: TILEFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	85.05	5.00	3.15
635	187.64	11.04	0.28
700	0.65	0.04	0.00
701	847.64	49.86	0.00
707	29.99	1.76	Conf.
708	40.31	2.37	0.00
712	Conf.	Conf.	0.00
713	46.34	2.73	Conf.
714	54.53	3.21	Conf.
717	25.70	1.51	Conf.
719	1.01	0.06	0.00
720	Conf.	Conf.	0.00
722	13.67	0.80	Conf.
728	1,392.26	81.90	89.80
732	1,666.81	98.05	86.16
736	1,929.91	113.52	115.63
741	176.09	10.36	12.68
744	42.89	2.52	0.74
748	10.96	0.64	0.51



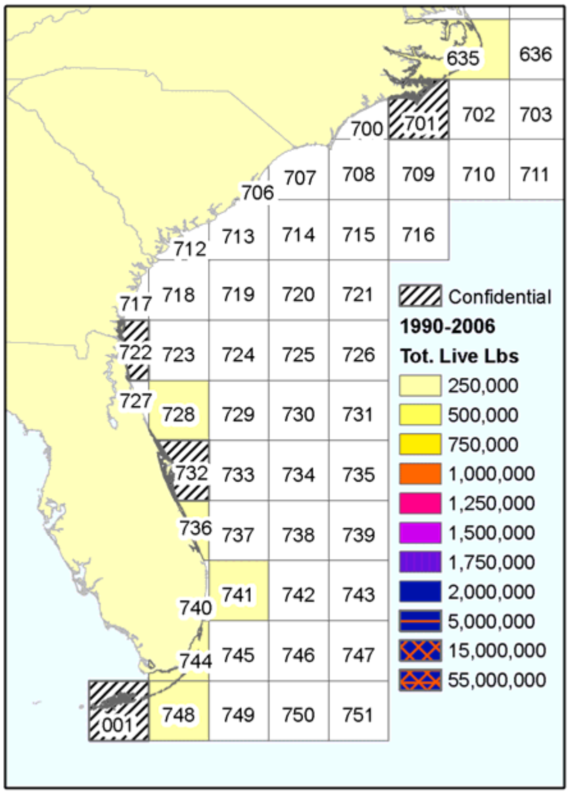


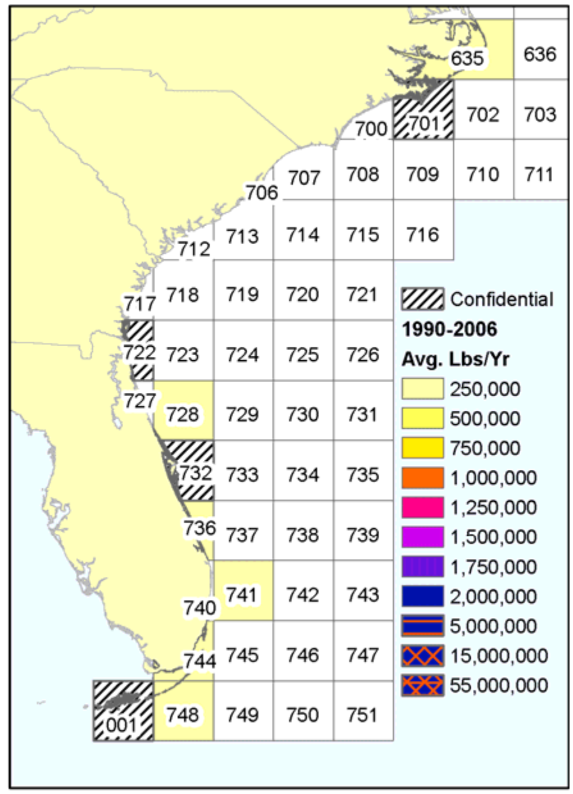


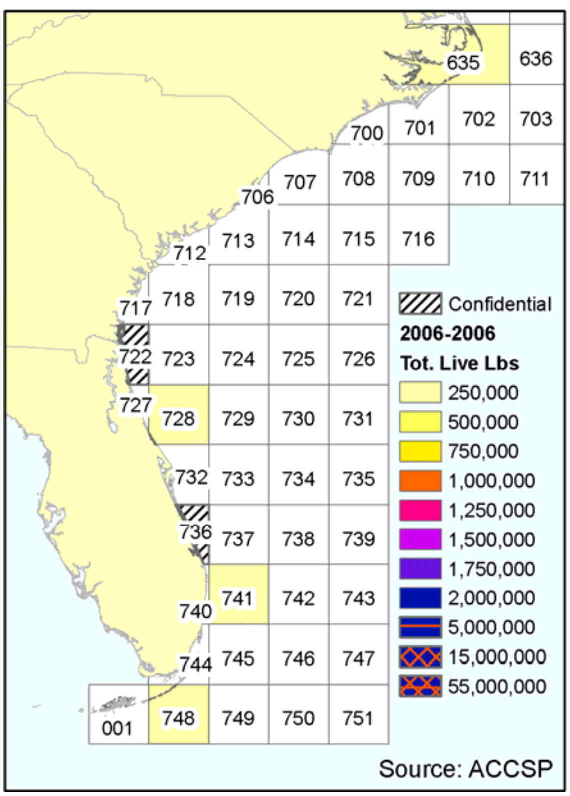
Source: ACCSP

Logbook Catch: TILEFISH, BLUELINE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	134.94	7.94	1.94
635	695.74	40.93	1.69
700	Conf.	Conf.	0.00
701	591.58	34.80	0.00
707	11.57	0.68	0.00
708	10.29	0.61	0.00
713	7.93	0.47	Conf.
714	13.23	0.78	Conf.
717	0.81	0.05	Conf.
719	Conf.	Conf.	0.00
720	Conf.	Conf.	0.00
722	4.39	0.26	0.00
728	40.23	2.37	2.13
732	75.53	4.44	Conf.
736	45.64	2.68	Conf.
741	32.81	1.93	Conf.
744	56.15	3.30	0.78
748	66.43	3.91	3.86

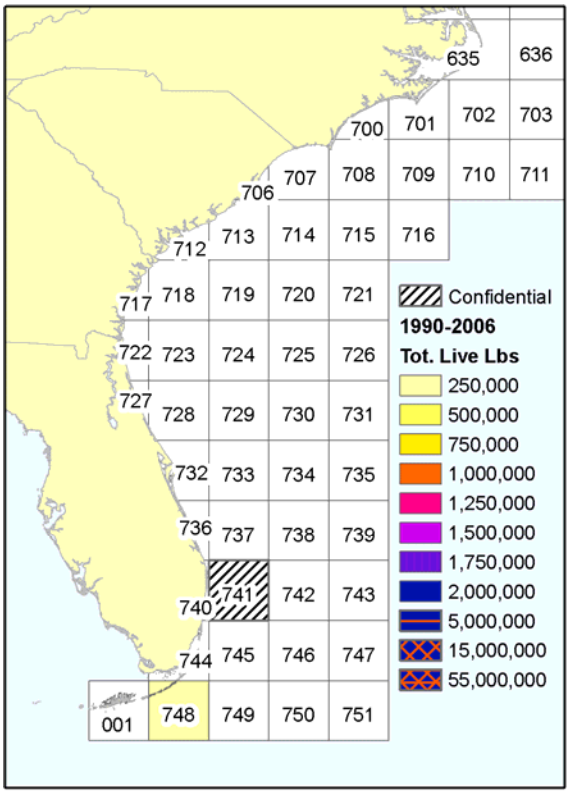


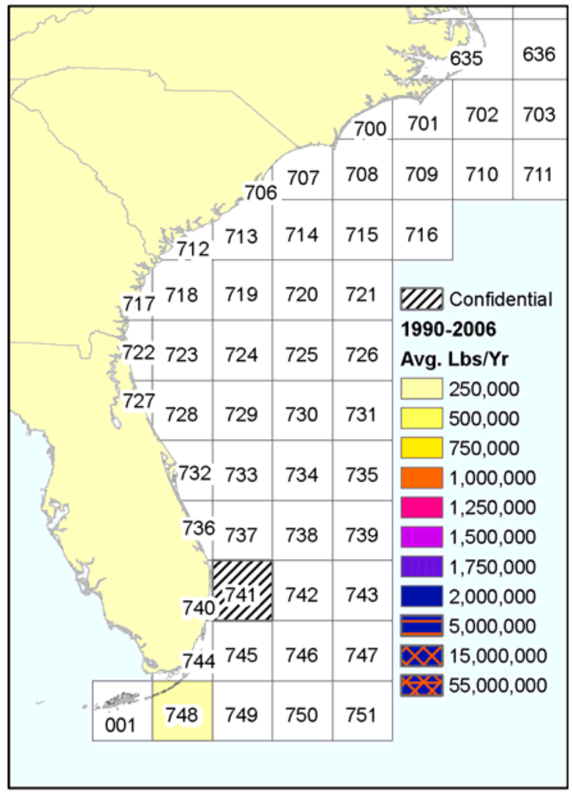


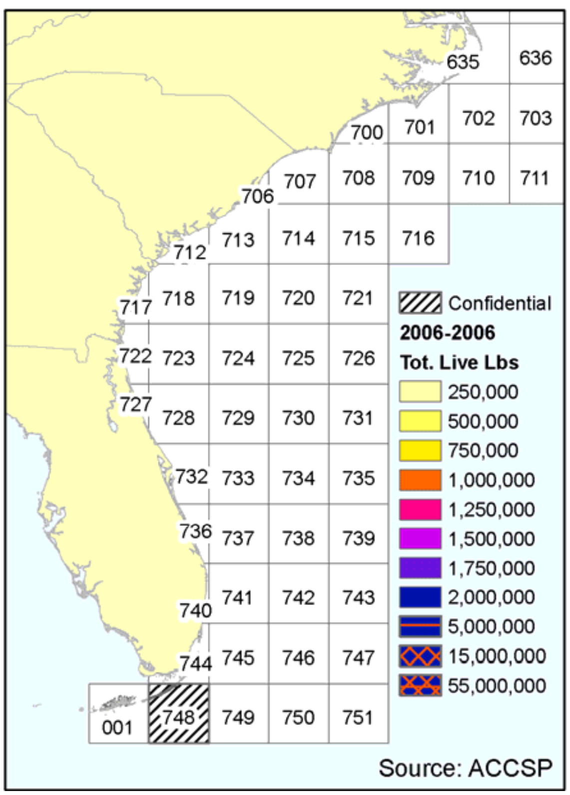


Logbook Catch: TILEFISH, SAND
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	Conf.	Conf.	0.00
635	10.30	0.61	0.60
701	Conf.	Conf.	0.00
722	Conf.	Conf.	Conf.
728	0.24	0.01	0.01
732	Conf.	Conf.	0.00
736	0.14	0.01	Conf.
741	5.19	0.31	1.46
744	0.37	0.02	0.00
748	0.46	0.03	0.03

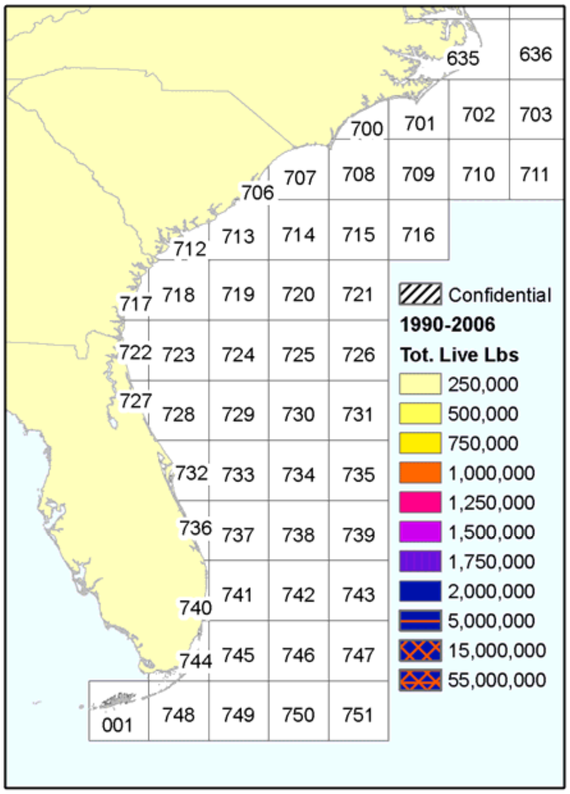


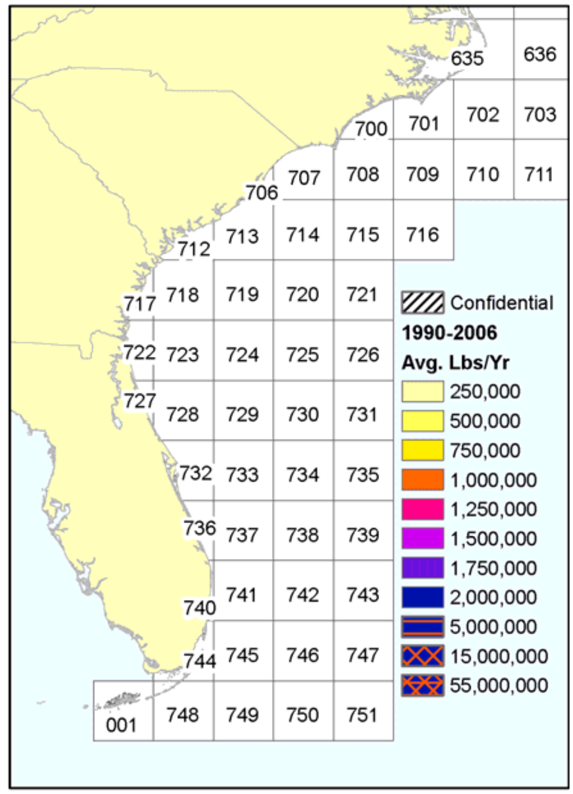


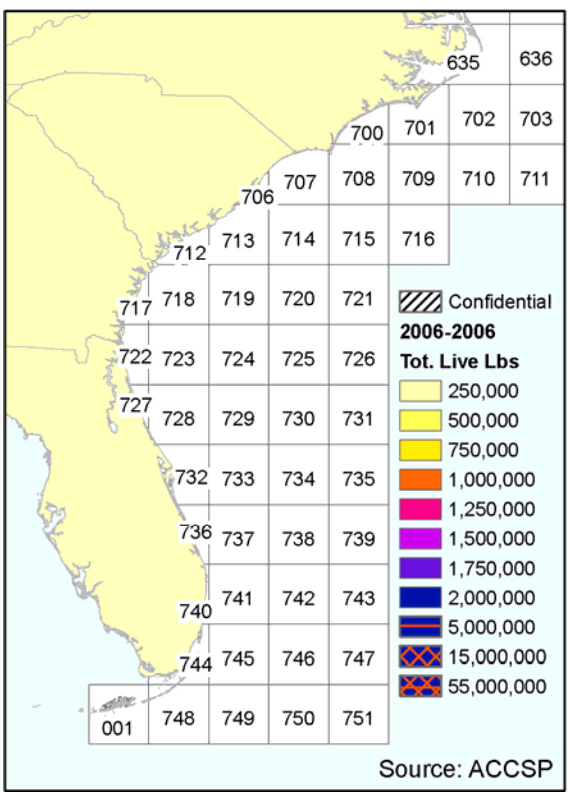


Logbook Catch: TOMTATE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
741	Conf.	Conf.	0.00
748	0.37	0.02	Conf.

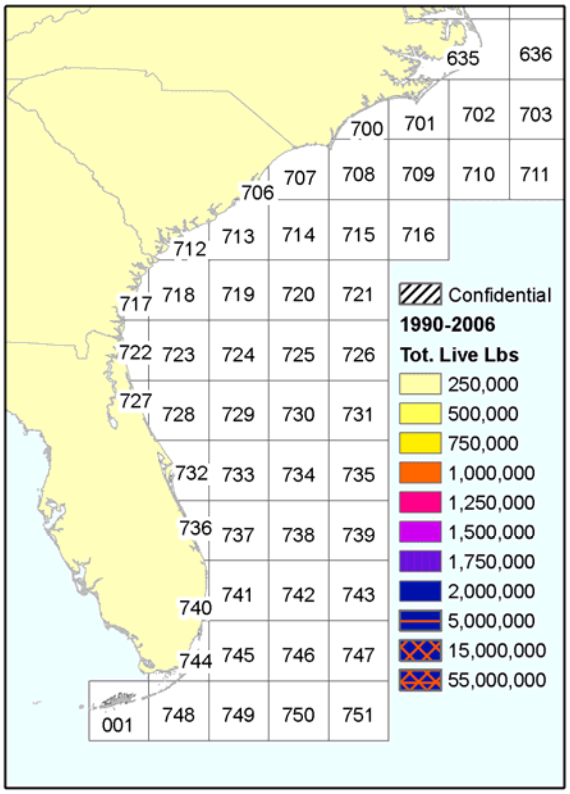


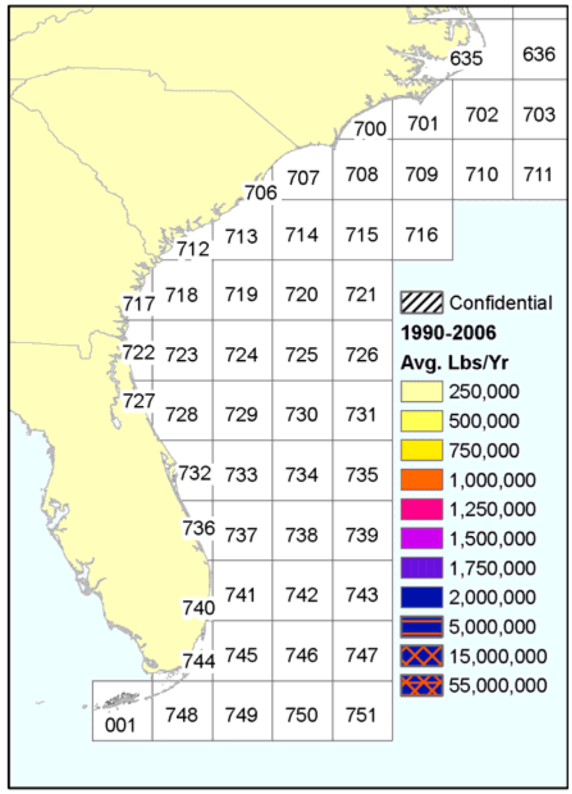


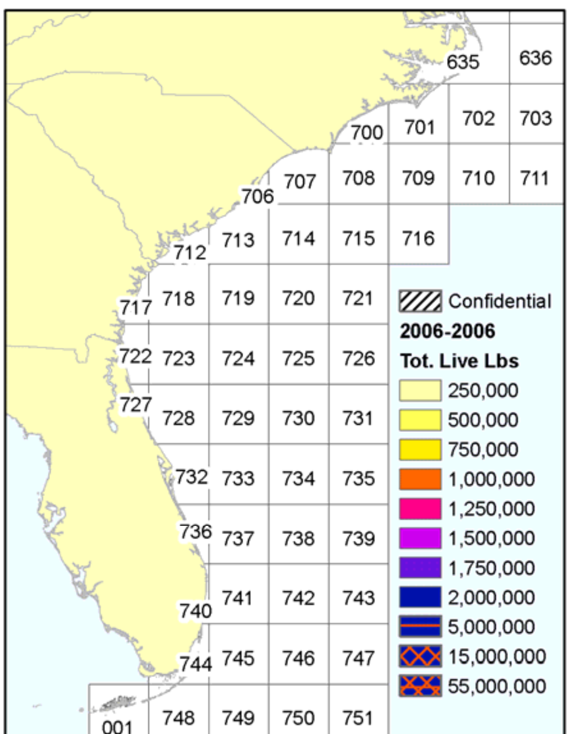


Logbook Catch: TRIGGERFISH, GRAY
1990-2006
Pounds in Thousands

No data for this area



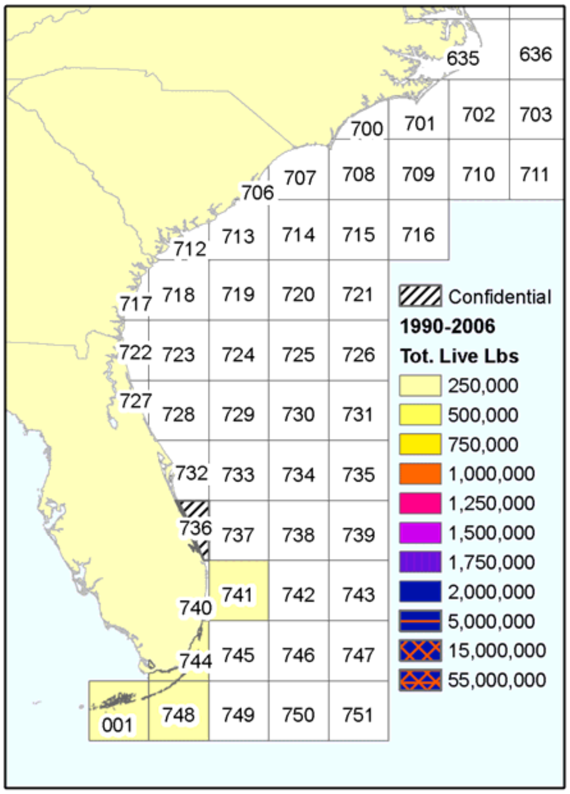


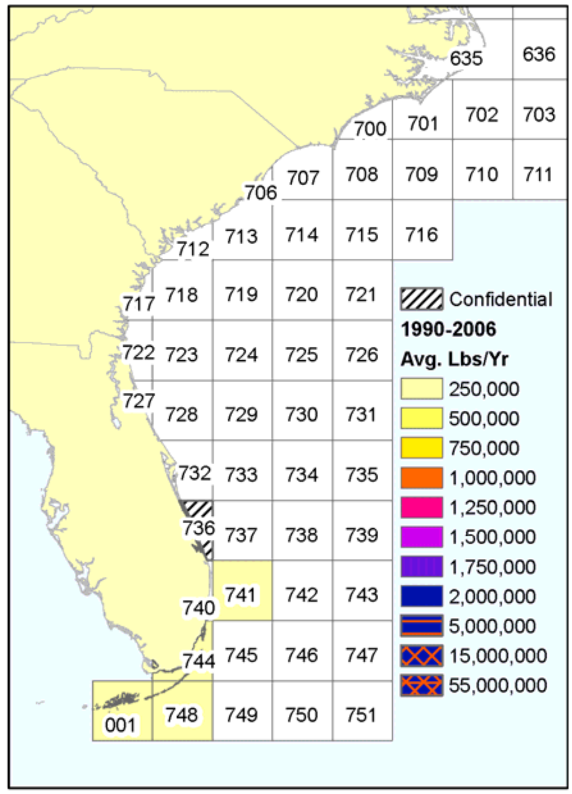


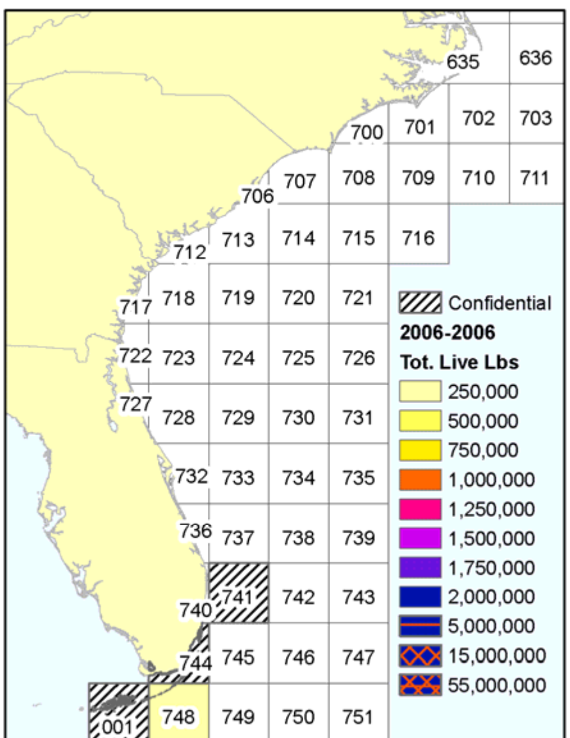
Source: ACCSP

Logbook Catch: TRIGGERFISH, OCEAN
1990-2006
Pounds in Thousands

No data for this area



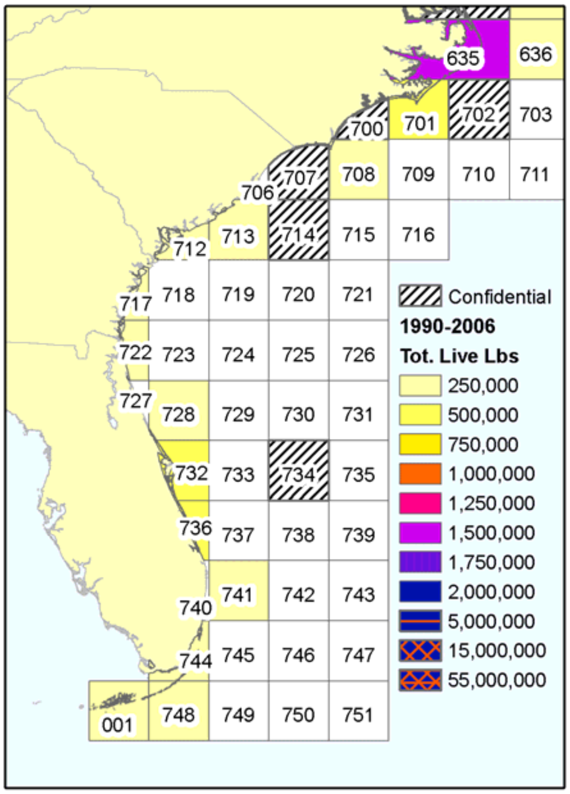


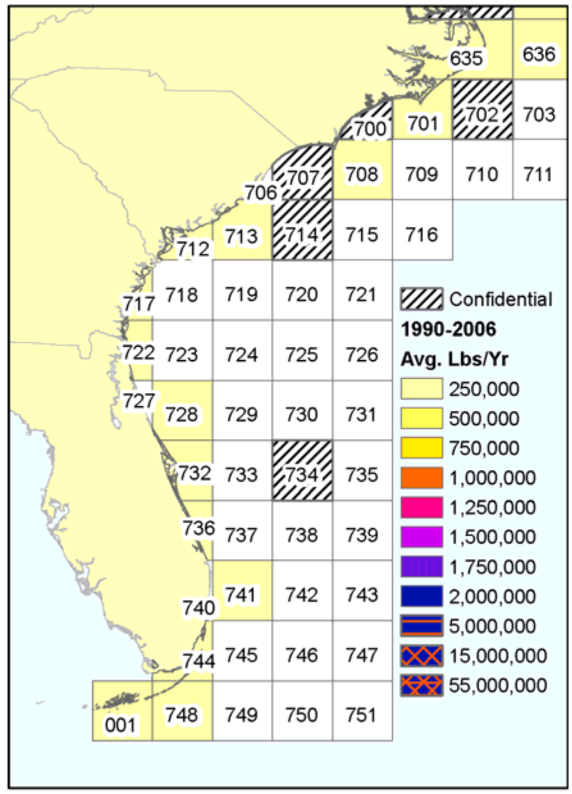


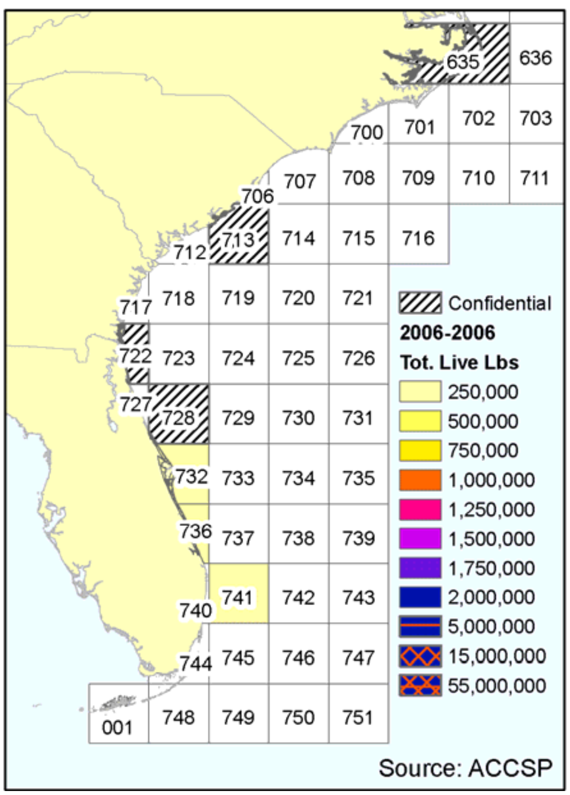
Source: ACCSP

Logbook Catch: TRIGGERFISH, QUEEN
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.10	0.01	Conf.
736	Conf.	Conf.	0.00
741	0.51	0.03	Conf.
744	0.42	0.02	Conf.
748	1.05	0.06	0.01

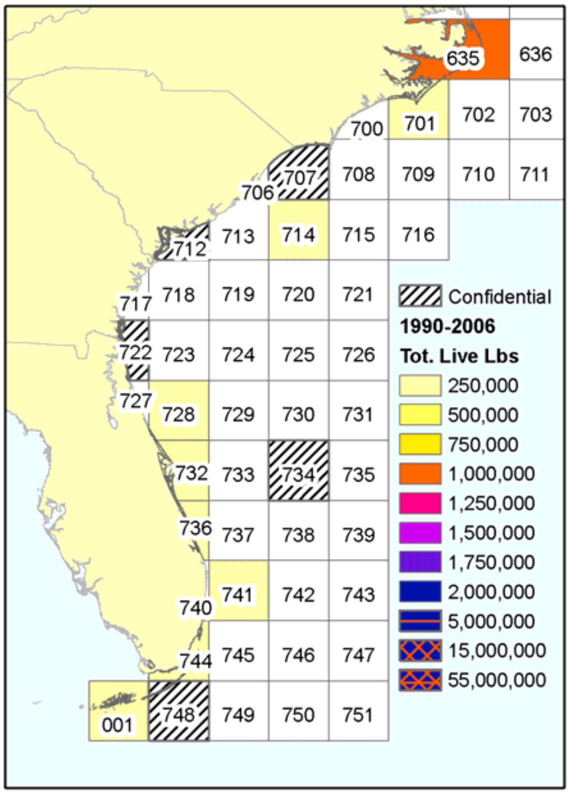


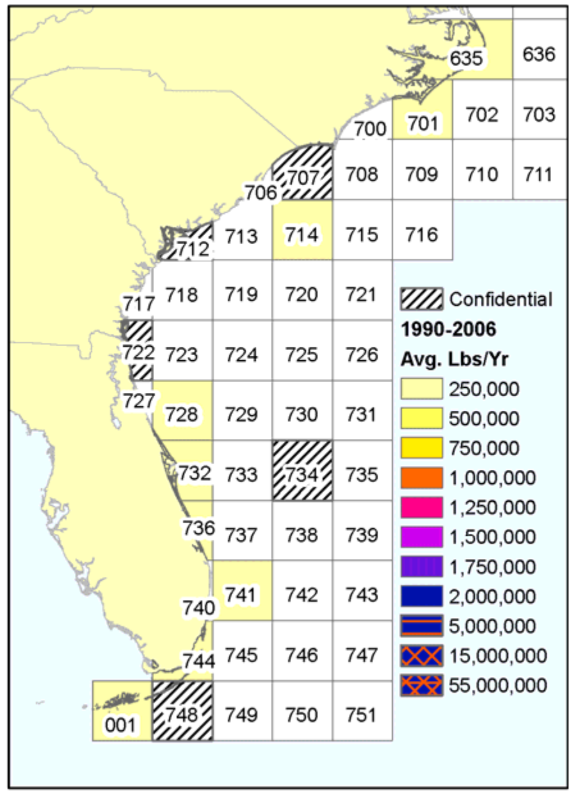


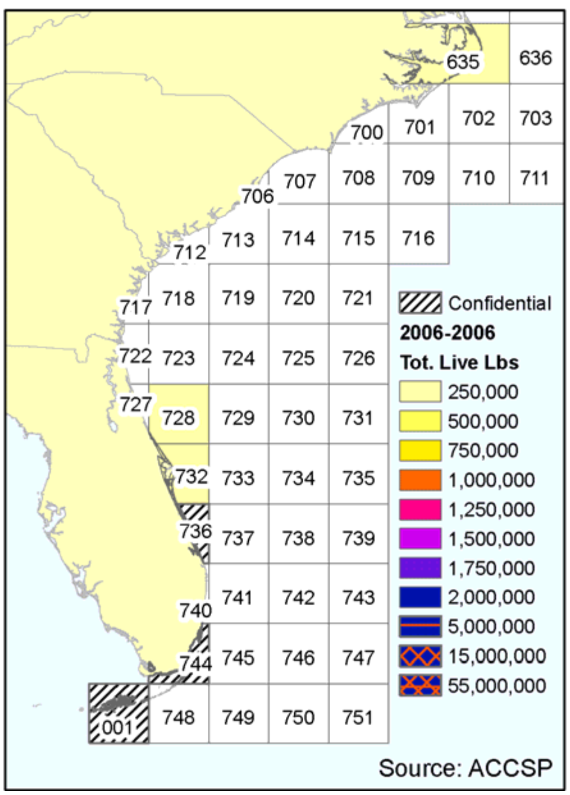


Logbook Catch: TUNA, BIGEYE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	125.47	7.38	0.00
635	1,396.44	82.14	Conf.
636	0.19	0.01	0.00
700	Conf.	Conf.	0.00
701	407.16	23.95	0.00
702	Conf.	Conf.	0.00
707	Conf.	Conf.	0.00
708	0.87	0.05	0.00
712	0.45	0.03	0.00
713	0.44	0.03	Conf.
714	Conf.	Conf.	0.00
717	6.13	0.36	0.00
722	54.95	3.23	Conf.
728	174.77	10.28	Conf.
732	376.43	22.14	65.58
734	Conf.	Conf.	0.00
736	268.45	15.79	2.26
741	101.93	6.00	3.89
744	15.31	0.90	0.00
748	15.61	0.92	0.00

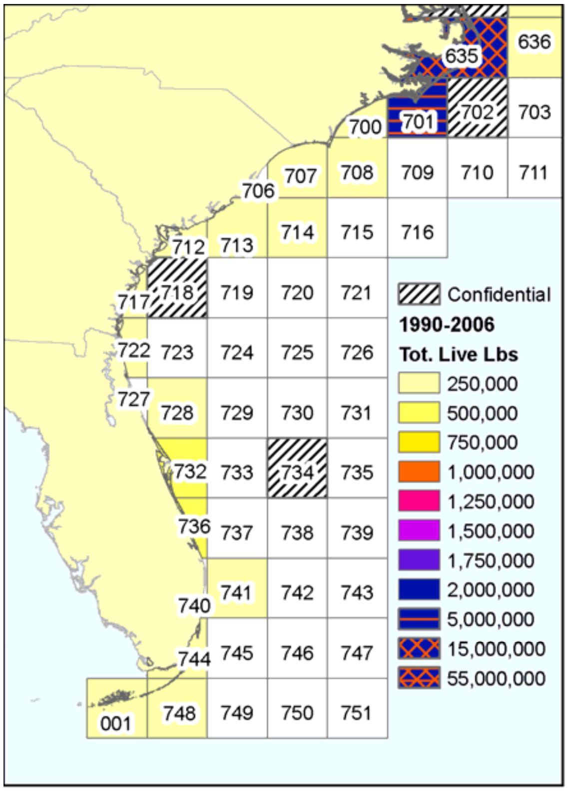


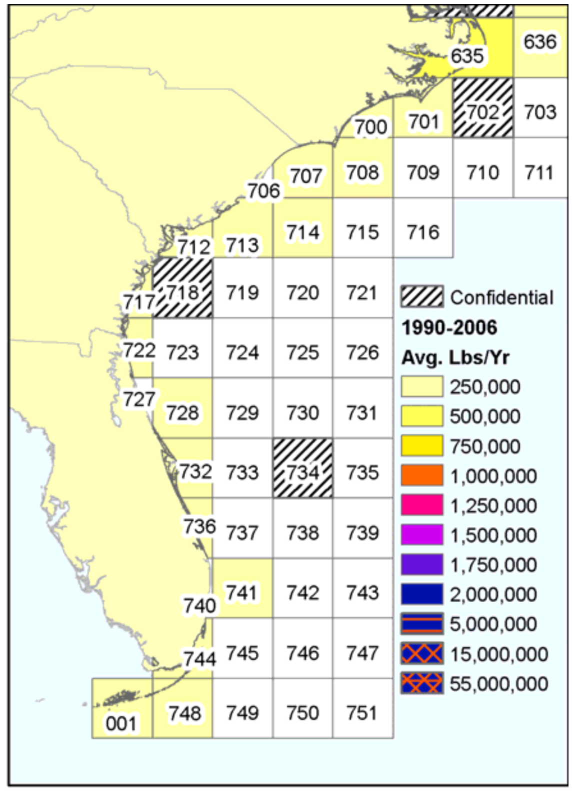


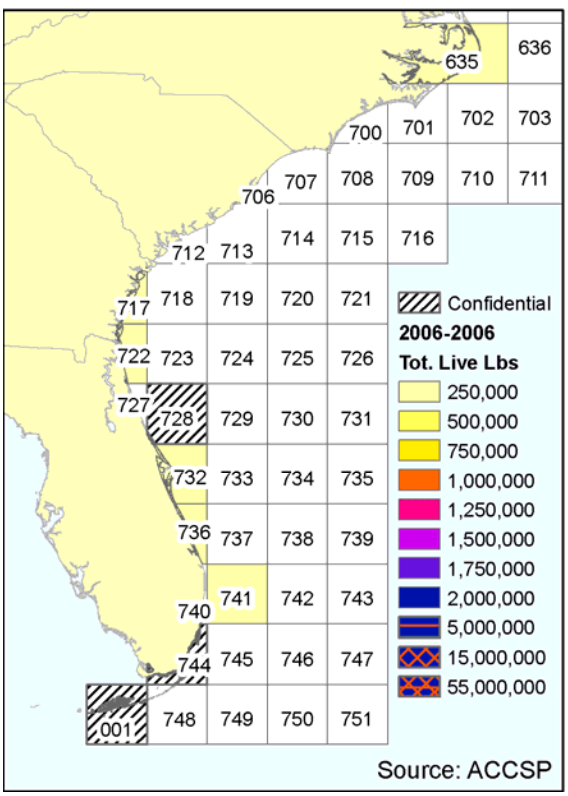


Logbook Catch: TUNA, BLUEFIN
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	3.89	0.23	Conf.
635	765.41	45.02	11.35
701	16.70	0.98	0.00
707	Conf.	Conf.	0.00
712	Conf.	Conf.	0.00
714	0.89	0.05	0.00
722	Conf.	Conf.	0.00
728	9.31	0.55	0.40
732	31.87	1.87	3.08
734	Conf.	Conf.	0.00
736	21.06	1.24	Conf.
741	12.40	0.73	0.00
744	2.04	0.12	Conf.
748	Conf.	Conf.	0.00

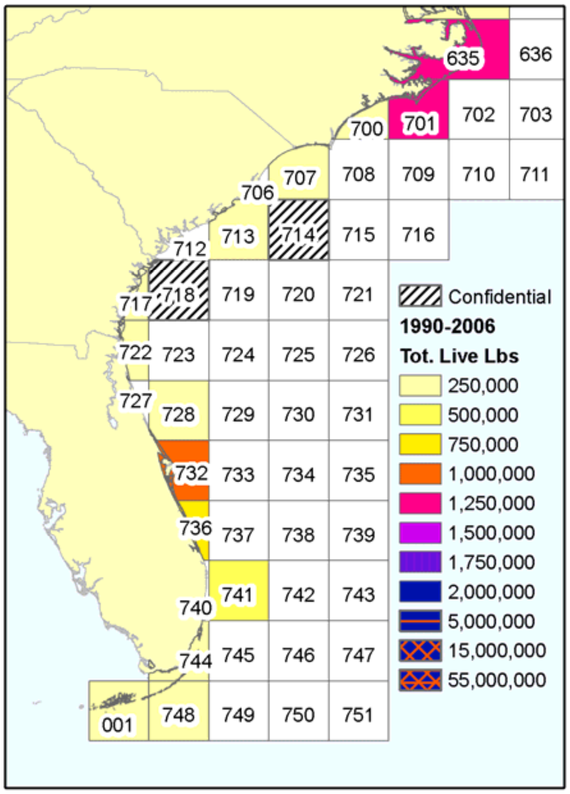


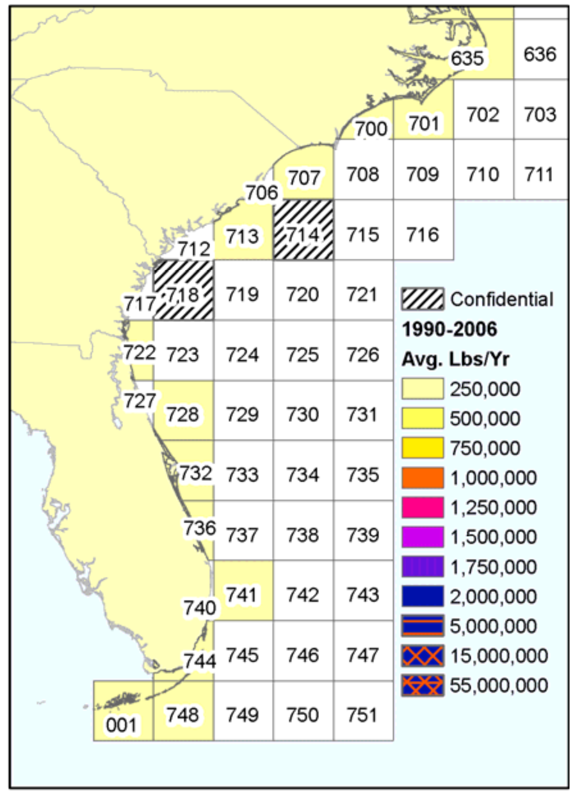


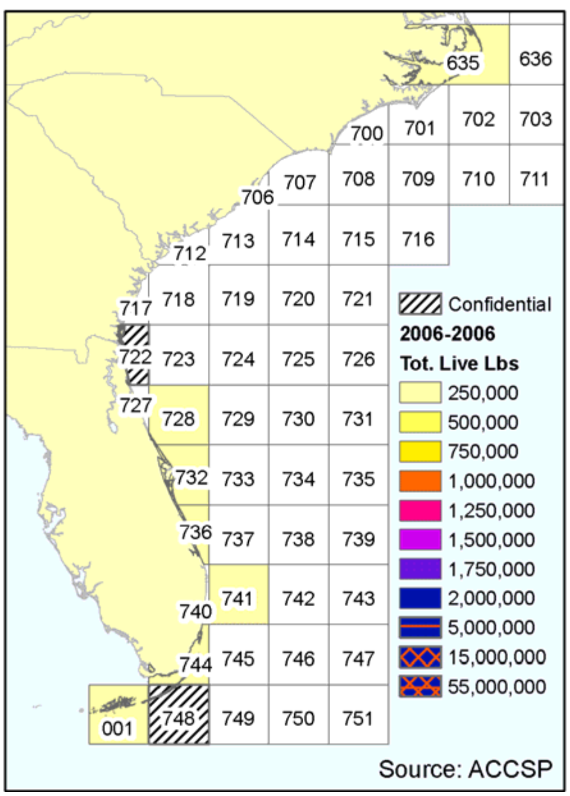


Logbook Catch: TUNA, YELLOWFIN
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	147.06	8.65	Conf.
635	7,798.52	458.74	73.36
636	9.50	0.56	0.00
700	2.71	0.16	0.00
701	3,488.37	205.20	0.00
702	Conf.	Conf.	0.00
707	10.31	0.61	0.00
708	0.27	0.02	0.00
712	5.81	0.34	0.00
713	4.17	0.25	0.00
714	5.16	0.30	0.00
717	23.71	1.39	0.46
718	Conf.	Conf.	0.00
722	118.92	7.00	0.28
728	206.03	12.12	Conf.
732	331.50	19.50	53.61
734	Conf.	Conf.	0.00
736	253.63	14.92	8.72
741	139.23	8.19	2.38
744	37.66	2.22	Conf.
748	25.88	1.52	0.00



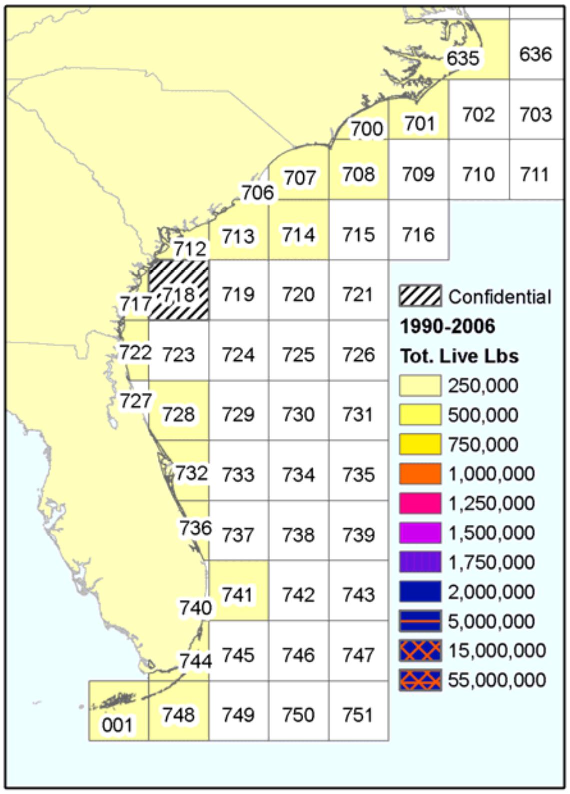


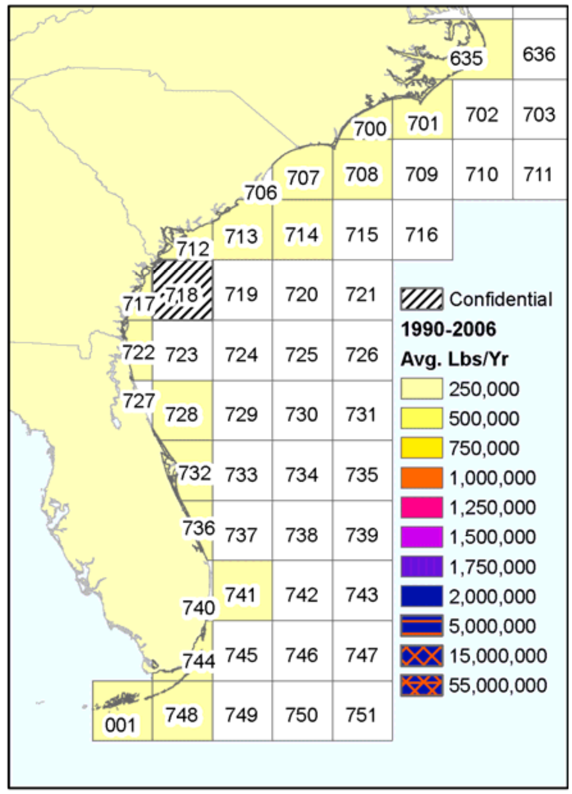


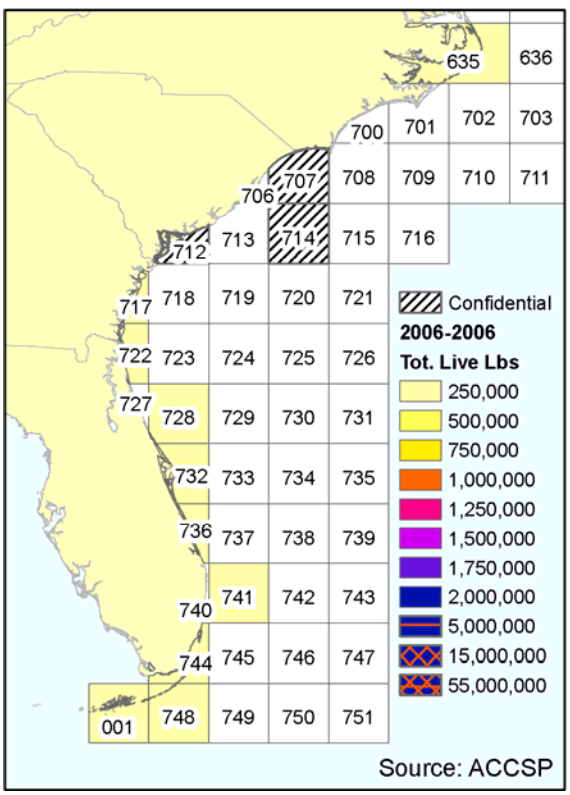
Source: ACCSP

Logbook Catch: TUNNY, LITTLE
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	59.78	3.52	0.46
635	1,184.35	69.67	18.56
700	0.46	0.03	0.00
701	1,023.37	60.20	0.00
707	0.33	0.02	0.00
713	0.62	0.04	0.00
714	Conf.	Conf.	0.00
717	0.01	0.00	0.00
718	Conf.	Conf.	0.00
722	18.78	1.10	Conf.
728	38.68	2.28	0.34
732	783.82	46.11	19.48
736	578.94	34.06	67.70
741	302.91	17.82	86.68
744	189.23	11.13	3.04
748	3.39	0.20	Conf.

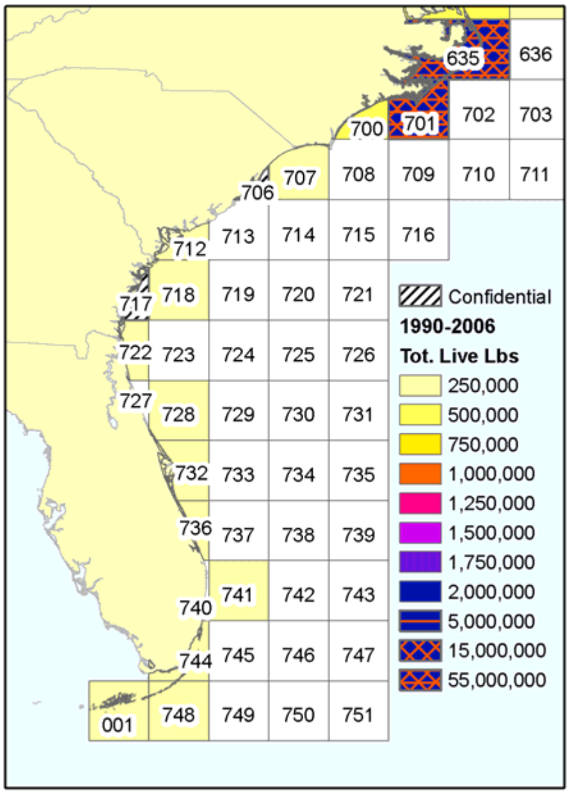


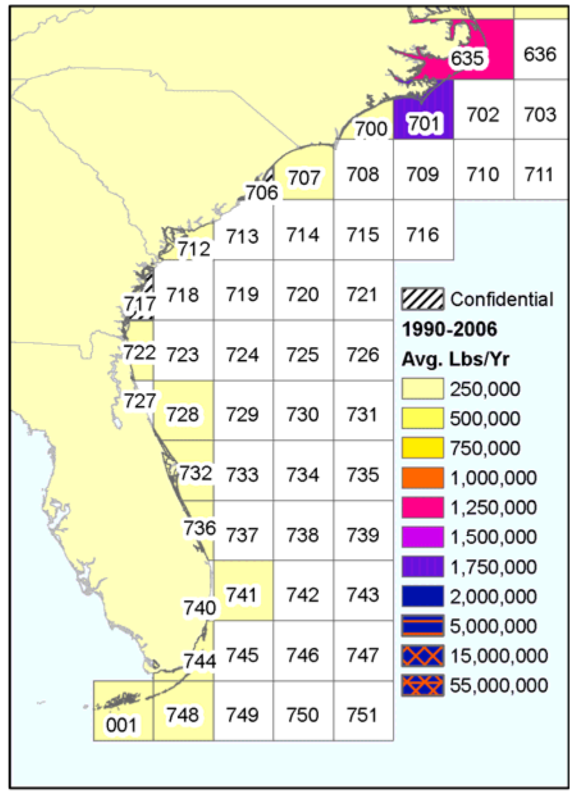


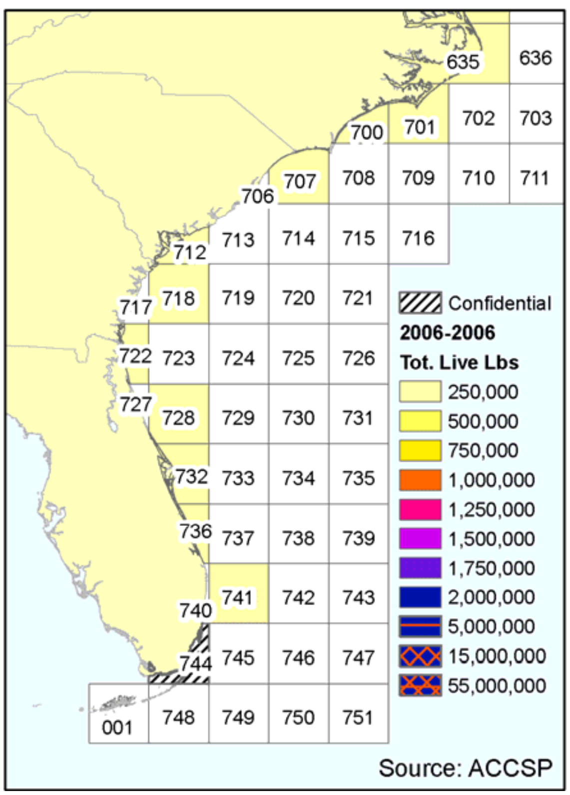


Logbook Catch: WAHOO
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	120.72	7.10	4.74
635	191.75	11.28	7.51
700	0.76	0.04	0.00
701	152.07	8.95	0.00
707	2.20	0.13	Conf.
708	0.37	0.02	0.00
712	1.09	0.06	Conf.
713	4.54	0.27	0.00
714	2.60	0.15	Conf.
717	2.04	0.12	0.96
718	Conf.	Conf.	0.00
722	31.30	1.84	0.55
728	78.21	4.60	1.37
732	37.38	2.20	1.13
736	50.57	2.97	1.14
741	73.22	4.31	2.12
744	67.65	3.98	1.92
748	48.95	2.88	1.76







Logbook Catch: WEAKFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	0.75	0.04	0.00
635	20,325.41	1,195.61	90.50
700	277.68	16.33	2.29
701	28,087.10	1,652.18	61.19
706	Conf.	Conf.	0.00
707	0.44	0.03	0.05
712	0.10	0.01	0.09
717	Conf.	Conf.	0.00
718	0.05	0.00	0.05
722	166.04	9.77	1.33
728	8.17	0.48	0.01
732	67.64	3.98	2.16
736	55.56	3.27	1.49
741	1.01	0.06	0.04
744	0.70	0.04	Conf.
748	0.09	0.01	0.00

5.4.2 Recreational Catches