# Gray's Reef National Marine Sanctuary (GRNMS)

## *A Socioeconomic Overview of Georgia's Marine Related Industries and Activities*

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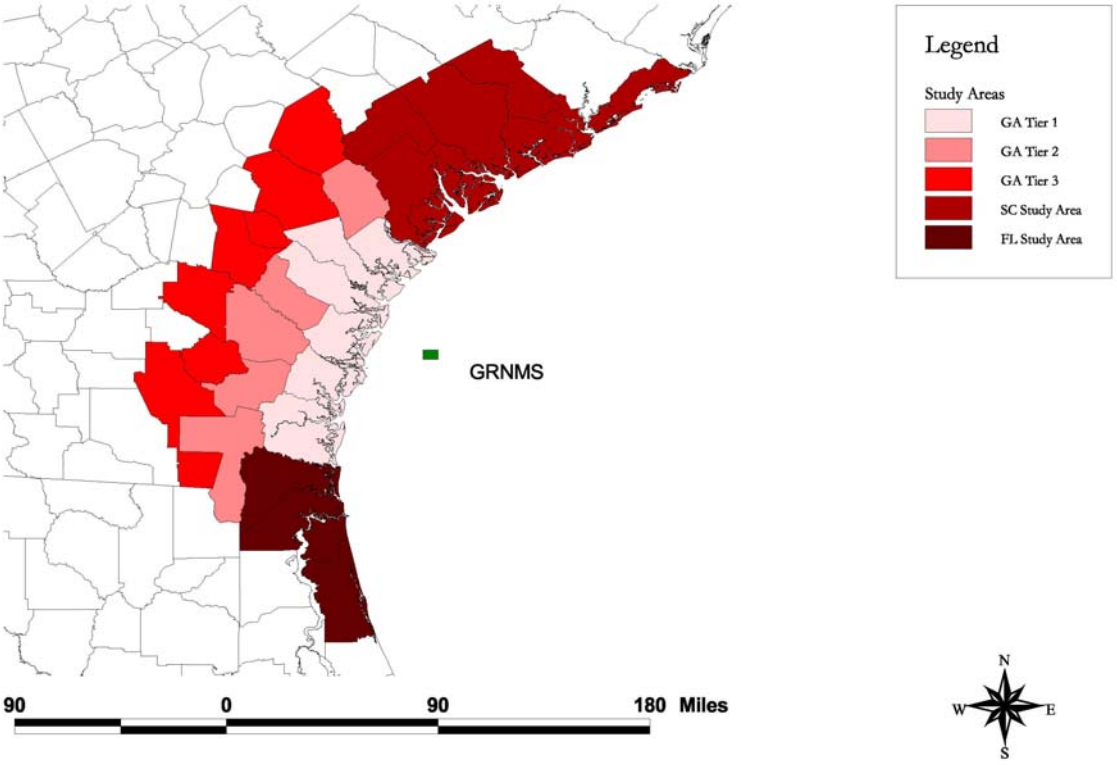
# GRNMS Socioeconomic Study Area




The study area for the socioeconomic overview paper is presented above. The study area is comprised of three tiers of Georgia counties defined by their proximity to the coast, plus several counties in southern South Carolina and Northern Florida. Detailed analysis is presented for each of these specific study areas, as well as combinations of them. It should be noted that as far as direct targeting of the Sanctuary by recreational anglers from Florida and South Carolina, this would be highly unusual due to the distance to the Gray's Reef from those locations, especially in light of the existence of much more accessible and larger live bottoms and artificial reefs off northern Florida and southern South Carolina. Subjectively, it would seem that the number of potential anglers targeting Gray's Reef from Jacksonville would be very low (except in conjunction with annual king mackerel tournaments). This would also seem to hold true for Charleston, although it is possible that some interests target Gray's Reef from Hilton Head and other counties immediately adjacent to Georgia. (Henry Ansley, GA DNR) The following counties are included in the specific study areas:

| Georgia 1st Tier |
|---|
| Chatham County |
| Bryan County |
| Liberty County |
| McIntosh County |
| Glynn County |
| Camden County |

| Georgia 2nd Tier |
|---|
| Effingham County |
| Long County |
| Wayne County |
| Brantley County |
| Charlton County |

| Georgia 3rd Tier |
|---|
| Screven County |
| Bulloch County |
| Evans County |
| Tattnall County |
| Appling County |
| Pierce County |
| Ware County |

| South Carolina |
|---|
| Charleston County |
| Colleton County |
| Beaufort County |
| Dorchester County |
| Jasper County |
| Hampton County |

| Florida |
|---|
| Nassau County |
| Duval County |
| St. Johns County |

## INTRODUCTION

### Purpose

The purpose of this document is to provide the necessary background information on the local social and economic (socioeconomic) environment for which changes in management actions in the GRNMS can be analyzed in a socioeconomic impact analysis. The information presented here is what we have found to date to be the "best available information".

Two direct uses are potentially impacted; 1) tourist/recreational use and 2) commercial fishing. With respect to the local economies, these uses will have ripple or multiplier effects as measured by market economic values (e.g., output/sales, income, employment and tax revenues). In this report, we attempt to review available information to assess how important these industries are to the local economies. We will also present what is known about social and economic parameters that can be used in socioeconomic impact analyses.

### Background

The Gray's Reef National Marine Sanctuary (GRNMS) is currently involved in a management plan revision, a process that is mandated to take place approximately every five years. For the management plan revision, the GRNMS has organized a Sanctuary Advisory Council (SAC) made-up of various stakeholders.

The information being collected to support the socioeconomic impact analysis is being collected and compiled in a manner so as to capture both the temporal and spatial variation in activities for the recreation industry and catch and value for the commercial fisheries. The information will be linked with economic parameters from existing studies to develop estimates of economic impacts as measured by changes in both market economic values (e.g., sales/output, income and employment) and non market economic values (e.g., consumer's surplus and economic rents). Socioeconomic profiles of those potentially impacted will be compared against all users from a given user group and against the general population of the local area (e.g., the coastal Georgia counties).

To accomplish the above requires a review of the existing literature and databases available and compiling this information in a manner that it can be used in the socioeconomic impact analyses. In some cases, available information will not support certain aspects of the proposed analyses. In addition, supplemental data collection and analysis may not be feasible with time and resources available. What we are left with is what is commonly referred to as the "best available information".

### Demographic and Economic Profile

***Population.*** Historical population estimates presented here are from the U.S. Department of Commerce, Census Bureau (http://www.census.gov), while population projections are from the Georgia Office of Planning Budget, the South Carolina Statistical Abstract, and the Florida Office of Economic and Demographic Research.[1] The latest population estimates for 1999 indicate the population level of the study area at approximately 2.2 million. As a whole, the study area has grown in population by about 34 percent over the past 20 years, with a forecasted growth over the next 10 years of just under 20 percent.

Within the Georgia study area, the majority of the population lives in the counties adjacent to the coast (435 of 693 thousand), with over half of these people living in Chatham County (226 thousand). Significant growth has been seen in two of the smaller coastal counties, Bryan and Camden. In fact, for the period 1980 to 1999, these two counties have shown the highest population growth in the entire study area at 140

[1] Note that the U.S. Census Bureau is currently releasing the results of the 2000 census. These data are not currently available for all counties in the study area, specifically Florida. While available population counts for 2000 are included in the appendix table, the text and exhibits refer to 1999 results for consistency.

percent and 252 percent, respectively. The majority of the growth of Camden County came during the 1980s. The high level of growth of these two counties is projected to continue over the coming decade. In fact, the projected population growth from 1980 to 2010 for Bryan County is 237 percent and Camden County is almost 500 percent.

It should be noted that the extraordinary growth of Camden County, especially during the 1980's and early 1990's, was due to the location and subsequent development of the King's Bay Naval Submarine Base in the county. In light that the base has been about "built out" by now, it is reasonable to suspect that the growth rate will slow. (Henry Ansley, GA DNR)

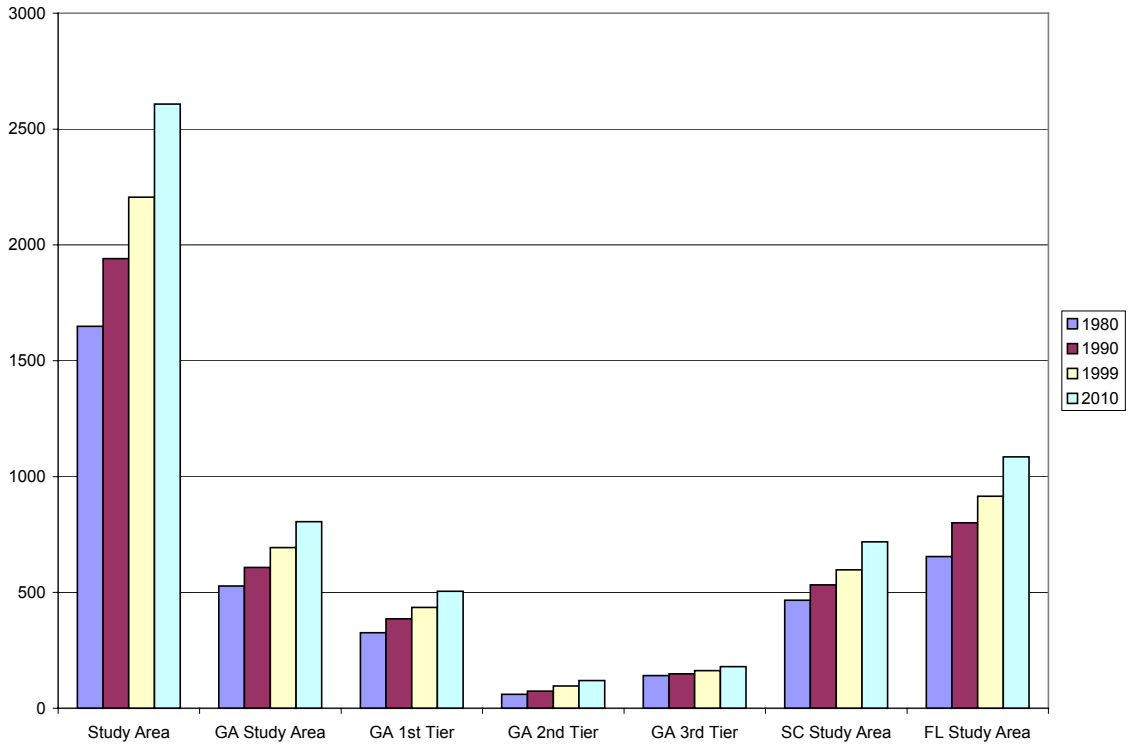
While only 120 thousand people live in the 2nd tier counties of Georgia, as a whole this area has seen the highest growth rate (over 60 percent) over the past 20 years. This high growth rate has been driven by the counties of Effingham and Long.

Containing 162 thousand people, the 3rd tier of the Georgia study area has shown less than average growth in population. In fact, the most interesting finding concerning this area was that Ware County has seen a consistent decline in population over the past 20 years (a drop of 5 percent).

The six counties that make up the South Carolina study area have a population level of almost 600 thousand people. Higher than average growth has occurred in Beaufort and Dorchester counties.

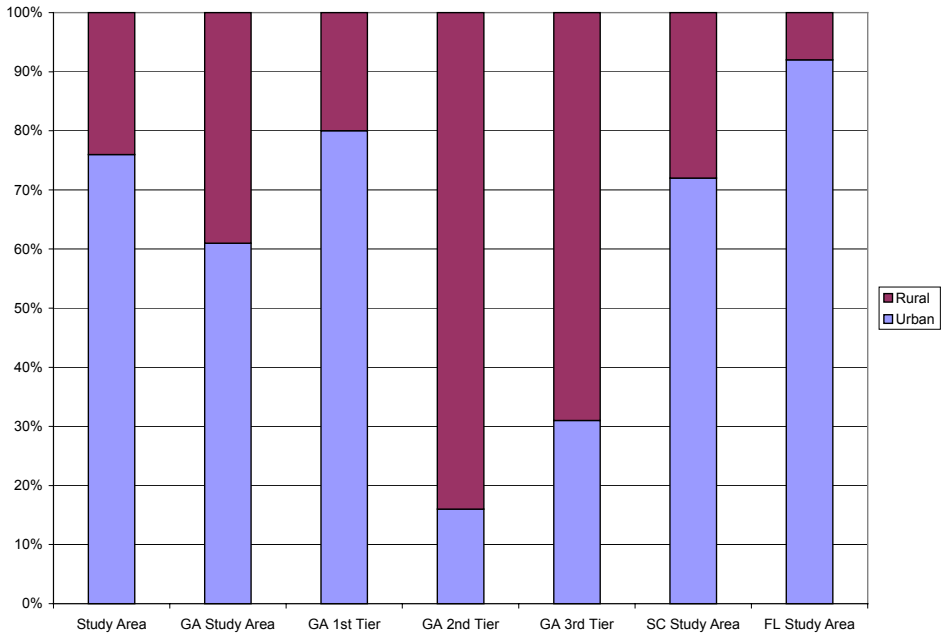
Almost half of the study area population live in three northern Florida counties, due mostly to the city of Jacksonville located in Duval County. The highest growth (133 percent over the past 20 years) for this area has been seen on St. Johns County.

Exhibit 1. Population, Population Growth and Projected Growth for the Gray's Reef Study Area




The study area is predominately a rural area, with the exception of several counties that include the cities of Savannah, Brunswick, Charleston, Beaufort, and Jacksonville. The counties that are almost entirely classified as rural-nonfarm are McIntosh, Effingham, Long, Brantley, Charlton, and Jasper.

Exhibit 2. Study Area Demographics: Urban vs. Rural

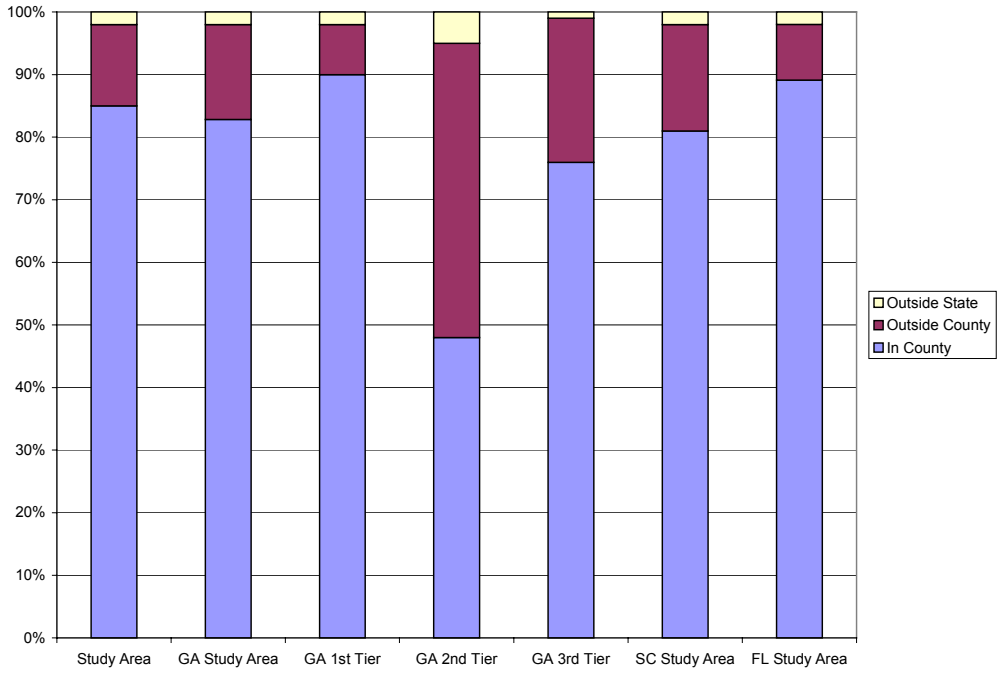


The proportion of white to black in the study area is approximately 70 percent white and 30 percent black. This proportion is consistent throughout the study area, with the exception of McIntosh, Screven, Colleton, Jasper, and Hamilton which have a significantly higher proportion of black residents. Counties with higher proportions of whites are Bryan, Effingham, Brantley, Pierce, Nassau, and St. Johns.

Several of the counties in the study area appear to have a greater proportion of residents at retirement age. These counties are Chatham, McIntosh, Glynn, Screven, Evans, Tattnall, Colleton, Jasper, and St. Johns.

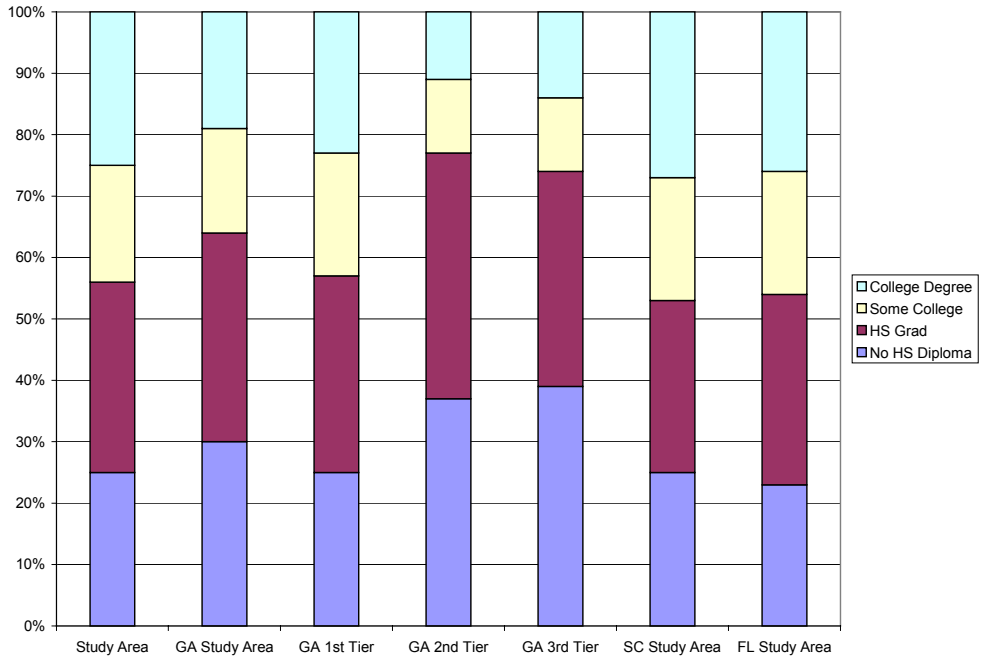
In the study area, 85 percent of the residents work in the county where they reside. There are several significant exceptions to this finding. Counties in which a majority of residents work outside the county are Bryan, McIntosh, Effingham, Long, Brantley, and Pierce. There are four counties with high proportions of residents that work outside the state, Charlton (26 percent), Jasper (14 percent), Nassau (8 percent) and Camden (5 percent).

Exhibit 3. Place of Work



In the study area, approximately one quarter of the residents have not completed high school. A significant correlation exists between predominately rural counties and a highproportion of residents without a high school diploma. In fact, every rural county has a significantly higher proportion of residents without a high school diploma.

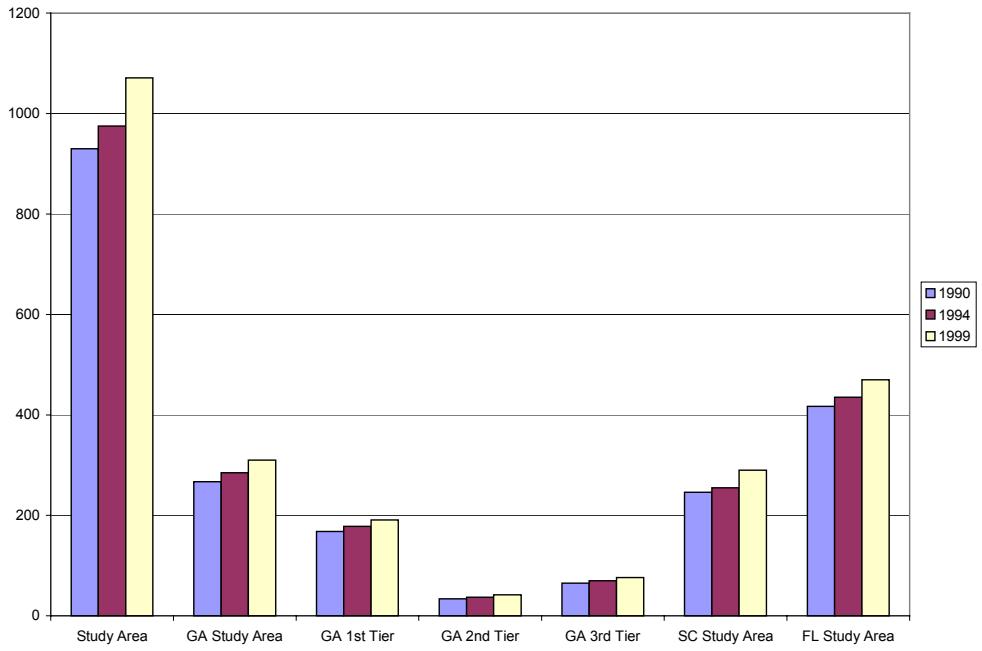
Exhibit 4. Educational Attainment




***Labor Force.*** The labor force characteristics in the study area closely match the population characteristics. On average, the labor force has grown at a faster rate during the second half of the 1990s as compared to the early 1990s. Several of the counties have grown at substantially higher rates than the average, including Bryan, Camden, Effingham, Long, Bulloch, Beaufort, and St. Johns. Two of the counties, Screven and Colleton, had labor forces that declined over the past 10 years. These declines came during the period 1994 to 1999. McIntosh county showed a significant decline in labor force during the 1990 to 1994 period.

As we shall discuss below, there is a difference between those that work in a county and those that live in a county. And, this will have important implications for assessing socioeconomic impacts.

Exhibit 5. Labor Force and Labor Force Growth

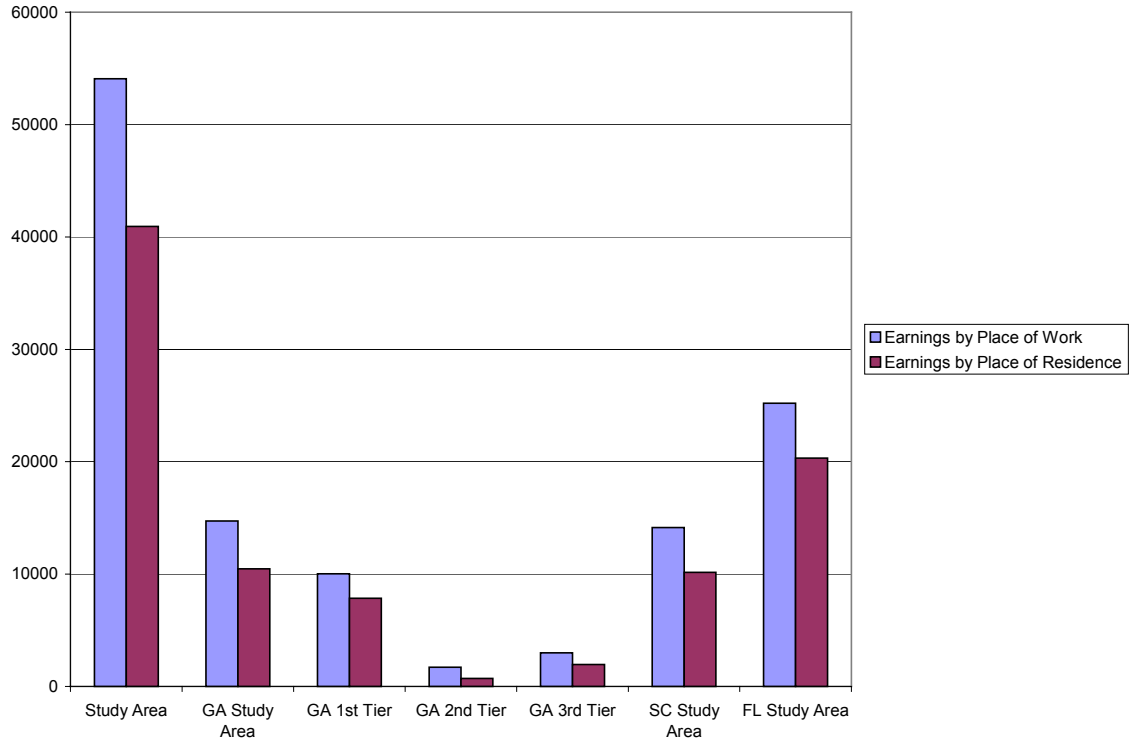



***Employment and Income.*** In conducting economic impact analyses, an important first step is defining the study area. In developing regional economic impact models it is important to understand the interrelationships between surrounding areas. The county political unit and metropolitan statistical areas (MSAs) are used to organize statistical information about employment and income. MSAs attempt to define areas that cross political boundaries but are economically closely linked because of numerous interrelationships. There is no MSA that includes the entire study area, an indication that the 27 counties are not highly linked economically. The MSAs in the study area are Savannah, GA, Charleston, SC, and Jacksonville, FL. Much of the study area, especially Georgia, is not included in any of these MSAs, therefore, we only report county level information here.

Income is reported from two perspectives; 1) income by place of residence and 2) income by place of work. Income and employment by place of work are further reported by industry. Income and employment by place of work is also reported for wage and salary workers versus proprietors (business owners). Differences in these measurements often reveal important differences about the nature of the local economies that are important for socioeconomic impact analyses. For example, a large difference between income by place of residence and income by place of work might reveal that the economy of the area under study is largely driven by income earned from sources unrelated to work in the area and this will dampen the impacts of management changes that impact local work related income and employment. A large number of proprietors indicate the prevalence of small businesses which receive special treatment under Federal Regulatory Impact Reviews.

*Income by Place of Residence versus Income by Place of Work.* In 1998, the study area's income by place of work was 75.7 percent of the income by place of residence. Several of the counties have vastly different ratios than the study area as a whole. Liberty County actually has a higher income by place of work than place of residence (114.6 percent). Other counties with high work to residence income ratios are Camden (96.2 percent), and Duval (94.3 percent). Long County's income by place of work is only 20 percent of income by place of residence. With the exception of Wayne County (63.4 percent), the entire 2nd tier of the Georgia study area (39.1 percent) has a disproportionately low work to residence income ratio. Other counties with low ratios are Bryan, Pierce, Jasper, Nassau, and St. Johns.

Exhibit 6. Personal Income by Place of Residence and by Place of Work.




There are several sources of income unrelated to work in a county that are recorded and they are generally referred to as transfer payments and property income. Social security and pensions are two of the most important transfer payments and dividends, interest and rent are the most important sources of property income. Social Security and Medicare deductions from current workers are recorded as a deduction in income by place of work in deriving income by place of residence. The other difference between income by place of work and residence is called the residence adjustment. The residence adjustment is the net flow of income to a county that results from some residents that work outside the county of residence and bring income into the county (inflow of income) versus residents from other counties that work inside the county but take their incomes home to their counties of residence (outflow of income).

In 1998, Chatham County had a net outflow of income or a residence adjustment of about -$526 thousand. Two other counties in the 1st tier of Georgia counties had net outflows of income, Liberty and Camden. None of the 2nd tier counties had net outflows of income. Two counties in the 3nd tier, Ware and Appling, had net outflows. Additionally, as can be expected Charleston and Duval counties had large net outflows of income

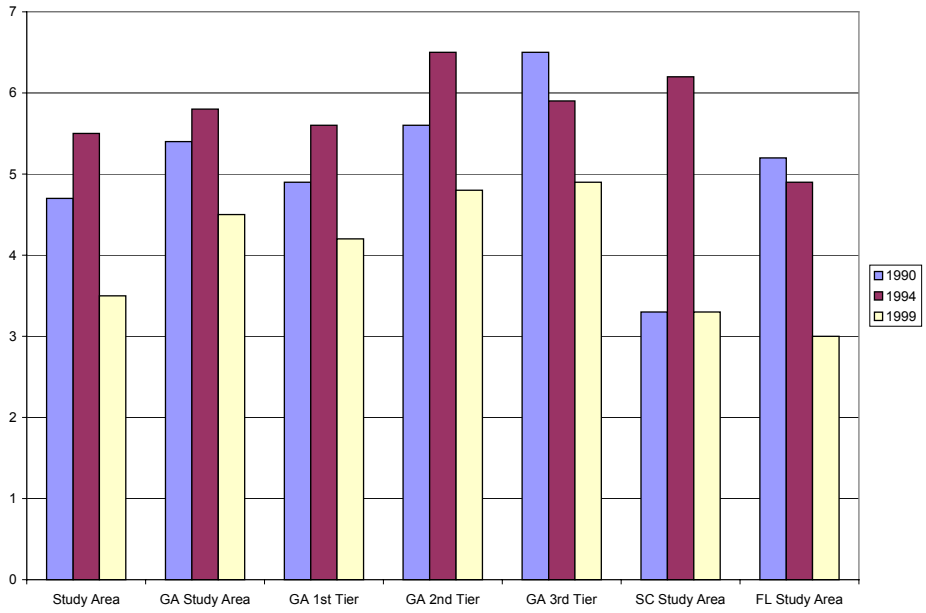
The Census of Intercounty Commuters for 1990 reveals the nature of the above net flows. It is apparent that the three major cities, Savannah, Charleston, and Jacksonville) draw workers from many of the surrounding counties. These counties can be considered bedroom communities for these cities. Chatham County (Savannah) has a positive flow of workers to the county of 14,278. Most of the commuters flowing into the county reside in Effingham County (6.4 percent) with others coming from Bryan County (3.5 percent). Surprisingly few people commute to the Savannah area from South Carolina. Charleston and Duval (Jacksonville) counties had a positive net flow of 45,551 and 38,955, respectively. It does appear that especially the second tier of Georgia counties serve as bedroom communities to the first tier coastal counties.

Since the majority of the marine related economic activity in the study area occurs along the Georgia coast, these counties were analyzed for connectivity. Only 63.4 percent of the workers in Bryan County reside in the county, with commuters coming from Liberty (12 percent), Chatham (9.7 percent) and Bulloch (5.2 percent). In Liberty, 85.4 percent of the workers reside in the county, with almost 5 percent coming from Long and 3 percent from Chatham. Approximately 82 percent of the workers in McIntosh County live there, with almost 10 percent commuting from Glynn. In Glynn County, about 87 percent of the workers are county residents, with equal amounts (about 4 percent each) coming from McIntosh and Brantley. Over 10 percent of the workers in Camden County are Florida residents, with others coming in from Charlton County.

*Proprietors.* Across the study area in 1998, proprietors accounted for 13.6 percent of employment, but only 6.7 percent of income. Several counties, Tattnall, Appling, and Pierce, show a much higher and more balanced mix of proprietors income and employment. This is an indication that small businesses are very important in these counties. There are other counties that have higher than average proprietors employment but low income as percentages to the total. These include Bryan, McIntosh, Effingham, Long, Brantley, Charlton, Screven, Colleton, Jasper, and Nassau counties. This is a possible indicator that these counties small businesses pay wages that are below the average for the study area.

*Indicators of Economic Health and Wealth.* Unemployment rates and per capita incomes are probably the two most popular measures used as indicators of the health and wealth of communities, states or nations. Throughout the 1990s unemployment rates in the Georgia study area counties were lower than that for the State of Georgia. The general trend for the study area has been toward lower unemployment, although many counties' unemployment rates rose during the period from 1990 to 1994. Unemployment in the 1st tier counties has been consistently lower than the 2nd and 3rd tier counties, except for Liberty and McIntosh, which have shown high unemployment. McIntosh County has shown a rebound in unemployment in 1999. In the 2nd tier, Effingham and Long have had low unemployment, while Brantley has had a high rate of unemployment. The county with the highest unemployment rate in the entire study area was Appling County, at almost 10 percent, in the 3rd tier of Georgia. Unemployment in the South Carolina study area has followed a similar trend of a small rise from 1990 to 1994 and a recovery in 1999. The Florida study area has shown a more consistent and lower than average unemployment rate.

Exhibit 7. Unemployment Rates




Real per capita incomes (per capita income in 1999 $, i.e., adjusted for inflation using the Consumer Price Index) in the Georgia study area counties were, for the most part, lower than that for the entire State of Georgia throughout the 1990s. The two exceptions were Chatham and Glynn, which have both had higher real per capita incomes. Several of the counties, Liberty, McIntosh, Camden, Brantley, and Charlton had much lower than average real per capita incomes. Long County has had the lowest level of any county in the entire study area. Interestingly, the 3rd tier counties had very consistent per capita income, with all in the $18,000 to $19,000 range. The South Carolina study area has had a wide range of per capita incomes, with Charleston and Beaufort on the high end and Colleton on the low end. The three Florida counties all have very high per capita incomes, with St. Johns coming in highest at $36,809 for 1998.

Other comparisons between the two counties reveal another interesting finding in the study area. Average Earnings Per Job and Average Wage & Salaries reveal that real average earnings per job and real average wages & salaries have not grown consistently with personal income. In fact, several of the counties have shown declines during the period of 1990 to 1998 for these indicators. These counties include McIntosh, Effingham, Appling, Charleston, and Nassau.

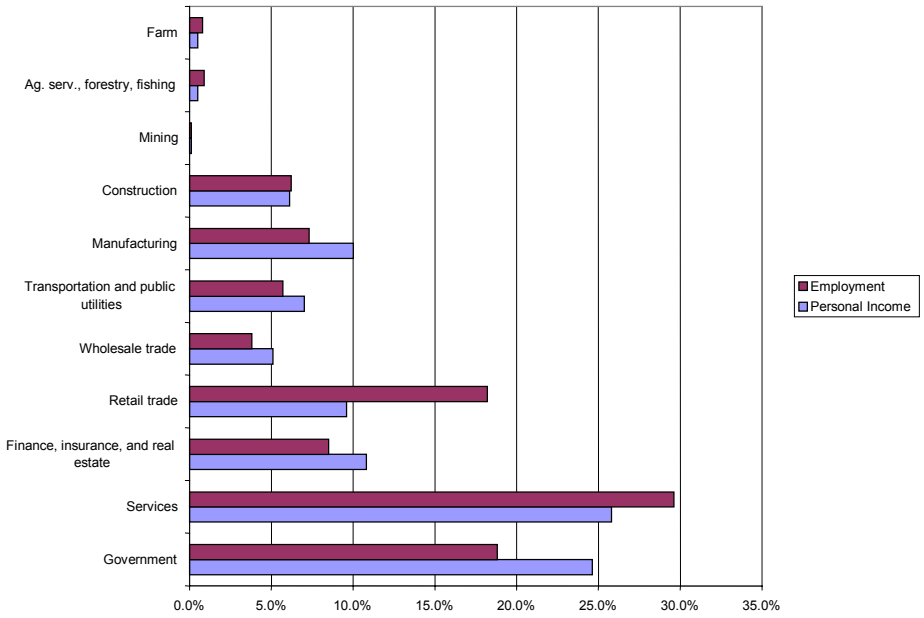
*Income and Employment by Industry.* For purposes of economic impact analyses, in terms of income and employment impacts, income and employment by industry is critical because it provides the necessary control totals in the economic accounting system. A limitation of this accounting system is that it is still based on the old industrial economy and generally is not designed to yield direct insights into how the use of natural resources and the environment are connected to the economy. Linking the economy and the environment is the very heart of the socioeconomic analysis. **We need to be able to answer the question, "if the use of the natural resources of the GRNMS change, what will be the impact on the income and employment in the local economies?"** To answer this question requires supplemental information organized so that it maps directly into the current system of accounting. In some cases, the income and employment by industry statistics can give us upper bound estimates of the direct portion of impact (i.e., not counting multiplier impacts) for particular uses. Our approach here is to first look at the most aggregated information, then proceed to evaluate information collected by other institutions and how it maps into the more aggregated statistics. Each step along the way our objective is to see how close we can

get to linking the economy with the environment and assessing the relative importance to the economy of natural resource base uses.

Exhibit 8 shows the percentages of income and employment by industry to the study area (see Appendix Tables for more details). Commercial fisheries would be included under the category "Agricultural Services, Forestry, Fishing and Other". In 1998, this category accounted for only 0.5 percent of income by place of work in the study area. Several of the counties pop out as relying more on this sector, including McIntosh (8.6 percent), Brantley (5.4 percent), Tattnall (3.1 percent), Dorchester (3.2 percent), Nassau (2.9 percent), and Long (2.1 percent). This serves as a first step upper bound on the proportion of income by place of work for the direct impacts of the harvesting portion (not including multiplier impacts) of commercial fishing. Other direct impacts of commercial fishing would include some portion of Wholesale Trade (e.g., fish houses and buyers) and some portion of Manufacturing (fish processing).

The Retail Trade and Services sectors are where the direct impacts of tourism/recreation would be included. However, these categories are too broad to yield any useful bounds for estimation of the direct impacts for tourism/recreation. The accounts, as stated above, were simply not designed for this purpose. In any case, the first step of linking the natural resource use activities to the economy yielded only limited insights.

Exhibit 8. Employment and Personal Income, Percentage by Industry for the Study Area. 1998




*Income and Employment: Step 2 Additional Disaggregation.* The accounts reviewed above are what are called two-digit SIC (Standard Industrial Classification) level of aggregations. The SIC system of accounting can actually go down to four and six digit levels, which contain more specificity about the activity. However, because of nondisclosure rules to protect the privacy of business information, the four digit level is the best available for large counties and even here there are many categories for which information is not reported due to nondisclosure. In this step, we will explore how much detail we can glean about the three sectors that are our primary interest. Only income is reported at the lower levels of disaggregation.

*Commercial Fishing Industry.*

As regards commercial fishing on Gray's Reef, it is important to note that, excluding charter fishermen, only one fisherman is known to fish commercially on Gray's Reef (out of Glynn County, for king mackerel). Other than hook-and-line, most commercial gears are prohibited on the Sanctuary. Commercial hook-and-liners or "bandit reel" fishermen after bottom fish bypass the Sanctuary to fish well offshore on less fished areas, which support more abundant amounts of valuable fish species such as groupers and snappers. These fishermen typically fish along or just inside the shelf "break", which is 80 nautical miles off Georgia, but much closer to shore off Cape Hatteras, North Carolina, and Cape Canaveral, Florida. Commercial boats typically work north and south along the "break" well offshore of Grays Reef and normally land most of their catches in Florida and South Carolina since it is a shorter trip to/from the "break" to these ports. Unless a commercial hook-and-liner belongs to the small, local snapper/grouper fishing fleet out of Bellville, they rarely venture inshore to the Gray's Reef area. (Henry Ansley, GA DNR)

In 1997, fishing income was a little over $19 million in the study area. This represents approximately 0.05 percent of the income by place of work in the study area. Again, this would be the income received by harvesters or commercial fishermen including crews and proprietors of the harvesting operations. It would not include buyers and fish houses or processors of commercial fish products.

Exhibit 9 shows the percentage change in commercial fishing income from 1970 to 1980, 1980 to 1990, and 1990 to 1997. A very large increase occurred during the 70s, with a slow down in the 80s and some significant drops in the 90s. Adjusted for inflation, using the Consumer Price Index, the decreases in commercial fishing income becomes much more apparent.

Exhibit 9. Direct Income to Commercial Fishing Harvesting Sector (current dollars)

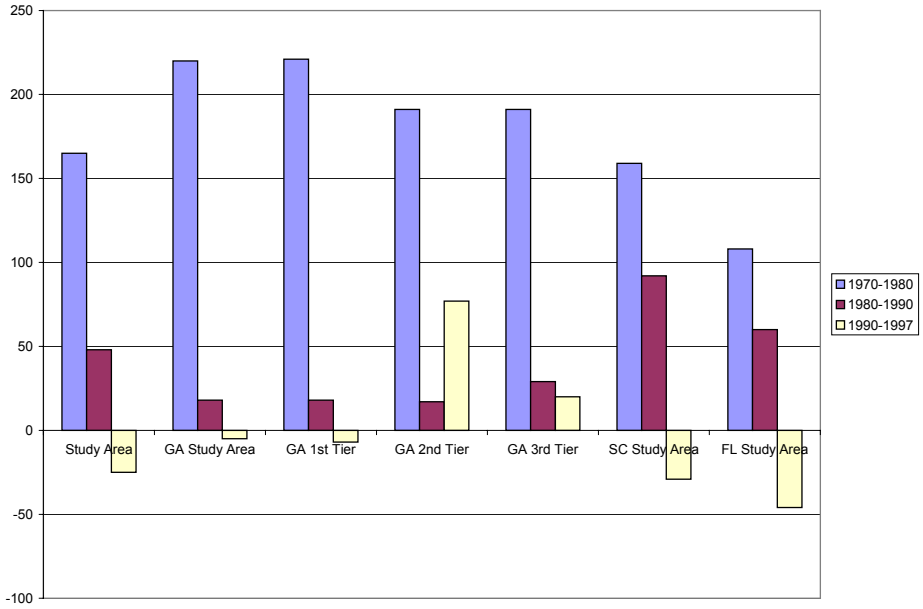
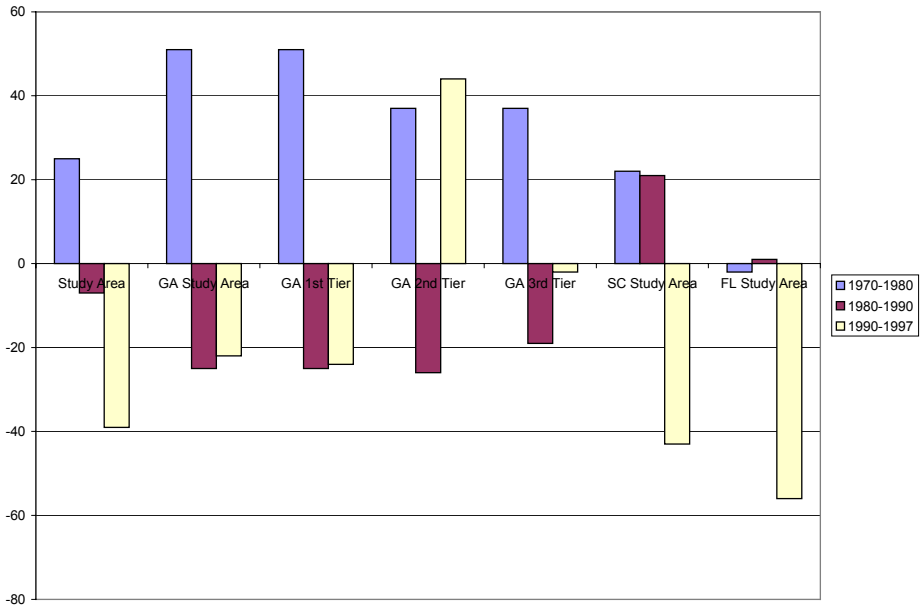



Exhibit 10. Direct Income to Commercial Fishing Harvesting Sector (1999 dollars)




*Tourism/Recreation.* Tourism/recreation has been a notoriously difficult activity to document because the expenditures made while undertaking the activities are spread across so many sectors. Few that really capture the industry. Three commonly used are "Eating and Drinking Places" (within Retail Trade), "Hotels and Other Lodging Places", and "Amusement and Recreation Services" (within Services). A fourth is sometimes included "Museums, Botanical and Zoological Gardens" (within Services). Unfortunately, these sectors tell us very little about tourism/recreation. They are not good discriminators across areas in a single point in time, nor are they good indicators of the trends of tourism/recreation over time in a given place. Life style changes have resulted in high proportions of the local population eating out. Business related travel is a major portion of hotel and motel business and some communities may have extensive numbers of hotel and motels with very little in the way of tourism/recreation. In highly diverse economies like the U.S., measurements from these industries yield nothing of use to get us close to linking natural resource uses with the economy. We must look elsewhere for supplemental information to get us closer to our goal.

*Income and Employment: Step 3- Supplemental Information.* In step 2, we were able to narrow in on the commercial fishing contribution to the local economies at the first stage of direct impacts. The industry accounts did not support any additional insights for tourism/recreation. In this step, we sought out additional sources of information and to see what they might reveal about the activities and their income and employment impacts.

*Commercial fishing Industry.* For the commercial fisheries, we went to information compiled by the Fisheries Statistics & Economics Division of the National Marine Fisheries Service (NMFS). The following description of landings background information is from the NMFS website: http://www.st.nmfs.gov/st1/commercial/index.html.

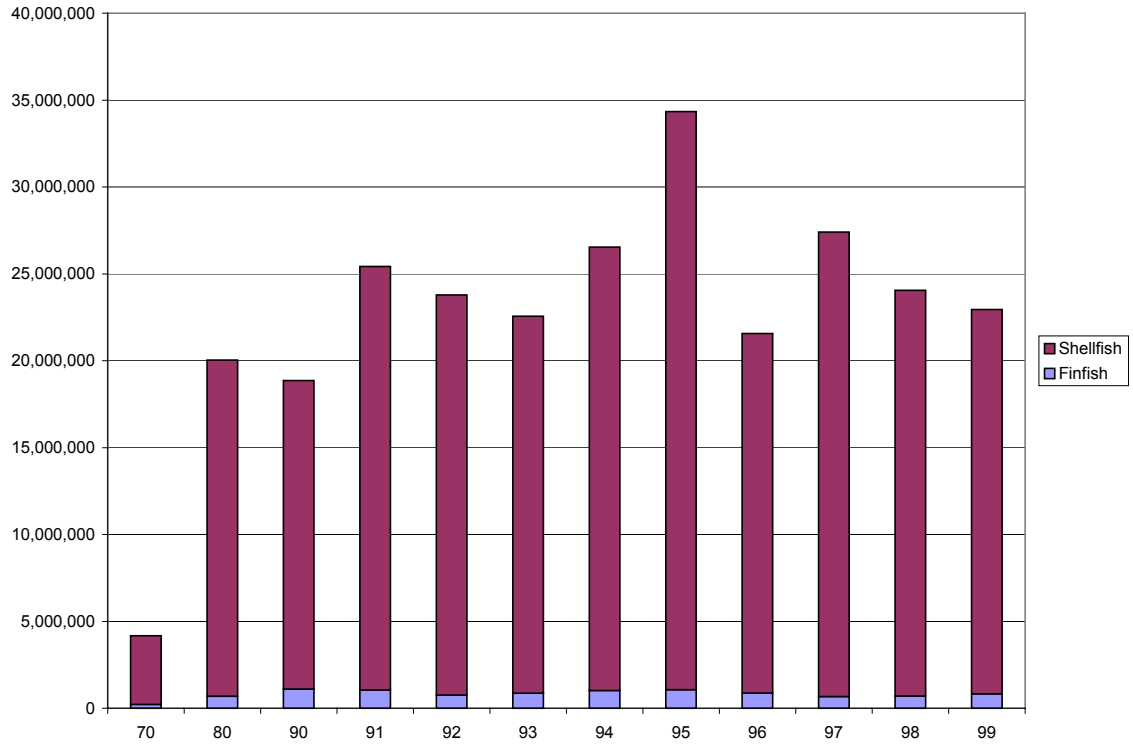
NMFS and its predecessor agencies, the U.S. Fish Commission and Bureau of Commercial Fisheries, began collecting fisheries landings data in 1880. Landings data were collected during surveys of a limited number of states and years between 1880 and 1951. Comprehensive surveys of all coastal states have been conducted since 1951. Years, areas and completeness of landing surveys prior to 1977 are listed in the publication, "Fisheries Statistics of the U.S., 1977."

The collection of U.S. commercial fisheries landings data is a joint state and federal responsibility. The cooperative State-Federal fishery data collection systems obtain landings data from state-mandated fishery or mollusk trip-tickets, landing weighout reports provided by seafood dealers, federal logbooks of fishery catch and effort, and shipboard and portside interview and biological sampling of catches. State fishery agencies are usually the primary collectors of landings data, but in some states NMFS and state personnel cooperatively collect the data. Survey methodology differs by state, but NMFS makes supplemental surveys to ensure that the data from different states and years are comparable.

Statistics for each state represent a census of the volume and value of finfish and shellfish landed and sold at the dock rather than an expanded estimate of landings based on sampling data. Principal landing statistics that are collected consists of the pounds and ex-vessel dollar value of landings identified by species, year, month, state, county, port, water and fishing gear. Most states get their landings data from seafood dealers who submit monthly reports of the weight and value of landings by vessel. Increasingly, however, states are switching to mandatory trip-tickets to gather landings data. At the conclusion of every fishing trip, seafood dealers and fishermen indicate their landings by species on trip-tickets and may be required to record other data such as fishing effort and area fished.

In 1999, the preliminary total ex vessel value of landings in Georgia was $21.13 million. As a check, we compared the income estimates from step 2 above as a percent of total ex vessel value in the state of Georgia. For the state of Georgia in 1997, income to harvesters was 53.6 percent of ex vessel value. This estimate is within the range of estimates from various cost and earnings studies for the fishing industry.

Exhibit 11. Georgia Commercial Fishing – Ex-vessel Value




Several of the Georgia commercial fisheries stand out in terms of value. The highest value fishery is white shrimp. In 1999, shrimp accounted for $16.8 million of the total $21.1 million, or about 80 percent of the value of the total catch. In fact, shellfish as a group (including crustaceans) has historically accounted for over 96 percent of the total commercial harvest for Georgia. Over 90 percent of Georgia shellfish was caught in the 0 to 3 miles from shore area.

By comparison, the value of the commercial finfish market is much smaller, with a value of $816 thousand in 1999. The majority of finfish are caught in the 3 – 200 miles from shore area ($691 thousand or about 85 percent). Historically, the Snapper/Grouper fishery has provided the highest value (66 percent of the total finfish landings). In 1999, Grouper landings were valued at $298 thousand and Snapper landings valued at $237 thousand. The Snapper value includes Vermillion, Red, and Other. All of the Snapper/Grouper catch was in the 3 – 200 miles from shore area. Other fish landed in Georgia with relatively high value were Sharks and American Shad, each with a value of $44 thousand.

Exhibit 12. Georgia Commercial Finfish Landings (3 – 200 Mile Zone), 1999. ($691,000 total)

| | 1999 $ | % of Total |
|---|---|---|
| Groupers | 298 | 43% |
| Snapper | 237 | 34% |
| Sharks | 44 | 6% |
| Dolphinfish | 13 | 2% |
| Scup/Porgy | 11 | 2% |
| King Mckrl | 7 | 1% |
| Other | 81 | 12% |

Exhibit 13. Georgia Commercial Shellfish Landings, 1999. ($20,283,000 total)

| | 1999 $ | % of Total |
|---|---|---|
| Shrimp | 16830 | 83% |
| Crab | 2254 | 11% |
| Conch | 415 | 2% |
| Clam | 122 | 1% |
| Oyster | 15 | 0% |
| Other | 647 | 3% |

The NMFS estimated that 350 commercial fishing vessels (documented craft greater than 5 net registered tons) operated out of Georgia ports in 1998. For comparison only, the South Carolina estimate was 569 and Florida was 2,384. It can be assumed that the majority of vessels operating out of South Carolina and Florida do not primarily fish off the coast of Georgia.

The NMFS also reported that in 1998, 8 processing plants and 66 wholesalers operated in Georgia employing 1,259 and 586 people respectively. Again, for comparison, South Carolina had 5 processing plants employing 82 people and 28 wholesalers employing 194 people. Florida had 108 processing plants employing 3,142 people and 374 wholesalers employing 2,984 people. It should be noted that the Georgia figures for processing facilities include two very large processors (eg., King & Prince Seafood, Rich-SeaPak). These processors rely heavily on imports from elsewhere and not on the local fishery. These processors also produce a wide variety of products, not just seafood. (Henry Ansley, GA DNR)

The NMFS ranks commercial fishery landings at major U.S. ports. Darien-Bellville, GA ranked 64th in terms of value ($9.2 million). Several other ports located within the study area also rank among the top 100, including Charleston-Mt. Pleasant SC ranked 51st ($12.0 million), Beaufort, SC ranked 70th ($8.5 million), and Mayport, FL ranked 74th ($7.7 million). For comparison, Dutch Harbor, AK ranked 1st ( $140.0 million), New Bedford, MA ranked 2nd ($129.9 million) and Kodiak, AK ranked 3rd (100.8 million).

Appendix A identifies a preliminary sample of seafood wholesalers located in the state of Georgia. These will be contacted during the second phase of this analysis.

*Socio-Demographics of Commercial Snapper-Grouper Fishermen*. In 1997, The South Carolina Department of Natural Resources and Clemson University published a report titled *Socio-Demographic Assessment of Commercial Reef Fishermen in the South Atlantic Region*. This project was funded by NMFS through the MARFIN Program. In Georgia, the target sample was 14, of which 10 interviews were completed.

Of the 10 interviews completed with Georgia Snapper-Grouper fishermen, 7 were Georgia residents. One of the topics covered by the survey was preferred management options. Of the 7 Georgia resident fishermen, none preferred individual transferable quotas, 1 preferred co-management, 2 preferred license limitation, 1 preferred limited closure, 1 was not sure, and 2 stated "other" options. Of all 198 surveys conducted in the Southeast, almost 40 percent preferred the license limitation management option.

Exhibit 14. Socio-demographics of Commercial Reef Fishermen in Georgia.

| | |
|---|---|
| Mean Boat Length | 41.1 |
| Years Fishing | 11.0 |
| 1994 Pounds Caught | 58,250 |
| Age | 42.5 |
| Number of Children | 1 |
| # Using Bandit Reel as Primary Gear | 5 |
| # Using Spearfishing with Power Heads as Primary Gear | 1 |
| # Using Rod and Reel as Primary Gear | 1 |

*Marine Related Recreation.* Generally we know from past studies that recreational fishing and diving (both consumptive and non consumptive) take place in the GRNMS. More is known about recreational fishing than for diving. Below are initial results of a recreational fishing and diving study undertaken by the NMSP. Following that, we summarize some estimates that have been made for recreational fishing and the economic impacts using the studies we were able to find.

*Initial Summary of In-person Socio-economic Interviews for Gray's Reef National Marine Sanctuary (GRNMS) – Charter Recreational Fishing and Diving*

*Overview*

The overview study of GRNMS identified recreational activities, primarily fishing and scuba diving, as the major activities that occur within the boundaries.

During the last week of January 2002, in-person interviews were completed with 7 fishing charter boat and 4 dive shop operators along the Georgia Coast from Savannah to Brunswick. Out of these interviews came recommendations of further interviews with specific fishing clubs, camps and marinas and fishing tournament organizers. These interviews are ongoing and will be completed over the phone in February and March 2002. In addition, the most significant group of users identified were private boat owners that are members of fishing clubs, camps and marinas. A comprehensive study of these private boat owners is planned.

The in-person interviews revealed a considerable amount of information and insight about the users of GRNMS. Several regulatory issues were discussed at great length, including the prohibition of spearfishing and anchoring and the installation of mooring buoys. These three issues were well received and supported by these particular users.

An unexpected finding was that no charter fishing or diving boats operating out of Savannah travel to GRNMS. The northern-most charter-fishing operator and marina that use GRNMS are located in Richmond Hill, approximately 15 miles south of Savannah. Richmond Hill is a growing bedroom community of Savannah with many new housing developments. The Richmond Hill charter-fishing operator indicated that approximately 15 percent of his fishing trips target GRNMS. The Fort McAllister Marina has approximately 150 boats, 90 percent of which will fish GRNMS on any given day. It was reported that the majority of the charter boats targeting GRNMS originate out of Townsend (Sapelo Island) south to Brunswick.

*General Findings*.

A series of opinion and awareness questions were asked to those interviewed. A general narrative of the findings is presented below.

Most users agree that Georgia needs to protect and conserve special marine areas and are aware of GRNMS, its boundaries, and rules and regulations.

They believe that a marine sanctuary is a unique area that should be protected through certain restrictions, be studied, but also remain open for responsible use. In other words, enjoyed but not destroyed.

Most think that the current sanctuary regulations are fair and agree that anchoring and spearfishing should be prohibited.

Concern was expressed by several of the fishermen about future regulatory changes at GRNMS, specifically the issue of creating a marine reserve or "no-take" area within the sanctuary. Most stated that it would be a mistake to close GRNMS, since it is not a major spawning area and the majority of the fish that are caught are migratory species that are targeted seasonally.

Many of the users mentioned a concern with the inadequate level of enforcement of GRNMS. Several of those interviewed said that they have never seen the GRNMS boat out at the reef. An increased amount of visibility out at the site would be a positive thing.

*Impact Estimation Methodology*

Recreational activity impacts are estimated in person days. This is a measure that represents one person engaging in a particular activity (in this case either recreational fishing or diving) during any part of a day. In order to estimate this number, interviewees were asked to provide the following information by month for 2001: percent of activity within and outside the sanctuary, total number of trips, typical number of days

per trip, average number of customers per trip, and percent of full capacity. Monthly person days are then calculated by simply multiplying number of trips by number of customers for each month. Total person days are the sum of the monthly person days.

Each operation was then asked to estimate the percentage of activity both within the sanctuary and outside the sanctuary. Person days of activity within GRNMS for each operation was calculated by applying this percentage to their total person days of activity.

The impacts from the business operations are estimated in terms of operating revenues, costs, market value, and profit/loss. Interviewees were asked to provide this information.

It is important to note that all of these results were calculated from self-reported data and could be subject to an unknown level of bias. It was my personal opinion that those interviewed provided as accurate and honest as possible.

*Recreational Fishing*

A 1996 American Sportfishing Association study estimated Georgia saltwater angler expenditures at $57.1 million and economic output of $116.7 million, and 1,576 related jobs accounting for wages and salaries of $32.0 million. The NMFS's Marine Recreational Fisheries Statistics Survey estimated that in 1999 1.8 million pounds of fish were caught in Georgia waters. Of this, 14 percent were caught more than 3 miles offshore, 7 percent were caught within 3 miles of the coast, and 79 percent were caught inland. In the area more than 3 miles offshore 31 percent of the fish (in terms of weight) were caught by charter boats and 69 percent were caught by private boats.

There was general consensus among charter boat captains that approximately 15 charter fishing boats target GRNMS. The in-person interviews covered approximately one-third of these operations.

The sample of charter boat captains interviewed reported a 2001 annual total of 860 trips resulting in 3,620 person days. The percentage of activity in GRNMS ranged from 10 percent to 75 percent. These percentages were then applied to the totals, resulting in an estimation of 115 trips and 481 person days in GRNMS. A rough estimate of the total fishing charter boat activity within GRNMS came to 345 trips totaling 1,443 person days. These total estimated were calculated by multiplying the sample results by three, since the sample reportedly accounted for one-third of the population of boats targeting GRNMS.

The total gross revenue of the sample of charter fishing operations was reported to be $343,000 with $194,000 in operating costs. The total market value was estimated at $857,500. Again, these findings can be multiplied by three to provide a rough picture of the population that operates in GRNMS. The population results were estimated at $1,029,000 in gross revenues, $582, 000 in operating costs, and total market value of $2,572,500.

*Sport Fishing Tournaments*

Another significant use of GRNMS is sport-fishing tournaments. Several major tournaments occur offshore Georgia every year with GRNMS being a premier target for the participants. It was estimated by one organizer that approximately one million dollars in prize money has been won in GRNMS alone.

Some of the more significant tournaments:

All Coast Classic Tournament
St Mary's Coastal Classic
Halfmoon Sportfish Club Kingfish Klash
Sapelo Open King Mackerel Tournament
Two Way Sportfishing Kingfish Tournament
Golden Isles Kingfish Classic
Savannah Coastal Classic

Ft. McAllister King Mackerel Tournament

*Diving*

While it appears that GRNMS is a premier fishing destination for Georgia, it has limited use from scuba divers. After speaking with four diving operations (two in Savannah and two in the Brunswick area), only one diving operation was identified offering trips to GRNMS. This business was found to be the only one that offers diving trips on it's own boat, with the others simply providing retail services, instruction, and filling tanks. Employees of these other diving businesses do offer their services as guides on privately owned boats.

This business reportedly does 20 percent of their total diving activity at GRNMS, or approximately 10 trips annually totaling 50 person days. In total, the operation reported 178 trips and 1,018 person days of scuba diving. Gross revenues of this business were reportedly $90,000, operating costs of $90,000, and a total market value of $80,000.

The diving operation owner that does visit GRNMS stated that the NOAA data buoy located within the sanctuary saves money in lost trips. Real-time weather and sea conditions information from this data buoy can be accessed via the internet. This information helps determine whether or not to travel out to GRNMS.

*Spearfishing*

There is wide support for the issue of prohibiting spearfishing, especially among fishermen. Spearfishing is generally viewed as a method of targeting and taking specific large fish. These larger fish represent the top of the recruitment line and are the major reproducers of offspring.

*Anchoring*

The overall consensus of everyone interviewed was that that the methods of fishing and diving used at GRNMS do not require anchoring. Fishermen are either drifting for bottom fish or trolling for migratory species. Due to the nature of the strong currents, scuba divers primarily use the drift diving method. They also added that they have historically seen very few boats anchoring. It was the opinion of several of the interviewees that anyone anchoring within GRNMS is not fishing properly and is definitely damaging the live bottom.

*Mooring Buoys*

The concept of installing mooring buoys in GRNMS as a substitute for anchoring is highly supported by these users. Many stated that if anchoring is not allowed, an alternative must be provided for safety. "A vessel in trouble must be able to tie up to something without breaking a law." The fishermen also see a system of mooring buoys as areas that would attract baitfish. They would like to see four mooring buoys installed as a pilot program, one in each quadrant of GRNMS. Their suggestion is to place each approximately an eighth to a quarter of a mile from four of the prime fishing ledges.

*Enforcement*

A concern among the majority of those interviewed was the issue of enforcement. They stated that they seldom or never see enforcement (Sanctuary, Coast Guard, or Georgia DNR) boats at GRNMS.

Most agree that the best method of enforcement, due to the remoteness of the GRNMS location, is self-enforcement. This sample of users fully understands the importance of protecting the resource. They understand the concept of sustainable use and many stated that they hope many future generations can enjoy it as they have. They definitely feel a sense of ownership and a responsibility to protect fish populations along with the entire ecosystem, including the hard bottom habitat. Many stated that they would not hesitate to report users that they observe breaking the law, and several have done so in the past.

They would also like to see expanded education efforts. Several used the examples of throwing trash out of a car window and the recycling of plastic, glass, and metal containers. Twenty years ago, no one gave a thought to these problems, but now they are common sense. They believe the same can be done with marine conservation, especially in a protected area like GRNMS.

*Next Steps*

Several economic sectors were identified within the GRNMS study area that suggests further study. These include:

Private boat based fishing
Private boat based scuba diving.
Boat dealers
Marinas
Fish clubs
Fish camps

A comprehensive study of private boaters is planned. This will include a full-scale survey of fishermen and scuba divers that use private vessels. Due to the scope of the study, approval from OMB will be necessary. This approval process requires a minimum of 6 months to complete. Because of this, the private boat study is a long-term project for GRNMS.

*Marine Recreational Fishing Recent Studies.*

For estimates of recreational fishing activity, there are four main sources of information at the State level; Georgia Department of Natural Resources' report *Resident Participation in Freshwater and Saltwater*

*Sportfishing in Georgia,* the National Marine Fisheries Service, Marine Recreational Fisheries Statistics Survey (MRFSS), the U.S. Fish and Wildlife Service, Survey of Fishing, Hunting and Wildlife Associated Activity (USFWS-SFHW), and the American Sportfishing Association's (ASA) report *The Economic Importance of Sportfishing*, and. MRFSS is an annual on-going survey done in two-month waves, while USFWS-SFHW is done every five years, with the most recent completed in 1996. MRFSS measures trips and catch. Trips are equivalent to days in MRFSS. USFWS-SFHW measures number of anglers, days and spending. MRFSS population is all fishermen, whereas USFWS-SFHW is only fishing by U.S. households. Therefore, MRFSS estimates of trips should always exceed those estimated by USFWS-SFHW.

*Georgia Department of Natural Resources Sportfishing Survey Results*.

Historically, the state of Georgia has used the USFWS National Hunting and Fishing Survey previously mentioned. These data were used for projects such as determining the freshwater-saltwater split of Wallop Breaux (i.e. SportFish Restoration Program funding). However, the USFWS study estimates of saltwater sportfishing participation were based on only approximately 30 interviews. It was decided that a more comprehensive survey was required. In 1995 and 1999, the Georgia DNR Coastal Resources Division reported the results of a telephone survey of households in Georgia. The 1995 interviews were conducted by Georgia Southern University and the 1999 interviews were conducted by the University of Georgia. These surveys were determined to be necessary because the national surveys conducted by the USFWS contained too few cases in Georgia to accurately estimate the total number of anglers in the state, particularly in the coastal zone, because of the smaller aggregate population.[2]

In 1999, 29.0 percent of the 1,999 households surveyed in the coastal counties participated in saltwater sportfishing during the 12 month period prior to the interview. This finding was slightly less than the 1995 participation of 33.8 percent. In McIntosh county, 53.1 percent of households had fished during the 1999 period, sharply up from 36.6 percent in 1995. Most of the other coastal counties had participation rates just above or below 30 percent, with several declining significantly from 1995 (Brantley, Camden, and Glynn). Liberty county had the lowest participation in 1999 of 20.8 percent down from 31.7 percent in 1995.

The inland regions have had historically lower levels of saltwater sportfishing participation than the coastal counties, averaging 9.2 percent in 1999, which is up from 8.8 percent in 1995. As expected, Inland Region VI, which is the region adjacent to the Coastal Counties region, had the highest participation rate of 15.8 percent, down from 18.8 in 1995. Inland Region II has shown significant growth in participation, from 6.7 percent in 1995 to 10.2 percent in 1999. This finding is possibly due to two factors: the region's proximity to Atlanta, a city that has had significant population growth, and the possibility that Lake Lanier freshwater fishermen are frequently also participating in saltwater fishing.

Exhibit 15. Saltwater Fishing Participation by Coastal County and Region.

[2] The Georgia Department of Natural Resources has completed two surveys regarding resident participation in freshwater and saltwater fishing in Georgia. These surveys are utilized to ascertain the correct split of Federal Aid in Sport Fish Restoration Program funding between Georgia's marine and freshwater programs. These surveys were initiated due to concerns regarding the admittedly limited sampling regime and design utilized in the USFWS surveys to determine these proportions. Through its significantly larger, more comprehensive design, the first Georgia survey demonstrated that the USFWS survey had grossly underestimated marine participation at only 4%, whereas the more comprehensive Georgia survey showed 16% marine participation (18% in the most recent survey). Also, it was noted that the MRFSS does not survey/sample Georgia in January-February. It was also noted that MRFSS does not sample tournaments (several king mackerel tournaments occur each year off Georgia - Gray's Reef is heavily targeted during these events). (Henry Ansley, GA DNR)

| | Households Contacted | Households Fished | Households Contacted | Households Fished | Participation | |
|---|---|---|---|---|---|---|
| | 1995 | | 1999 | | 1995 | 1999 |
| **COASTAL COUNTIES** | | | | | | |
| **Brantley** | 79 | 33 | 58 | 18 | 41.8% | 31.0% |
| **Bryan** | 78 | 30 | 97 | 33 | 38.5% | 34.0% |
| **Camden** | 85 | 38 | 198 | 65 | 44.7% | 32.8% |
| **Chatham** | 919 | 278 | 966 | 253 | 30.3% | 26.2% |
| **Glynn** | 197 | 85 | 303 | 105 | 43.1% | 34.7% |
| **Liberty** | 281 | 89 | 178 | 37 | 31.7% | 20.8% |
| **Long** | 38 | 13 | 50 | 16 | 34.2% | 32.0% |
| **McIntosh** | 71 | 26 | 32 | 17 | 36.6% | 53.1% |
| **Wayne** | 107 | 35 | 117 | 35 | 32.7% | 29.9% |
| **TOTAL** | **1855** | **627** | **1999** | **579** | **33.8%** | **29.0%** |
| **INLAND REGIONS** | | | | | | |
| **I** | 201 | 20 | 727 | 63 | 10.0% | 8.7% |
| **II** | 89 | 6 | 244 | 25 | 6.7% | 10.2% |
| **III** | 1240 | 84 | 1271 | 98 | 6.8% | 7.7% |
| **IV** | 343 | 29 | 600 | 57 | 8.5% | 9.5% |
| **V** | 177 | 22 | 232 | 20 | 12.4% | 8.6% |
| **VI** | 197 | 37 | 303 | 48 | 18.8% | 15.8% |
| **TOTAL** | **2247** | **198** | **3377** | **311** | **8.8%** | **9.2%** |

*National Marine Fisheries Service, Marine Recreational Fisheries Statistics Survey (MRFSS).* The following description of the MRFSS is taken from the NMFS website at: http://www.st.nmfs.gov/st1/recreational/survey. A more detailed explanation can be found on this website. Data on commercial fisheries have long been collected by NMFS and its predecessor agencies. However, data on marine recreational fisheries were not collected in a systematic manner on a continuing basis until 1979. The purpose of the Marine Recreational Fishery Statistics Survey (MRFSS) is to establish a reliable database for estimating the impact of marine recreational fishing on marine resources.

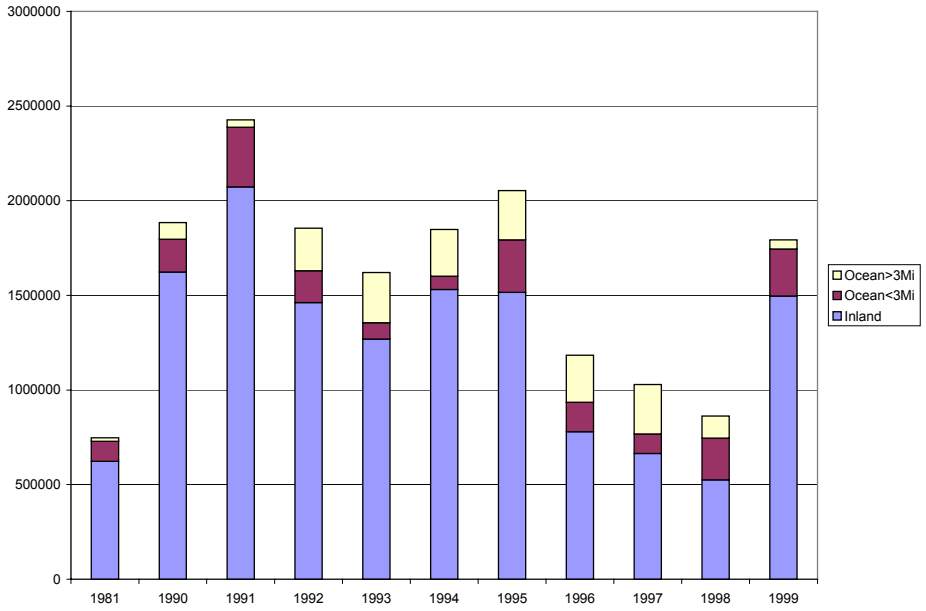
Fisheries management and development requires information on the numbers and size distributions of each fish species caught in each mode and area of fishing within each state or subregion. The MRFSS helps meet the goals of the Magnuson Fishery Conservation and Management Act of 1976 (MFCMA - Public Law 94-265). The MFCMA mandates a national program for management of fishery resources in the ocean zone known as the Exclusive Economic Zone (EEZ), which ranges from 3 to 200 miles from shore. MFCMA also requires that the fishery management plans consider both recreational fisheries and commercial fisheries and their harvests.

Between 1993 and 1998, marine recreational fishing trips have remained fairly steady at approximately 500,000. In 1998, it was estimated that anglers took 572,000 saltwater fishing trips in Georgia. Private/Rental boat trips made up 60%, shore-fishing trips 37%, and Charter/Party boat trips were only 3% of the total.

The MRFSS database shows, for Georgia, a wide range of numbers of fish caught from under 1 million in 1981 and 1998 to over 2 million in 1991 and 1995. The majority of these fish were caught in the inland zone, ranging from 60 percent to over 80 percent of the total catch. In EEZ, the catch grew from 18,664 fish in 1981 to a high of 265,297 in 1993, but has dropped in recent years and in 1998 was estimated to be down to 48,623 fish. It should be noted that many new catch regulations went into effect in 1992 for many offshore species. Further investigation will be required to determine the causes of this drop and sudden shift back to inland fishing. Inland catch had consistently dropped, as a percent of total, from 1981 to 1998. Catch in 1999 almost tripled to 1.5 million from 0.5 million in 1998. Charter fishing harvest in the EEZ

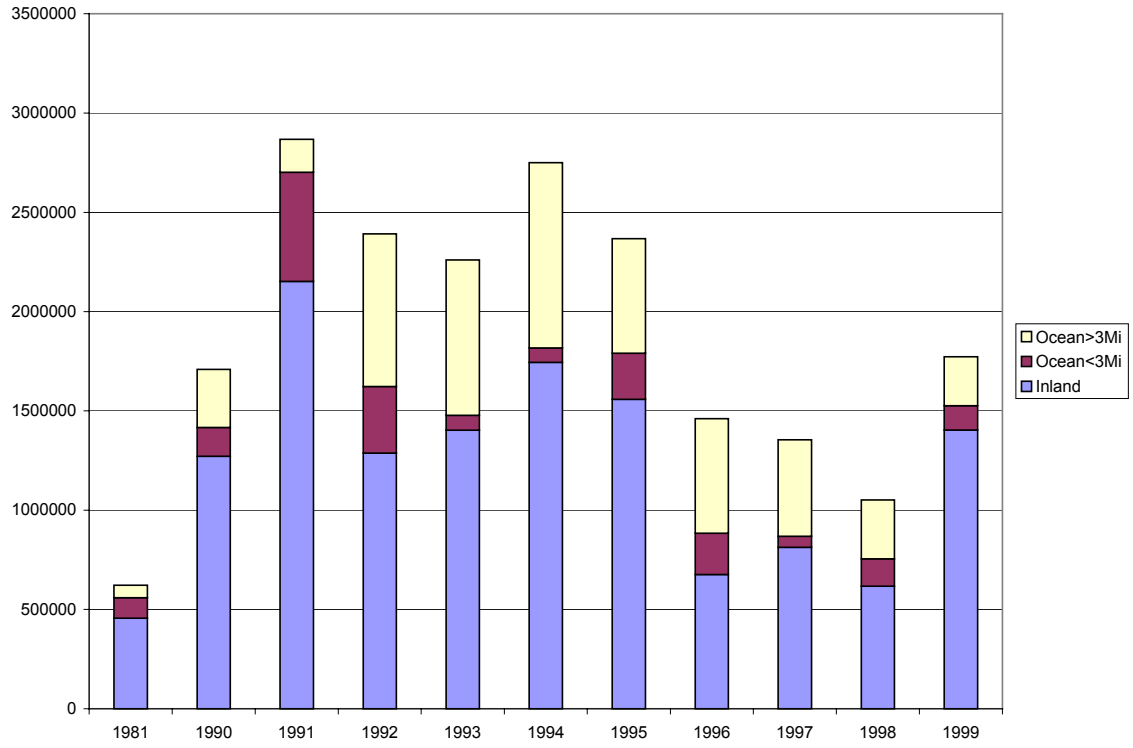
has grown considerably since 1981, from 0 in 1981, to a high of over 200,000 fish in 1995 (over 70 percent of the catch in the EEZ), and back down to 26 thousand in 1999.

Exhibit 16. Georgia Recreational Fishing Harvest, NMFS MRFSS, Number of Fish




Harvest weight has historically shown similar wide swings. Total weight has risen from 0.6 million pounds in 1981 to 1.8 million pounds in 1999. As with number of fish caught, most of the harvest in terms of weight has been in the inland zone. However, a much higher proportion, in terms of weight, has been caught in the EEZ. The high proportion of harvest weight from the EEZ may be due to the harvest weights associated with the larger fish species more frequently taken in the EEZ, such as king mackerel (incidentally, the king mackerel stocks also rebounded significantly during the 90's to a fully recovered stock status). In 1996, 40 percent of the harvest weight came from this zone compared with 21 percent of the number of fish. A similar sharp rise in inland harvest weight was seen for 1999, more than doubling from 0.6 million pounds in 1998 to 1.4 million pounds in 1999. Harvest in the EEZ by charter boats as measured by weight also peaked in the mid 1990s and has dropped off over the past few years.

Exhibit 17. Georgia Recreational Fishing Harvest, NMFS MRFSS, Weight Pounds




The USFWS-SFHW for years 1991 and 1996 actually shows a dramatic increase in the number of marine recreational fishing days in Georgia. Between 1991 and 1996, days increased an estimated 63.9 percent, from 606,000 to 993,000. Even more dramatic was the estimated increase in total anglers which rose from 72,000 in 1991 to 138,000 in 1996, an increase of 91.7 percent. State residents have consistently accounted for almost 60 percent of total anglers and just under 80 percent of total days of fishing. This is a clear indication that Georgia resident anglers, on average, spend more days fishing than nonresidents (10 days for residents compared with 4 days for nonresidents). Additionally, in 1996, the USFWS-SFHW estimated 874,000 total trips, with 84 percent of these being Georgia residents.

The USFWS-SFHW estimated that, in 1996, a total of $51.8 million was spent on saltwater fishing in Georgia. This total included expenditures of $9.0 million in food and lodging, $7.5 million in transportation, $8.3 million for equipment, and other trip costs of $27.1 million. The USFWS-SFHW also estimated a total of 164,000 spenders in Georgia with average expenditures of $315 per spender and $349 per angler.

Exhibit. 18. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation
Georgia Saltwater Fishing

**1996 Saltwater Anglers**

*16 years old and older*

| Anglers, trips, and days of fishing | Total | | State Residents | | Nonresidents | |
|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent |
| **Total anglers (thousands)** | 138 | 100% | 80 | 58% | 57 | 41% |
| **Total trips (thousands)** | 874 | 100% | 731 | 84% | 143 | 16% |
| **Total days of fishing (thousands)** | 993 | 100% | 787 | 79% | 206 | 21% |
| **Average days of fishing** | 7 | | 10 | | 4 | |

**Saltwater Anglers and Days of Fishing: 1991 - 1996**

*16 years old and older*

| Anglers and days of fishing | 1991 | 1996 | % Change 1991 - 1996 |
|---|---|---|---|
| | 72 | 138 | 91.7% |
| **Residents** | 42 | 80 | 90.5% |
| **Non residents** | 30 | 57 | 90.0% |
| **Days** | 606 | 993 | 63.9% |
| **Residents** | 463 | 787 | 70.0% |
| **Non residents** | 143 | 206 | 44.1% |

**1996 Saltwater Fishing Trip and Equipment Expenditures**

*16 years old and older*

| Expenditure item | Anount ($) | Spenders (#) | Average $ per Spender | Average $ per Angler |
|---|---|---|---|---|
| **Total (thousands)** | 51,752 | 164 | 315 | 349 |
| **Food and lodging** | 8,960 | 97 | 92 | 65 |
| **Transportation** | 7,486 | 109 | 68 | 54 |
| **Other trip costs** | 27,052 | 114 | 237 | 197 |
| **Equipment** | 8,253 | 78 | 106 | 32 |

The ASA took these USFWS-SFHW results one step further and estimated the total economic impact of sportfishing for Georgia, including the full multiplier effects. The following is the methodology that the

ASA used to calculate these economic impacts. This description came directly from the ASA website, www.asafishing.org/statistics/economic/methods.htm.

Economic Impact Procedures

The following is a brief summary of the methodology used to derive the economic impacts presented in this report. The impacts were calculated through a five-step process:

1. Calculate expenditures made to purchase products and services related to sport fishing and disaggregate by type of fishing (freshwater, saltwater, Great Lakes), as appropriate.

2. Disaggregate estimated expenditures into retail, wholesale, and manufacturing portions, as needed.

3. Derive economic multipliers from the RIMS II input-output model.

4. Estimate total economic impacts by combining the multipliers with the corresponding expenditure estimates.

5. Estimate tax revenues using expenditure data and sales tax rates for state sales tax revenue, and earnings and jobs data with income tax rates for state and federal income tax revenue.

Each step is discussed in greater detail below.

Calculate and Disaggregate Direct Expenditures

National Survey respondents were asked to provide information on their fishing-related expenditures which were divided into the following categories: 1) trip-related; 2) fishing equipment; 3) auxiliary equipment; 4) special equipment; and 5) other expenditures. A detailed listing of the components of each of these categories can be found in Appendix A.

Anglers reported, for each state they fished in, their share of trip-related expenditures for freshwater, Great Lakes and saltwater trips. In the remaining expenditure categories, anglers were asked for the total amount spent for a particular good or service and then asked to specify whether it was used predominantly for freshwater, saltwater or Great Lakes fishing. If the respondent was unable to specify the type of fishing associated with a given expenditure because it was used for more than one type of fishing, the expenditure was assigned to an "unable to specify" category for inclusion in state totals only.

Anglers were also asked to report their state of residence in order to determine what part of expenditures was made by in-state and out-of-state anglers. In addition, anglers who traveled from their home state to another state to fish were asked where their non-trip related expenditures took place so that each expenditure could be included in the appropriate state expenditure calculations.

Disaggregate Expenditures by Market Component

The next step was to calculate trade margins and market portions. Retail purchases were disaggregated into three components: retail, wholesale, and manufacturing portions. This procedure allowed for representing the percent of total sales accruing to retailers, wholesalers, and manufacturers. For example, fishing reels have a manufacturing portion of 43%, meaning that 43% of all money spent on fishing reels accrues to manufacturers. The sum of the portions for a product totals 100%. Expenditures are multiplied by portions to estimate the amount of money flowing into each component of the industry as a result of sport fishing expenditures.

For some products no portions were used, as all money was assumed to accrue to the retail level. This is true of all services considered in the survey, since there is no wholesale or manufacturing level for services.

Retail and wholesale margins (the percentage markup made over costs by retailers or wholesalers) were calculated using gross margin and sales data from the U.S. Census Bureau publications "The Annual Retail Trade Survey: 1986 to 1996" and "The Annual Benchmark Report for Wholesale Trade: January 1987 to February 1997" for 1995 retail and wholesale sectors. Gross margins were divided by the corresponding sales figures to calculate the margins for the retailers and wholesalers in question. These margins were then used to calculate the percentage of an expenditure which can be attributed to retailers and wholesalers for a given product. The formulae used were:

Retailer portion = R / (1+R)

Wholesaler portion = W / [(1+R) * (1+W)]

where W = wholesale margin and R = retail margin.

Manufacturing portions were then calculated by subtracting retail and wholesale portions from 100 percent.

Market portions were calculated for industry sectors as classified by Standard Industrial Classification codes. Market portions were determined for the economy at the national level only, due to the unavailability of state-specific data.

Multipliers

The multipliers used in this analysis are derived from the Regional Input-Output Modeling System (RIMS II) model developed by the Bureau of Economic Analysis of the Department of Commerce. RIMS II multipliers yield estimates of economic impacts including direct, indirect, and induced effects. Direct effects of expenditures on a product produced by industry Y capture the initial expenditure on a good and the cost of inputs (goods and services) used by industry Y in producing that good. Indirect effects account for the additional production across all industries needed to meet industry Y's direct requirements. Induced effects capture the additional production required to meet consumer demand generated by payments from industry Y to households for their labor inputs.

RIMS II provides multipliers to estimate the output, earnings and jobs generated in a region for every dollar spent by consumers on the products of a particular industry. Separate multipliers are used for each of the retail, wholesale and manufacturing portions of an industry, reflecting differences in the nature of these distinct operations. For example a RIMS II national level output multiplier of 2.8315 for motor vehicle retailers in the U.S. would mean that for every dollar earned by a motor vehicle retailer in the U.S., the output generated across all related industries in the U.S. would be $2.83.

For most expenditure categories, there are nine multipliers, to calculate output, earnings and jobs generated from each dollar earned by retailers, wholesalers and manufacturers. The exceptions are service industries where there are no wholesale or manufacturing components and other sectors that do not encompass all three market components.

Combining Expenditures with Multipliers

To calculate economic impacts, expenditures are first multiplied by the market portions accruing to retailers, wholesalers, and manufacturers. Output, earnings and job multipliers are then multiplied by these disaggregated expenditures to arrive at the economic impacts attributable to the separate market components. The retail, wholesale and manufacturing impacts are then summed to arrive at the total output, earnings and jobs generated from each expenditure category.

Tax Revenues

State sales tax revenues were calculated by multiplying expenditures on goods and services by the respective state sales tax rates and fuel expenditures by fuel tax rates from 1996. Tables providing sales and fuel tax information were obtained from the Commerce Clearing House's State Tax Guide. Prevailing gas prices were obtained from the Census Bureau of most state income tax systems.

Income tax figures could not be calculated simply from earnings because of the progressive nature of most state income tax systems. Instead, income tax revenues were estimated by calculating earnings per job for each state. The taxes paid on this average level of earnings were determined using income tax tables from the Commerce Clearing House. The average earnings per job were reduced by the applicable standard deductions and exemptions to approximate the taxable portion of earnings subject to income taxes. The taxes per job were then multiplied by the total number of jobs to provide an estimated total income tax figure. Federal income tax revenues were estimated in the same fashion, using 1996 Internal Revenue Service tax tables.

The ASA estimated that in 1996, 137,463 saltwater anglers spent over $57 million dollars on their sport in the state of Georgia. These expenditures multiplied through the local, regional and national economy with a total impact of almost $117 million dollars. These expenditures supported 1,576 jobs accounting for $32 million in saltwater fishing related wages and salaries.

Combined with freshwater fishing, all sportfishing expenditures in the state of Georgia in 1996 totaled $1.2 billion. Saltwater expenditures accounted for only 5.1 percent of this total. The total economic impact of sportfishing in Georgia was $2.3 billion, with saltwater also making up only 5.1 percent of this total. Detailed results can be seen in the appendix.

*Marine Recreational Fishing Resident Demographics.* The NMFS supplemented the data collected as part of MRFSS with an add-on telephone survey during the period of March 1997 to February 1998 of households in the coastal states of the Southeastern U.S. This survey was aimed at collecting socioeconomic data to develop age, gender, and ethnicity profiles of resident marine recreational fishing participants. These data were also used to develop population cohort participation rates that were combined with U.S. Census Bureau population projections to provide forecasts of marine recreational fishing through 2025. These forecasts did not include nonresident participants who may be a sizeable share of participation in some states.

Estimates of marine recreational fishing participation in the Southeast have been developed since 1981 by NMFS. While participation in several states, including Florida, Louisiana, and South Carolina, peaked in the early 1980s and have declined in recent years, participation in Georgia has remained relatively steady at around 3 percent. It also should be highlighted that Georgia has had the lowest participation rate each year since 1981.

While there is a wide range of participation rates among the Southeastern coastal states, the estimated number of participants for the states is much more consistent, with the exception of Florida, with estimates in the 2.5 million range. Georgia has historically had estimated participation right around 100,000, the lowest in the Southeast region. South Carolina and Alabama have had similar levels of participation.

The following is a summary of the demographics of marine recreational fishing participants in the Southeast. Seventy percent of the participants were estimated to be male, which is consistent across all the states in the region. In Georgia, 30 percent of the participants are in the 36-45 age group. Eighty six percent are white and 11 percent are black. The household income of Georgia participants is similar to that of the other states.

Georgia's marine recreational fishing participants is expected to grow by 37 percent from 1997 to 2025. This growth is second only to Florida, which is estimated to grow 46 percent for that period. South Carolina is expected to grow by 29 percent through 2025.

A separate NMFS report titled The Economic Value of Marine Recreational Fishing in the Southeast United States, just published in July 2000, estimated a useful pieces of analysis: the willingness to pay for a one unit fish increase in historic catch and keep rates per trip. There is a fairly consistent willingness to pay for an additional fish across all states. It was estimated that in Georgia, fishermen would pay $14.44 to catch an additional big game fish, $6.41 for an additional small game fish, $2.98 for an additional bottom fish, and $22.14 for an additional flat fish (i.e., flounder).

*Marine Recreational Diving.* As noted above, we had less information to work with for diving than for fishing. The literature review did not reveal any existing studies on recreational diving in Georgia. The one source that I could identify is Dun and Bradstreet's database iMarket. Dun and Bradstreet collects employee and sales data for every business in the United States. The database used for this study is for the year 2000.

In Georgia, thirty-eight companies operate under the Standard Industrial Classification (SIC) codes 5941-0501 Retail skin diving, scuba equipment and supplies and 7999-1116 Scuba and skin diving instruction. These 38 companies employ 143 people with a total sales of 13.1 million dollars annually.

Of these 38 companies providing recreational diving services, it is likely that most cater to freshwater recreational diving or organize trips out of state. Six diving operations are located in the coastal counties. One is in Camden, 3 are in Chatham, 1 is in Glynn, and one is in Ware. These 5 companies had revenues of approximately $2 million annually. Bibb County, located in the center of the state and containing the city of Macon, has a single diving operation with $5.3 million in revenue annually. There are 16 companies in the counties surrounding Atlanta that provide diving products and services, with annual revenues of about $4 million.

One dive shops has been identified as offering trips to Gray's Reef, Island Dive Center out of St. Simmons Island. In addition, two others in the coastal counties could possibly offer Gray's Reef trips, or do so in the future.

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