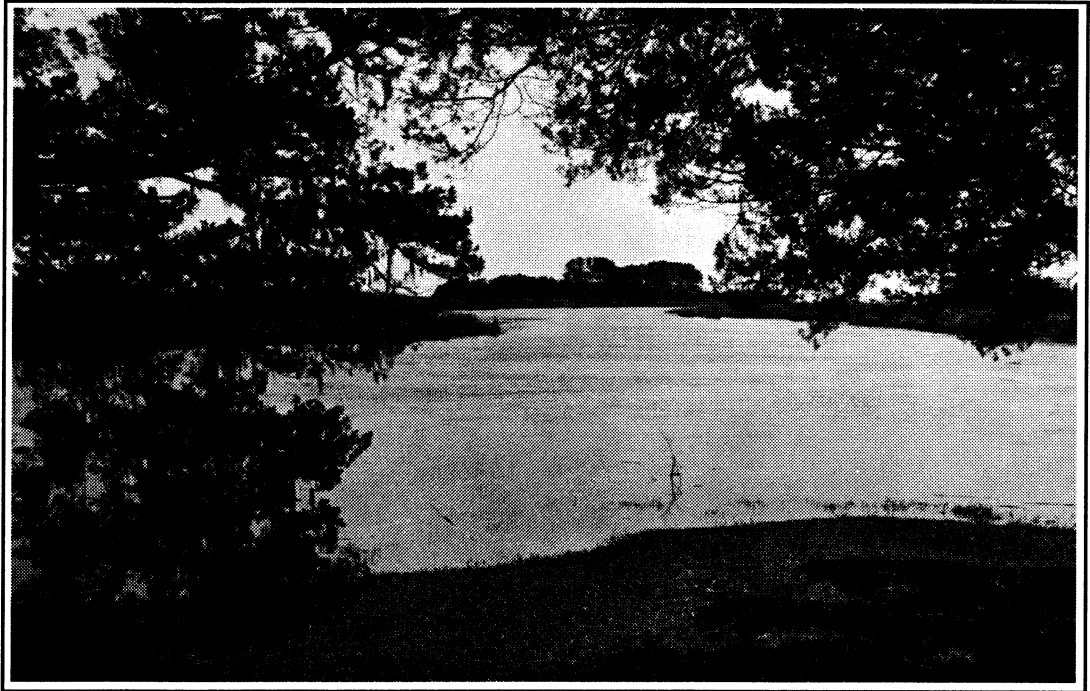


CHAPTER TWO: GEORGIA'S COAST



And now from the Vast of the Lord will the waters of sleep
Roll in on the souls of men,
But who will reveal to our waking ken
The forms that swim and the shapes that creep
Under the waters of sleep?
And I would I could know what swimmeth below when the tide comes in
On the length and the breadth of the marvelous marshes of Glynn.

Sydney Lanier
The Marshes of Glynn



SECTION I: INTRODUCTION

Across the United States, over 50% of the population lives along the coast in an area of land that comprises only 18% of the nation's total land area. Coastal populations are expected to increase 15% -- to 127 million people -- by the year 2010. This population growth creates increased and often conflicting demands for commercial, residential, industrial, and recreational development, thereby placing tremendous pressure on the nation's coastal resources.

The situation in Georgia is very similar. With over 2,344 linear miles of coastline, Georgia's coastal area is enriched with abundant marshes, barrier islands, beaches, river corridors, maritime forests, and uplands. To date, the Georgia coast has been relatively undeveloped, due to the fact that many of Georgia's barrier islands are not easily accessible and much of the available developable land is currently being managed for timber production. Pressures from increasing population and development, however, are threatening the quality of life on the coast. The population of coastal Georgia is growing at approximately 20% per decade. Along with this increased population growth comes the pressure to develop environmentally sensitive areas such as wetlands, floodplains, and barrier islands. A long-range resource management plan is needed to continue an acceptable level of protection while providing for compatible economic development. Thoughtful resource management will ensure that future generations also have the opportunity to enjoy the Georgia coast.

In order to be successful, any comprehensive planning effort must take into account many factors including history, natural environment and climate, economy, population and demographics, and regional land uses. An overview of these factors in the Georgia coastal area follows.

SECTION II: HISTORY

The Native Americans were the first known settlers of coastal Georgia, over 10,000 years ago. Changes in sea level have made it difficult to obtain archaeological evidence for an exact date of the first human habitation. A band of the Creek Indian tribe inhabited most of the Georgia coast at the time of Spanish arrival in 1540. The Creeks lived off of the land, farming and fishing for subsistence. Large shell middens, composed mainly of oyster shells, can be found on most of Georgia's barrier islands. The oldest shell midden is located on Sapelo Island and has been dated back 5,800 years.

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Following the formal conquest of Florida by De Soto in 1539, the Spanish occupied the Georgia coast from 1540 to 1680, building missions and attempting to convert the Indians to Christianity. They called the area Guale (pronounced "wally"), after a Native American who received the Spanish hospitably on St. Catherine's Island. Missions were established first on St. Catherine's Island around 1566 and then on St. Simons in the late 1590s. These missions began to disappear toward the end of the 1600s due to Indian uprisings and disease. The Spanish are credited with introducing fruits (figs, pomegranates, oranges) and domesticated hogs and goats, as well as the durable "tabby" building material. A mixture of crushed oyster shells, water, and sand, "tabby" was molded and used by the Spaniards to construct missions and other buildings. In the late 1600s, as the British and Native American tribes invaded the area from colonies at Charleston, South Carolina, the Spanish retreated to Florida.

The area remained largely uninhabited from 1690 until the 1720s, with the notable exception of the famous pirate Edward Teach, otherwise known as "Blackbeard." He used the Georgia coast as his refuge, and roamed the coasts of the Carolinas, Florida, and the West Indies until his capture and execution in 1718. According to local legend, buried treasure remains undiscovered on Georgia's Blackbeard Island to this day.

In the early 1700s, the British began to establish permanent colonies in coastal Georgia when the region was ceded to General James Oglethorpe as a buffer between the Spanish colonies in Florida and the British colonies in South Carolina. In 1721, Colonel John Barnwell began construction of Fort King George near Darien. In 1733, Oglethorpe settled Savannah and built Fort Frederica. He built Fort St. Simons on St. Simons Island three years later. Formed from lands ceded from South Carolina, the new colony was named Georgia in honor of King George II. English citizens were offered free passage, a land grant, and three years of support to settle in the new colony. Scottish Highlanders, mostly from the McIntosh clan, were offered the same opportunity as the English, and many accepted. The Scottish settled the town of Darien at the mouth of the Altamaha River. A few large plantations were established to grow cotton, indigo, and rice. Many of the citizens hunted and trapped the abundant wild game (deer, wild turkey, and furbearers) in the area.

The Spanish were not pleased with the English colonization efforts, and demanded that all of Georgia be returned to Spain. Britain declared war on Spain in December of 1739, and the Spanish attacked St. Simons Island in 1742 with over 50 ships and over 5,000 men. Oglethorpe, with only 650 men including Scottish Highlanders from the Altamaha River area and Creek Indians, repelled the Spanish in the Battle of Bloody Marsh. Thus, England took control of the Georgia territory and all points north.

Slavery began in the 1740s in coastal Georgia, despite being vehemently opposed by the Scottish Highlanders. Oglethorpe returned to England in 1743 and passed away in 1785 at the age of 89. Fort Frederica was destroyed by fire in 1758, and was abandoned. Much of the property on

St. Simons was given to British soldiers for their service in the military, but most returned to England at the beginning of the Revolutionary War. Those that remained purchased slaves and began to clear and dike off large tracts of river swamp land to grow rice and cotton. During the Revolutionary War, much of coastal Georgia was ravaged by the British army. Homes were looted and burned, and people were murdered by troops loyal to the Crown of England. The coast would soon recover economically due to abundant timber and the introduction of sea-island cotton from the West Indies.

The period from the late 1700s up to the Civil War was marked by the production of naval stores (tar, pitch, turpentine) and the cultivation and harvest of live oak timber, rice, indigo, and cotton. The naval stores and timber were needed for the growing shipbuilding industry. Live oak, which grew on the Georgia coast, was the ideal lumber for building ships because of its strength and resistance to rotting. With the Industrial Revolution going on in England, cotton was in great demand to supply the cotton gins and textile mills. Due to the fertile soils and suitable climate, the Georgia coast provided the ideal conditions to grow high quality cotton. Many large plantations were established on coastal islands to cultivate this highly valuable sea island cotton. Vast areas of forest and swamp were cleared and drained for the timber and for land to cultivate. Timber, indigo, and cotton cultivation and harvest began to decline in the late 1800s, signalling the end of the plantation period. Most of the live oak forests had been harvested by this time. At the same time, the demand and price for indigo and cotton in England declined and the boll weevil decimated existing crops. Rice production reached its peak just prior to the Civil War in 1860. Coupled with the onset of the Civil War and the loss of slave labor, the plantation period in Georgia came to an end. After the Civil War, freed slaves populated many areas of the Georgia coast, particularly Sapelo Island. The coast quickly went from one of the most prosperous regions of the country to one of the poorest.

From the 1870s to the 1900s, during Reconstruction, the region tried to recover from the economic decline. Lumber mills began to appear on the Georgia coast. With most of the live oak already harvested, the mills sawed cypress, pine, and other oaks into lumber for export to Europe. The timber was floated down the Satilla and Altamaha rivers to the mills at Darien and St. Simons. Many of the small marsh hammock islands in the vicinity of the old sawmills were formed from the discarded ballast stones of the old schooners used to transport lumber to Europe.

During the early 1900s, people began to discover coastal Georgia as an ideal resort destination. Savannah, St. Simons Island, Jekyll Island, and Cumberland Island were home to the cottages and summer villas of the nation's wealthiest families such as the Pulitzers, Carnegies, Reynolds, and Staffords. The cities of Savannah and Brunswick played an important role in national defense during World War II by building liberty ships. The Eighth Army Air Force, an important contingent in the European air battle during World War II, was formed in the City of Savannah. The coast continues to support national defense today, with Fort Stewart Army Base in Hinesville, Hunter Army Air Field in Savannah, and Kings Bay Naval Submarine Base in St. Marys.

Continuing the trends of the past few decades, the Georgia coast is growing at a rapid pace. Timber, agriculture, and related manufacturing plants dominate the coastal economy. Tourism and related service industries are increasing, and the Georgia coast also is a popular area for permanent residence. Many of the coastal counties have seen exponential growth in population due to the influx of tourism and the placement of military bases in the area. There remain areas of the coast where culturally and historically significant communities exist. Hog Hammock on Sapelo Island is one such community that carries on the traditions and heritage of the early African American inhabitants of Georgia. Many other historic sites enrich the Georgia coast, such as Fort Frederica, the Battle Site at Bloody Marsh, Fort Pulaski, Fort King George, and numerous historic districts, neighborhoods, commercial areas, homes, schools, and churches. A well-balanced, conscientious planning effort is needed to ensure that these historical resources remain in place for future generations.

SECTION III: NATURAL ENVIRONMENT AND CLIMATE

The Georgia coast is an interrelated system of productive coastal marine waters, barrier islands, estuaries, coastal marshlands, rivers, and associated upland areas. The westernmost portion of the United States on the Atlantic seaboard, Georgia's coast is located approximately in the center of the South Atlantic Bight. The broad, gentle slope of the continental shelf stretches 95 miles off the shoreline. On the shelf, many hard and soft bottom habitats can be found. "Live bottom" areas occur naturally where limestone outcroppings are exposed on the seafloor, allowing marine animals and plants to settle and colonize. The Gray's Reef National Marine Sanctuary, located approximately 15 miles east of Sapelo Island, is a natural reef community with an abundance of live bottom habitat in 60 to 70 feet of water on the continental shelf. Artificial reef communities have been created in some areas by sinking barges, World War II liberty ships, and other material that encourages reef organisms to settle and grow. The coastal marine waters off of Georgia provide habitat for many oceanic birds, sea turtles, marine mammals, crustaceans, and fishes. Marine wildlife includes endangered right whales, manatees, sea turtles (Kemp's ridley, hawksbill, and leatherback), and least terns. Many commercially-important species, such as snapper and grouper, live and breed in these waters.

A chain of eight main groups of barrier islands, stretching over 100 miles from northernmost Tybee Island near the South Carolina border south to Cumberland Island near the Florida border, buffers the marshes and mainland from the forces of the Atlantic Ocean. These islands have built up over the past forty thousand years due to shifting sand, creating over 94

linear miles of beachfront. Wave energy on the Georgia coast is generally low due to the broad, shallow continental shelf offshore. Most of this wave energy is dissipated by friction across the bottom of the shelf as waves move toward shore. Sand bars and shoals also help reduce wave energy close to shore, protecting against erosion and property damage. The islands and their associated dune, live oak, pine forest, and marsh communities also support an abundance of wildlife. Loggerhead, green, and leatherback sea turtles use Georgia beaches for nesting habitat. Ospreys, brown pelicans, egrets, shorebirds, and many species of sea gulls are a common sight in this area.

Six major watersheds terminate at the Georgia coastline, forming an extensive estuarine ecosystem. When freshwater from rivers mixes with and dilutes saltwater from the ocean, both water bodies contribute their own chemical and physical characteristics. This combination of properties creates a richly diverse and highly productive natural habitat. About 75% of commercially important fish and shellfish in the nation are estuarine-dependent. These species rely on estuaries and upper reaches of tidal rivers and streams for early life-state food, migration, and spawning. Georgia's coastal estuaries and associated aquatic ecosystems form a critical component in the life cycles of sport fishes such as spotted seatrout and red drum; commercial species such as shrimp, blue crabs, and oysters; and endangered species such as manatees and shortnose sturgeon. Fragile estuarine ecosystems establish the foundation for the interrelationship of many marine plants and animals with their environment. Without estuaries, that life could not exist.

Moving inland, a broad band of coastal marshlands covering 378,000 acres separates the barrier islands from the mainland. Poet Sidney Lanier immortalized these marshes in his famous poem, "The Marshes of Glynn." Measuring three to five miles wide in some places, Georgia's marshlands constitute one-third of the remaining salt marsh along the U.S. Atlantic coast. The marshes are dominated by cordgrass (*Spartina alterniflora*), which supports a highly productive food chain. High nutrient levels are transported in and out of the system by daily tidal cycles, thus supporting a rich habitat for fish, birds, crustaceans, and other wildlife. Herons, egrets, redwing blackbirds, oysters, red drum, sea trout, blue crabs, and white shrimp are common here. The area experiences an average tidal range of 6 to 8 feet, with tides of 9 to 11 feet possible on spring tides. These tidal ranges are several feet larger than the adjacent states of Florida, South Carolina, and North Carolina due to Georgia's location in the center of the South Atlantic Bight. This wide tidal range is the main reason Georgia has such an abundance of salt marsh.

Further to the west, brackish and freshwater marshes and swamps extend inland up rivers and streams. This area is generally flat and occupied by live oak, tupelo gum, and cypress swamps. These marshes and swamps serve to recharge the shallow groundwater aquifer and reduce the duration and magnitude of flood events. Wetlands function like sponges to retain floodwaters, filter out sediment and other contaminants, and slowly release the water over time to the rivers. These swamps also provide important habitat for wildlife, including endangered and

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threatened species such as the bald eagle and wood stork. Large numbers of migratory waterfowl (scaup, mergansers, mallards, coots) and wading birds (snipe, woodcock, yellowlegs) use these places as "staging" (resting and feeding) areas on the way to their wintering grounds in Central and South America. Several major coastal plain rivers feed these wetlands, including the Savannah, Ogeechee, Canoochee, Altamaha, Satilla, and St. Marys. Most of these rivers provide critical habitat for the endangered shortnose sturgeon and anadromous fish stocks. All of Georgia's coastal rivers carry large amounts of sediments to the sea, helping to build new land and to keep up with sea level rise over time.

Much of the coastal mainland is heavily forested with slash, spruce, loblolly, and longleaf pines. Forests that are less managed are populated with a mixture of pines, hardwoods, and other species such as oak, hickory, magnolia, bay, palmetto, and dogwood. The pine and hardwood forests are home to many bird species, such as the endangered red-cockaded woodpecker and many birds of prey, such as red-tailed hawks, turkey vultures, and great horned owls. Many game species, such as feral hogs, whitetail deer, black bear, wild turkey, and bobwhite quail, can also be found in these forested communities.

The marine subtropical climate of the Georgia coast is heavily influenced by the Atlantic Ocean and other meteorological and climatic features common to the southerly latitudes. The climate is moderate, with short, mild winters and long, humid springs and falls. Temperatures in the region average 52 degrees Fahrenheit in the winter, 65 degrees Fahrenheit in the spring, 80 degrees Fahrenheit in the summer, and 67 degrees Fahrenheit in the fall. Ocean and sea breezes tend to moderate temperatures along the coast. Rainfall averages 30 to 50 inches per year, half of which comes from summer thunderstorms. During the summer, the area is dominated by a large high-pressure system called the Bermuda High that diverts most of the continental frontal storms away from the southeast.

The Bermuda High disintegrates in late summer, allowing frontal passages to return. May through November is considered hurricane season. Historically, tropical storms and hurricanes impact the Georgia coast on the average of once every ten years. Coastal flooding resulting from hurricane-induced storm surges and long-term beach erosion poses a substantial danger to life and property on the low-lying barrier islands and mainland. The storms cost many lives and result in millions of dollars in property damage in the coastal zone due to high winds, flooding, and rainfall. Strong northeasters impact the coast more frequently than hurricanes and supply much of the rain in late fall, winter, and spring.

SECTION IV: COASTAL ECONOMY

The coast of Georgia enjoys a dynamic and diverse economy based largely on the region's abundant resources, including natural waterways, groundwater, pine forests, fisheries, and natural and historic features. Regional unemployment figures (1991) ranged from a high of 7.6% in Brantley County to a low of 3.6% in Camden County. The eleven-county average of 5.4% unemployment is in line with the Georgia statewide unemployment figure of 5.0%. Median income figures for the area ranged from a high of \$29,443 in Effingham County to a low of \$18,802 in Long County. Per capita incomes ranged from \$17,776 in Chatham County to \$8,080 in Long County.

The average median income and per capita income for the region during 1989-1990 was \$24,381 and \$12,630 respectively. Both averages are approximately 20% lower than the Georgia statewide average median income of \$29,021 and average per capita income of \$17,045. In 1989, 17.3% of the region's citizens were below the poverty level (\$12,674 for a family of four) versus the state average of 14.7% below the poverty level. Camden County had the lowest poverty level of 11.5%, while Long County had the highest at 23.7%.

The eleven-county coastal area accounted for \$6.2 billion in total buying power, about 6% of the Georgia State total of \$97 billion. Seventy percent of that buying power (\$4.3 billion) came from Chatham and Glynn counties. These figures show the wide range of wealth in the Georgia coastal area, and the tendency for that wealth to be clustered near the population centers of Savannah and Brunswick and the military facilities of Camden and Liberty counties, and absent from the rural counties of Brantley, Charlton, Long, McIntosh, and Wayne.

Extensive plantings of pine forests signify the importance of the timber industry in coastal Georgia. Timber activities include forestry management and harvesting, paper pulp processing, distilling pine products, and timber production. The long summer growing periods, plentiful rainfall, fertile soils, and access to large quantities of groundwater make the coastal area very conducive to timber growth and processing. Commercial forests cover much of the land area in the Georgia coastal area and produced a total income (from sawtimber and pulpwood) of \$110.5 million in 1993. Georgia Pacific pulp mill employs 850 people, and the Hercules plant, which distills pine oils, employs 544 people. Union Camp Corporation in Savannah employs 2,800 people. Riceboro Interstate Paper Corporation, ITT Rayonier (Jesup), Stone Container Corporation (Savannah), and Fort Howard Paper Corporation (Rincon) collectively employ another 3,200 people.

Other major manufactures in the Savannah area include Gulfstream Aerospace (jet aircraft), Great Dane Trailers (truck trailers), Savannah Sugar Refinery (refined sugar), and

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Kemira, Incorporated (Titanium Dioxide). Major manufacturing operations in the Savannah area provided a total of 15,800 jobs in 1993.

Row crop agriculture as well as livestock and poultry operations are also an important economic activity, especially in the second tier of coastal counties (Effingham, Long, Wayne, Brantley, and Charlton). In 1987, the eleven coastal counties contained 1195 individual farms, encompassing 7.3% of the total coastal land area. Tobacco is the most important row crop, along with corn, soybeans, peanuts, and cotton. Approximately 19,000 head of cattle are raised in the coastal zone, along with about 17,800 hogs and pigs and several million chickens.

Water-borne commerce and associated port development provides significant employment and revenue in coastal Georgia due to protected waterways, suitable physical port locations, and attractive local and regional markets. Savannah and Brunswick are the two major ports in Georgia that possess modern docking, storage, and land transportation facilities. Kings Bay Naval Submarine Base also has significant dockage facilities, but it is used exclusively by the U.S. Navy. In 1989, Savannah and Brunswick handled almost 15 million tons of cargo. Products landed and shipped from Georgia ports range from automobiles and wood products to grains and gypsum. The 138 mile long Georgia segment of the Atlantic Intracoastal Waterway supports substantial barge and other commercial traffic. While economically important, commercial port operations may also affect the coastal natural and recreational environment due to the need for dredging, competing shoreline uses, water quality degradation, and reduced water safety.

The commercial fishing and seafood processing industry is yet another important economic factor on the Georgia coast. In 1995, there were approximately 2,500 commercial fishers in Georgia, principally trawling for shrimp. Blue crabs, whelks, clams, and oysters are also commercially-important species. In 1995, approximately 7 million pounds of shrimp valued at \$27 million, approximately 9 million pounds of blue crabs valued at \$5 million, and approximately 1.3 million pounds of all other species (snapper, grouper, oysters, clams, and other finfish and shellfish) valued at over \$1.3 million were landed in Georgia. In that same year, 1,131 people were employed in 11 seafood packing and processing houses, along with 50 wholesale seafood dealers employing over 100 people. Rich-Sea Pak and King and Prince, two large seafood processing houses, employ approximately 800 and 600 people, respectively.

Recreation and tourism is also an integral component of the coastal economy. The natural, relatively undisturbed shorelines and beaches of Georgia coupled with the temperate climate make coastal Georgia an attractive vacation destination. Abundant natural and historic resources, such as the National Historic Landmark districts in Savannah and Jekyll Island, Cumberland Island National Seashore, Fort Frederica National Historical Monument, top-class golf courses, and abundant recreational fisheries, add to the allure of the area. Four State Parks and four State Historical Sites are operated by the State of Georgia and are open to the public. A 1994 survey estimated 443,717 anglers participate in saltwater fishing in Georgia. These fishers catch over

three million fish, creating an expenditure of \$53.4 million annually, as well as a total economic value of over \$250 million annually. Other popular activities include tennis, golfing, sailing, and scuba diving. Boating and fishing are other popular recreational activities, with almost 25,000 boats registered in coastal Georgia and over 40 marinas and 36 public boat ramps to serve them.

Savannah area visitors totalled 5.4 million in 1993, generating almost \$616 million in spending and supporting 18,000 full-time jobs. In Glynn County in 1995, 1.53 million tourists spent over \$699,874,553 dollars, supporting 15,322 full-time jobs annually. The total impact from tourism in the Georgia coastal area was estimated at around \$1.39 billion in 1993. Tourism continues to grow each year, and more people are choosing coastal Georgia as a place to retire. A comprehensive planning effort is needed for any future development and resource utilization to protect the natural and historic resources from environmental, aesthetic, and economic damage.

National defense-related complexes are another major component of the coastal Georgia economy. These facilities employ a large number of personnel, which results in economic growth of the surrounding communities. Camden County and Liberty County have both experienced tremendous growth from Kings Bay Naval Submarine Base and Fort Stewart Army Base, respectively. The Kings Bay facility is home for 5 to 10 Trident nuclear submarines and employs 9,000 people. Fort Stewart, which is the largest Army base east of the Mississippi, had 19,000 employees in 1993. Also in 1993, Hunter Army Air Field in Savannah employed 4,800 personnel. United States Coast Guard personnel in Savannah and Brunswick are economically important to their communities. The Federal Law Enforcement Training Center (FLETC) in Brunswick trains law enforcement personnel for over 70 federal agencies, employing approximately 1,300 people and graduating 25,000 people annually.

SECTION V: POPULATION CHARACTERISTICS

The eleven-county coastal area of Georgia has a combined population of 460,233 people according to the 1990 Census. At that time, approximately 66.9% were white, 31.2% were black, 1.7% were Hispanic, and 1.9% were of other descent. The population is mainly centered around the Savannah area (Chatham, Effingham, and Bryan Counties), with smaller centers around Brunswick (Glynn County) and Kingsland/St. Marys (Camden County). The overall population of the region, however, is largely rural (66.8%). With 430 people per square mile, only Chatham County's population density exceeds the State average of 112 people per square mile. The emigration of people out of Chatham County, along with the immigration of people to surrounding Effingham and Bryan Counties, suggests that people are moving out of metropolitan Savannah to the suburbs.

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The coastal population continues to grow from tourism on Tybee Island, Sea Island, St. Simons Island, and Jekyll Island, and from military bases in Camden, Liberty, and Long counties (Kings Bay Naval Submarine Base and Fort Stewart Army Base). According to the 1990 Census, a substantial 23% increase from 1990 is predicted for coastal Georgia in the future. This increase continues a trend in population growth on the coast which has exceeded 200% since 1930 in some counties. Liberty County and Camden County have experienced a remarkable 547% and 376% increase in population respectively since 1930, due largely to the placement of military bases in those counties.

SECTION VI: COASTAL LAND USE

The eleven-county coastal area of Georgia encompasses approximately 6,409 square miles (4,101,952 acres), with an average population density of 82 people per square mile. Of the total area, 5,637 square miles (3,611,661 acres) is land, and 772 square miles (494,080 acres) is water. Seventy-five percent (4313 square miles or 2,760,455 acres) of the land area is forested, and only 25% (1330 square miles or 851,216 acres) is non-forested. Although there are clusters of intense development, much of the Georgia coast remains relatively undeveloped. As of the mid-1980s, only 4% (less than 100,000 acres) of the coast was considered developed. Of that, 3.3% (80,000 acres) was classified as residential, 0.3% (6,000 acres) as commercial, and 0.4% (11,000 acres) as industrial. There is no shortage of developable land (currently estimated at 32% of the total land area); however, there is a need for better management of growth and better planning for development to insure that the region retains its growth potential and habitability.

Georgia has more acres in forest management than any other state, and forestry activities account for 71% (4,005 square miles or 2,563,294 acres) of the total acreage in the Georgia coastal area. Approximately 49% of the timberland is owned by industry, 39% is privately-owned, and 12% is owned by the government. The soils and climate of the area also make it conducive to growing crops due to the long growing season and ample rainfall. The second-tier coastal counties account for most of the conventional agricultural activities, such as row crop cultivation and livestock husbandry.

Commercial and industrial development along the Georgia coast is also an important land use with many positive economic benefits. Ports and waterborne commerce-related facilities, gypsum and sheet rock plants, pulp and paper mills, and public utility companies are a few examples of industries along the coast. The coastal area of Georgia has been attractive to industry for many reasons, including the proximity to water transportation, high quality groundwater resources, and nearby natural resources and raw materials. Manufacturing and other industry are

beneficial to the coastal economy, however, there can be drawbacks. Improper or unplanned development can result in waste disposal problems, toxic and hazardous waste, and water and air pollution if not properly managed. The electricity provided by utility companies in the area is generated by hydroelectric, nuclear, coal, oil, and natural gas powered plants throughout the state. However, there are no nuclear or hydroelectric plants within the eleven-county coastal area.

In fiscal year 1992-1993, the eleven-county coastal area received \$64.5 million in federal, State, and local funds to construct and maintain over 6,500 miles of public roads and highways for its citizens. In addition to roads and highways, there are several airports capable of servicing a wide variety of aircraft sizes, including major airports (Savannah International Airport and the Glynnco Jetport in Brunswick), and many smaller airfields throughout the coastal zone. The area is also served by railways such as AMTRAK, CSX, and Norfolk-Southern. In addition, the entire Georgia coastal area is within two hours of the Jacksonville, Florida or the Charleston, South Carolina metropolitan area.

There is a large military and national defense presence in coastal Georgia. The Kings Bay Naval Submarine Base, Hunter Army Air Field, and Fort Stewart Army Base are the three major installations in the area.

State and federal government entities own a wide variety of lands in coastal Georgia. Many of these areas are maintained as natural areas, and are very important to the ecological health of the area. These areas provide habitat for wildlife, control and abate floodwaters, recharge groundwater supplies, and improve surface water quality. The federal government owns and maintains many national parks, monuments, wildlife refuges, and other natural areas, including Cumberland Island National Seashore, Wassaw Island National Wildlife Refuge, Harris Neck National Wildlife Refuge, Gray's Reef National Marine Sanctuary, Fort Frederica National Monument, Fort Pulaski National Monument, Bloody Marsh National Monument, Wolf Island National Wildlife Refuge, Savannah National Wildlife Refuge, and Blackbeard Island National Wildlife Refuge. The Georgia Department of Natural Resources maintains parks and recreational areas at Skidaway Island and Crooked River; Wildlife Management Areas (WMAs) at the Altamaha River, Richmond Hill, Ossabaw Island, Paulks Pasture (lease), Sapelo Island (Richard J. Reynolds WMA), and Sansavilla (lease); State Heritage Preserves and Historic Sites at Fort King George, Fort McAllister, Wormsloe, Sunbury, Richmond Hill, Little Tybee Island, Cabbage Island and Hofwyl-Broadfield Plantation.

Many educational, medical, and other public facilities are located within the coastal area. Georgia Southern University, Savannah State College, Armstrong State College, Coastal Georgia Community College, and several other regional schools and technical colleges are all located on or near the coast. The Southeast Georgia Regional Medical Center in Brunswick; Candler, St. Josephs, and Memorial Hospitals in Savannah; and Camden Medical in St. Marys are a few of the major facilities that provide medical care to the citizens of the coast. In addition to schools and

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hospitals, a multitude of civic centers, theaters, museums, and other public facilities are also located throughout the eleven-county area.

All of these locations and facilities, with the exception of portions of the military bases, are available for the use and enjoyment of the general public.