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## *The State Senate*

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## **FINAL REPORT OF THE SENATE TYBEE ISLAND BEACH RENOURISHMENT STUDY COMMITTEE**

### **COMMITTEE MEMBERS**

**Honorable Eric Johnson  
District 1  
Chairman**

**Honorable Regina Thomas  
District 2**

**Honorable Seth Harp  
District 29**

**Prepared by the Senate Research Office  
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### **INTRODUCTION**

Senate Resolution 327, which passed the Senate during the 2007 Legislative Session, would have created the Joint Atlantic Coastal Beach Preservation and Maintenance Study Committee to examine possible options for conservation measures for Georgia' s Atlantic coastal beaches, as well as ways to fund beach preservation and maintenance, including public and private partnerships. However, Senate Resolution 327 failed to pass the House of Representatives. Therefore, the Senate Committee on Assignments created the Senate Tybee Island Beach Renourishment Study Committee (Committee) to examine the issues surrounding beach erosion and beach renourishment on Tybee Island.

The Committee was composed of three members of the Senate: Senator Eric Johnson, serving as Chairman; Senator Regina Thomas; and Senator Seth Harp.

Additionally, the legislative staff members assigned to the Committee were: Ms. Melanie Stockwell, Chief of Staff for Senator Eric Johnson; Ms. Rita Smith, Legislative Assistant to Senator Eric Johnson; and Ms. Angie Fiese, Senate Research Office.

The Committee held one meeting on Tybee Island on September 27, 2007. At this meeting, the

Committee heard testimony from: Dr. Clark Alexander, Skidaway Institute of Oceanography, Applied Coastal Research Laboratory, Georgia Southern University; Mr. Shell Solomon, Tybee Tourism Council; and Mr. Brad Pickel, American Shore and Beach Preservation Association.

Dr. Alexander presented information on coastal processes, rising sea levels, retreating shores, and beach renourishment; Mr. Solomon provided testimony regarding beach renourishment and the economy; and Mr. Pickel presented information on funding sources used in other states for beach renourishment.

### **EXECUTIVE SUMMARY**

Tybee Island is Georgia's northernmost and eleventh largest barrier island, measuring approximately 2.67 square miles long by 0.75 miles wide. It has a permanent resident population of 3,400, although this population increases greatly during the summer season.

Tybee Island, as other barrier islands in the United States, has been losing beach, especially at the northeast end, as prevailing currents, tides, and winds have moved sand southward from the island. In November 2007, the U.S. Army Corps of Engineers (USACE) published the final results of a study which examined the impact of the Savannah Harbor Federal Navigation Project (Project) on Tybee Island's beach erosion. These results confirm that the creation and continued maintenance of the Project have also caused about 70-80 percent of the erosion on certain areas of the adjoining beach and nearshore region at Tybee Island. However, the second phase of the study, which will determine the best way to replenish sand on Tybee Island for the least amount of money, could take up to two years.

The Tybee Island beaches have been renourished several times. The next scheduled beach renourishment for the island, in 2008, is expected to cost \$10 million. The federal government, in the past, has covered 60 percent of the cost, with state and local governments paying for the rest. However, this year, the U.S. Congress has failed to authorize funding for the 2008 beach renourishment project on Tybee Island.

The Mayor of Tybee Island, Jason Buelterman, enumerated the Top Five Reasons for federal funds to be made available for beach renourishment on YouTube in March 2007. See the YouTube video here: <http://www.youtube.com/watch?v=5MTydJVT5mM>.

Dr. Alexander presented information on the science of beach renourishment, specifically, coastal processes and rising sea levels associated with beach erosion on Tybee Island. He also detailed the USACE's requirements regarding possible sediment transport from the Project to renourish the beaches on Tybee Island. Mr. Solomon emphasized the importance of a healthy beach for the state's tourism industry, as well as for the livelihood of the people and businesses on Tybee Island.

The Committee also received a study, titled "The Economic Impact of Tybee Island Beach Renourishment on Georgia's Economy," published by the Center for Regional Analysis and Public Service Center at Armstrong Atlantic State University. This study found that on an annual basis, a total of \$2.7 million in state sales tax and income tax revenue would be generated for state government, provided that the beach is renourished. Mr. Pickel discussed various funding mechanisms used for beach renourishment projects in other states. These comparisons demonstrate a state interest in beach renourishment.

The Committee recognizes that beach nourishment results in storm protection and recreational benefits. The Committee finds that these benefits correlate to a significant economic impact at the state level and, therefore, recommends that the General Assembly provide adequate funding to support a portion of the beach renourishment efforts at Tybee Island.

## **BACKGROUND**

Tybee Island is Georgia's northernmost and eleventh largest barrier island, measuring approximately 2.5 miles long by 0.75 miles wide. The Island consists of 3,100 acres, of which 1,500 acres are uplands. Nearly 3.4 miles of beach runs roughly north and south before curving toward Savannah at the north end, where it reaches the Savannah River. Tybee Island has a permanent resident population of about 3,400, which swells on summer weekends to about 30,000.

At least three major impoundments or dams trap sediments upstream from Tybee, keeping natural sediments from adding to the shoreline. Also, a deep channel cut, or trench, is maintained by the USACE for the Savannah River Harbor, allowing large commercial freighters access to the Port of Savannah. This 42-foot-deep trench, scheduled to be deepened to 48 feet, traps southward-moving sands from South Carolina, preventing the natural renourishment that sustains and helps create the beach at Tybee Island. As the trench fills, dredging operations collect the sediments and move them to official Savannah Harbor Ocean Dredge Material Disposal Sites (ODMDS). These sediments, totaling seven million cubic yards a year, are not all beach compatible. Some of them are, however, which leads some observers to argue that the sandy component should be deposited at Tybee.

In January 2007, the U.S. Army Corps of Engineers commissioned a study to measure the extent that the Savannah River, which meets the Atlantic Ocean at Tybee Island's northern shore, disrupts the natural flow of sand being eroded and redeposited by waters along the beach. The final results

of the study were released in November 2007. These results show that creation and continued maintenance of the Savannah Harbor Federal Navigation Project (Project) have caused about 70-80 percent of the erosion on certain areas of the adjoining beach and nearshore region at Tybee Island. The study estimates that for every 100,000 cubic yards of erosion to the Tybee Island shelf and shoreline, 70,000 to 80,000 cubic yards could be attributed to the construction and maintenance of the adjacent federal navigation project (channel and jetties).<sup>1</sup>

However, the completion of this study does not provide for a new federal authorization for funding of Tybee Island beaches. Engineers must conduct a feasibility study to formulate a mitigation proposal to recommend to Congress through the USACE. The least costly, environmentally compatible mitigation strategy will likely be the plan recommended to Congress.

Tybee Island, as other barrier islands in the United States, has been losing beach, especially at the northeast end, as prevailing currents, tides, and winds have moved sand southward from the island. Measures to protect structures from an eroding shoreline include: (1) Hard stabilization (seawalls, groins, breakwaters, etc.); (2) Relocation or retreat (move structures back from shoreline); and (3) Soft stabilization (beach renourishment). Over the years, Tybee Island has undertaken hard stabilization efforts. For example, officials have built more than 100 beach-trapping structures of different degrees of effectiveness in an ongoing effort to stop the island from losing its beach. In 1941, a sea wall was constructed along the length of Tybee on the eastern side from the north to south end. The USACE periodically pumps sand from offshore "borrowing" sites and transports it to eroding areas.

Beach nourishment is defined as "the process of mechanically or hydraulically placing sand directly on an eroding shore to restore or form, and subsequently maintain, an adequate protective or desired recreational beach."<sup>2</sup>

The Georgia Shore Protection Act, codified in the Official Code of Georgia Annotated §12-5-230, outlines the permitting process and requirements for beach nourishment activities. A permit is required for all shoreline engineering activities, which include beach restoration or renourishment and artificial dune construction. The state holds all artificially created lands in trust for the benefit of the public.

Beach nourishment projects are financed by a combination of federal, state, and local government funds, as well as private funds. The USACE has primary authority to carry out federally authorized beach nourishment projects and is authorized to conduct such projects under the following program areas: 1) navigation (disposing of beach quality sand during construction or maintenance of inlets, channels, and harbors); 2) flood damage reduction; 3) recreation; 4) hurricane and storm damage reduction; and 5) ecosystem restoration. Although the USACE has used dredged material for many beach nourishment projects along the East Coast, some observers believe they have not done so often enough, i.e., only when it is the least costly disposal method. Tybee Island beach renourishment projects in recent years have been conducted under the storm damage reduction program area.

The Tybee Island beaches have been renourished several times. In 1975-1976, a major renourishment project was launched to build three miles of beach with sand from nearby shoals. The most recent beach renourishment occurred in 2000. The next scheduled beach renourishment for the island, in 2008, is expected to cost \$10 million. In the past, such projects have been funded utilizing a shared-cost formula. Typically, the federal government has funded 60 percent of the cost (\$6 million), the state has funded 30 percent of the cost (\$3 million), and the local government has funded 10 percent of the cost (\$1 million). However, this year, the U.S. Congress has failed to

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<sup>1</sup> U.S. Army Corps of Engineers Press Release: "Federal Channel Contributes to Erosion on Tybee Island" Sept. 14<sup>th</sup>

<sup>2</sup> U.S. Army Corp of Engineers. 1984. Shore Protection Manual Volume I, Washington, D.C.

authorize funding for the 2008 beach renourishment project on Tybee Island. In response, the local government has increased its share of the cost to 40 percent (\$4 million), and is now requesting \$3 million from the state, for a total of \$6 million, or 60 percent of the cost of beach renourishment on Tybee Island.

The Mayor of Tybee Island, Jason Buelterman, listed the Top Five Reasons for federal funds to be made available for beach renourishment on YouTube in March 2007. See the YouTube video here: <http://www.youtube.com/watch?v=5MTydJVT5mM>. The Top Five Reasons are: (1) Erosion: Tybee's beach is in a severe state of erosion; (2) Storm Protection: Healthy beaches provide storm protection; (3) Economy: An eroded beach has a significant impact on the economy; (4) Fairness: The city has met all of the conditions to receive federal funding; and (5) Shipping Channel: the widening and deepening of the channels prevents sand that would otherwise be deposited at Tybee.<sup>3</sup>

## **COMMITTEE FINDINGS**

### Science of Beach Renourishment

Georgia's islands are significantly different from Florida and North Carolina because they are relatively short with wide inlets. Georgia has a string of sandy barriers, a complicated coast, and small islands in marsh hammocks. Tybee Island's situation encompasses both rising seas and landward shifts of the shoreline into an increasingly massive, but static, infrastructure. The beach, a public trust resource, is compressed between the two trends. Government officials and policymakers are left with a decision: Which is more important?

Beaches are naturally dynamic systems, often receding or building out on a regular basis. Dr. Alexander described the three major factors in the dynamic equilibrium of barrier islands: (1) Relative sea-level change; (2) Sediment supply; and (3) Environmental energy (storms, wave energy, and location/shape of the beach). Tybee Island consists of a core of beach and dune deposits formed during the previous, and slightly higher, worldwide sea level of the Pleistocene Silver Bluff, approximately 40,000 to 50,000 years ago. The Island is also closely fronted by similar deposits formed during the present, or Holocene period, sea-level rise that began 15,000 years ago. About 5,000 years ago, the rate of sea-level rise decreased from three feet per century to a little less than a foot per century.

Dr. Alexander described Tybee Island's watershed boundaries, stating that the Savannah, Ogeechee, Satilla, and St. Mary's Rivers are not discharging any sand to the coast; however, the Altamaha River is contributing sand. Barrier islands either build themselves up or, if they do not have enough sediment, the waves push them back to shore. He explained that long-shore transport of sediment is moved by wave energy. Wave crests push sediment out-and-back, north-to-south. Georgia has ebb tide deltas which provide a conduit for sand to move across deep inlets, from barrier island to barrier island. Sand is torn loose from these deltas every six to 10 years. In

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<sup>3</sup> <http://www.youtube.com/watch?v=5MTydJVT5mM>.

the winter, waves pick up sand from the beach and transport it to sand bars. During the summer, the waves transport the sand back to the beach. Any interruption of this flow of sand, including inlet dredging, jetties, shoreline armoring, and so on, results in the starvation and erosion of down current shorelines. The problem lies in stabilization, i.e. when property owners prevent sand from moving landward.

Coastal engineers typically rely on three types of strategies to protect structures from shoreline erosion: 1) Hard stabilization; 2) Non-structural alternatives, such as relocation or retreat; or 3) Soft stabilization. Examples of hard structures include seawalls, bulkheads, revetments, breakwaters, groins, and jetties. These strategies interrupt the normal drift of sand and sediments, depriving the down-coast areas of natural replenishment and causing erosion. Land use controls, such as retreat programs, include the removal of structures or relocation further landward, to avoid costly repairs from storm damage and erosion. Relocation may be effective in undeveloped and underpopulated areas, but may be impractical in highly developed waterfront locations, such as Tybee Island, where cost and physical constraints make relocation unrealistic.

Dr. Alexander also spoke about the possibility of using the sediments collected by the USACE in the Savannah River navigation channel. He detailed USACE Regional Sediment considerations for beach renourishment: (1) Source of sand similar (slightly coarser) than that on the beach. This may be found in tide deltas or far offshore; (2) Placement is constrained by biological and physical factors (turtle nesting); (3) Continued funding is required (50 years); (4) Cost determined by flood/storm protection on the federal side; beach revenue generation determined on the local side; (5) Cost need not be shared with federal government; (5) Regulations should be enacted to protect the beach, such as prohibiting hard structures on shore); and (6) In Tybee's favor- determination of responsibility.

The U.S. Geological Survey (USGS) South Carolina Sea Grant Consortium Coastal Erosion Study determined erosion rates for all islands in Georgia. This Study found that Tybee Island's shoreline change statistics were the greatest from 1913-1991 when shipping increased.

#### Beach Renourishment and the Economy

Mr. Solomon presented information from the homeowners' and business community's perspective. Home sales have declined and potential buyers have been told that the federal government has always undertaken beach renourishment. Furthermore, the beach sustains the life and community on Tybee Island. Mr. Solomon analogized Tybee Island's dependency on its beach to other small towns that are dependent on a mill or other employer.

In November 2007, the Committee received a study, titled "The Economic Impact of Tybee Island Beach Renourishment on Georgia's Economy," published by the Center for Regional Analysis and Public Service Center at Armstrong Atlantic State University. This study documents the numerous and substantial state-level economic and fiscal impacts associated with beach renourishment on Tybee Island.

The analysis focuses on the net impact of Georgia's economy of beach renourishment. Thus, substantial effort was expended to estimate the proportion of Tybee Island's tourism activity that is attributable to: (1) Out-of-state residents who vacation at Tybee Island; and (2) The amount of tourism activity that would be "recaptured" for Georgia, provided that beach renourishment diverts some Georgia residents from vacationing in alternate out-of-state destinations, and thereby maintaining the flow of in-state residents to Tybee Island.

Key findings are provided in the table below:

<p style="text-align: center;"><b>Annual and Cumulative Economic and Fiscal Impact of Beach Renourishment on Georgia's Economy</b></p>
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	Employment	Business Revenue*	Labor Income	State Tax Revenue*
<b>Annual Impact</b>	678	\$54,738,000	\$18,354,000	\$2,661,000
<b>Cumulative Ten-Year Impact</b>	678	\$218,952,000	\$73,416,000	\$10,644,000

Note: \*Business Revenue, Labor Income, and Tax Revenue data are reported in 2007 dollars.

On an annual basis, the state-level net economic impacts can be summarized as follows: A total of 678 jobs, \$18.4 million in labor income and benefits, and \$54.7 million in business revenue are estimated to be supported by beach renourishment. Also, on an annual basis, a total of \$2.7 million in state sales tax and income tax revenue would be generated for state government, provided that the beach is renourished

Funding Mechanisms for Beach Renourishment Used in Other States

Mr. Pickel presented information on local funding sources and state funding sources in South Carolina, California, North Carolina, Texas, and Florida. Mr. Pickel also suggested three types of local funding sources: (1) General revenue funds; (2) Special taxing districts; and (3) Tourist Occupancy Tax or Accommodation Tax. He noted that the formation of special taxing districts typically requires a bond referendum or loan. Taxes may be assessed on storm damage reduction and recreational benefits. Tourist occupancy taxes collect revenue from users of rental property.

The table on the following page highlights beach renourishment programs in other states.

<b>NATIONAL BEACH RENOURISHMENT FUNDING PROGRAMS</b>					
	<b>SOUTH CAROLINA</b>	<b>CALIFORNIA</b>	<b>NORTH CAROLINA</b>	<b>TEXAS</b>	<b>FLORIDA</b>
<b>AUTHORIZATION OF FUNDING</b>	Funding authorized by Legislature, from the general fund.	By Legislature, in Public Beach Restoration Fund; however, there is no dedicated revenue source.	By statute (General Statute. 143-215.70-.73).	Coastal Erosion Response and Planning Act of 1999.	By statute (Florida Statutes 161.101).
<b>ADMINISTRATION OF PROGRAM</b>	Department of Health and Environmental Control (DHEC)	Department of Boating and Waterways	Department of Natural Resources, Division of Water Resources	Texas General Land Office (GLO)	Bureau of Beaches and Coastal Systems, Florida Department of Environmental Protection (FDEP)
<b>PROGRAM COMPONENTS</b>	Proposed projects are ranked based upon the environmental impact of the project, the public recreational benefits, the storm damage mitigation benefits to adjacent buildings and structures, the expected useful life of the project, and the extent of support for the project.	There is no state funding program for beach renourishment. However, the state does fund beach renourishment projects on a case-by-case basis with a 75 percent state/ 25 percent local match requirement.	There is no program, but state does help finance USACE beach protection/nourishment projects on a 75 percent state (of the non-federal cost of publicly-accessible beaches)/25 percent local match.	The GLO administers the Beach Maintenance Fund, a state program that reimburses eligible cities and counties for local expenditures to clean and maintain Gulf beaches. Activities eligible for reimbursement under this program include beach	Under the Beach Erosion Control Program, state financial assistance is available for 50 percent of the non-federal cost of publicly-available beaches. A list of projects is generated through local government requests and is prioritized by the FDEP based on standardized criteria.



NATIONAL BEACH RENOURISHMENT FUNDING PROGRAMS					
	SOUTH CAROLINA	CALIFORNIA	NORTH CAROLINA	TEXAS	FLORIDA
				nourishment.	
<b>FUNDING MECHANISM</b>	Funding dependent on publicly-accessible beaches. There is no dedicated funding source.	Funding determined annually. Since 1995, funding is appropriated from the	No set annual funding amount. There is no dedicated funding source.	Funding is determined every two years, and is from revenue generated by	Revenue generated through documentary stamp tax for real estate purchases. This results in \$30

## COMMITTEE RECOMMENDATIONS

The Committee understands that the replenishment of sand on Tybee Island provides storm protection and a viable alternative to allowing the ocean shoreline to migrate landward, threatening to degrade public beaches and cause the loss of public facilities and private property.

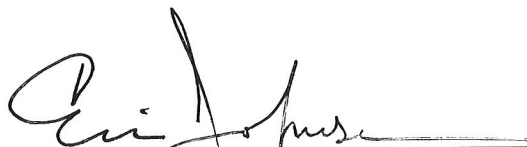
The Committee finds that on an annual basis, a total of \$2.7 million in state sales tax and income tax revenue will be generated for state government, provided that the beach is renourished. Georgia taxpayers will be reimbursed in less than two years. Furthermore, the Committee finds that creation and continued maintenance of the Savannah Harbor Federal Navigation Project have caused about 70-80 percent of the erosion on Tybee Island, indicating both a state and federal interest in beach renourishment.

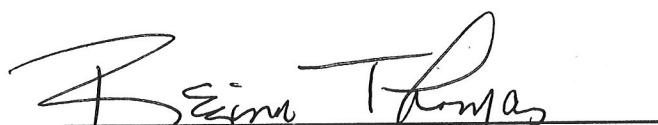
The Committee recognizes the short-term need for additional state funding of the 2008 beach renourishment efforts on Tybee Island. Due to the lack of full federal funding of 60 percent of the cost, and the inability to delay beach renourishment until the U.S. Congress provides this requisite funding, the Committee recommends that the General Assembly provide the balance of the funding for the 2008 beach renourishment efforts on Tybee Island.

Finally, the Committee encourages the U.S. Congress to appropriate the full amount of federal funding for future beach renourishment projects on Tybee Island. For all future beach renourishment projects, the Committee proposes a return to the previous shared-cost formula (60 percent federal; 30 percent state; and 10 percent local).

Respectfully submitted,

### THE SENATE TYBEE ISLAND BEACH RENOURISHMENT STUDY COMMITTEE

  
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Honorable Eric Johnson, Chairman  
Senator, 1<sup>st</sup> District

  
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Honorable Regina Thomas  
Senator, 2<sup>nd</sup> District

  
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Honorable Seth Harp  
Senator, 29<sup>th</sup> District