

LEGISLATIVE RESEARCH COMMISSION

**Coastal Beach Movement, Beach Renourishment, and Storm Mitigation**



REPORT TO THE  
2001 SESSION OF THE  
2001 GENERAL ASSEMBLY  
OF NORTH CAROLINA

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3/10/00

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SENIOR PRINCIPAL, COASTAL SCIENCES AND ENGINEERING, LLC  
COLUMBIA, SOUTH CAROLINA

1999 - 2000

LEGISLATIVE RESEARCH COMMISSION

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## **PREFACE**

The Legislative Research Commission, established by Article 6B of Chapter 120 of the General Statutes, is the general purpose study group in the Legislative Branch of State Government. The Commission is cochaired by the Speaker of the House and the President Pro Tempore of the Senate and has five additional members appointed from each house of the General Assembly. Among the Commission's duties is that of making or causing to be made, upon the direction of the General Assembly, "such studies of and investigations into governmental agencies and institutions and matters of public policy as will aid the General Assembly in performing its duties in the most efficient and effective manner" (G.S. 120-30.17(1)).

The Legislative Research Commission, prompted by actions during the 1998 Session and 1999 Sessions, has undertaken studies of numerous subjects. These studies were grouped into broad categories and each member of the Commission was given responsibility for one category of study. The Cochairs of the Legislative Research Commission, under the authority of G.S. 120-30.10(b) and (c), appointed committees consisting of members of the General Assembly and the public to conduct the studies. Cochairs, one from each house of the General Assembly, were designated for each committee.

The study of Coastal Beach Movement, Beach Nourishment and Storm Mitigation was authorized by Part II, Section 2.1 (6)(e) of Chapter 395 of the 1999 Session Laws (Regular Session, 1999). Part II of Chapter 395 allows for studies authorized by that Part for the Legislative Research Commission to consider House Bill 118 and Senate Bill 54 in determining the nature, scope and aspects of the study. The relevant portions of Chapter 395 House Bill 118 and Senate Bill 54 are included in Appendix A.

The Legislative Research Commission authorized this study under authority of G.S. 120-30.17(1) and grouped this study in its Environmental area under the direction of Senator Austin Allran. The Committee was chaired by Representative Nurham Warwick and Ray Sturza. The full membership of the Committee is listed in Appendix B of this report. A committee notebook containing the committee minutes and all information presented to the committee will be filed in the Legislative Library by the end of the 1999-2000 biennium.

## **COMMITTEE PROCEEDINGS**

The Legislative Research Commission on Coastal Beach Movement, Beach Renourishment, and Storm Mitigation met seven times during the 1999-2000 biennium to address the complex and controversial issues assigned to it by the Legislative Research Commission. The following summary of committee proceedings is designed to provide the reader with a brief synopsis of the matters brought before the Committee and to serve as an introduction to the Committee's findings and recommendations. A copy of the minutes of the proceedings and the materials presented to the Committee may be found on file in the Legislative Library.

### **MARCH 10<sup>TH</sup>**

The Committee's initial meeting was held in Room 544 of the Legislative Office Building in Raleigh, North Carolina. Considerable time was spent in this first meeting reviewing the unique characteristics of North Carolina's barrier islands. Dr. Stanley R. Riggs, Distinguished Professor in the College of Arts and Sciences, Department of Geology, East Carolina University, provided the Committee with an overview of the geomorphology of North Carolina's barrier island system.

According to Dr. Riggs, North Carolina is blessed with approximately 350 miles of ocean shoreline that fronts an extensive estuarine system. These barrier islands, along with their inlets are a very dynamic, high-energy system that is constantly changing in response to the action of wind, wave and sea level change. North Carolina's barrier island system can be divided into two sections. The northern part of the system, from Cape Lookout north, has deeply embedded estuaries with young sediments and rocks. The southern segment of the system, including Onslow Bay and Long Bay are controlled by hard rock. The underlying geology of the system controls whether there is a sediment rich or sediment starved system. According to Dr. Riggs, most of North Carolina's beaches are sediment starved and in a general state of recession due to sea level rise. Dr. Riggs went on to discuss a number of the barrier islands indicating those that he thinks are sediment rich, including Bogue Banks,

Shackleford Banks and Nags Head, and those that are sediment starved; areas below the Brown River Inlet, including Shell Island and Figure Eight Island. In his opinion, those areas with ample sand in the system can probably hold the line on erosion for a time with beach nourishment projects. Sea level rise will create new problems for these beaches. The systems that are sediment starved, however, are slowly collapsing with little potential for finding nearby long-term sources of sand for beach nourishment programs. To nourish these beaches would become extremely expensive. It is a political/economical question. Dr. Riggs suggested that the State develop a zoning plan for the barrier islands and let that which was going to sea go. This could be accomplished by not replacing infrastructure thus discouraging development.

The second speaker of the day was John Morris, Director of the Division of Water Resources, North Carolina Department of Environment and Natural Resources (DENR). Mr. Morris outlined the charge to DENR under the statutes and explained DENR's role in the process of obtaining authorization for federal shoreline protection projects. He stated that DENR was charged by statute to cooperate with federal agencies and units of local government in the planning and development of shoreline preservation projects. (See G.S. 143-355.) He also noted that the General Assembly has authorized the State to assist local governments with up to 75% of the nonfederal funding required for federal projects.

Mr. Morris next described for the Committee the process of obtaining a federal shoreline protection project. He pointed out that the process begins with a local initiative. At the behest of a unit of local government, The U.S. Army Corps of Engineers performs an initial study, known as a reconnaissance study. This initial study looks at whether there is a federal interest in constructing the project and whether a federal project appears to be feasible. The Corps of Engineers usually completes a reconnaissance study within a year. Such studies cost approximately \$100,000, all federal money.

Should the reconnaissance study show that a federal shoreline protection project would be feasible, the Corps then undertakes a more in-depth feasibility study. This second study investigates the economic benefits and costs of the proposed project and looks at potential environmental impacts. It usually takes several years to complete and is funded on a 50% federal, 50% nonfederal basis.

Even when the Corps of Engineers recommend a proposed project be constructed, there is usually a need for additional design work. Further, Congress must authorize the construction of the project and appropriate funds. Current cost sharing on federal shoreline projects is 65% federal and 35% nonfederal. After initial construction, beach nourishment projects are usually replenished every few years. These renourishment projects are cost shared on a 50-50 basis.

Steve Benton, Staff Geologist with the Division of Coastal Management, DENR, was the next person to address the Committee. Mr. Benton explained the State's oceanfront management program and described the setback rules for developing ocean front property. He noted that the setback provisions were established to accomplish three objectives: (1) to minimize loss of life and property, (2) to prevent the encroachment of permanent structures on the public beach and (3) to reduce the public costs associated with improperly designed and sited coastal development. Mr. Benton also noted that in response to the criticism being leveled at the Division, they had added coastal engineers and coastal geologists to their science panel.

Finally, Mr. Tom Jarrett addressed the Committee. Mr. Jarrett is the Chief of the Coastal Hydrology & Hydraulic Section of the U.S. Army Corps of Engineers. Mr. Jarrett spoke about the costs of beach nourishment projects. The Corps currently has three constructed projects in North Carolina. These projects are located at Kure Beach, Wrightsville Beach and Carolina Beach. Costs for these projects have totaled \$26,580,000 for Carolina Beach (1966- present), \$16,715,000 for Wrightsville Beach (1996-1998), and \$15,000,000 for Kure Beach (1967-1998). Mr. Jarrett told the Committee that he estimated that to construct federal projects to nourish each of the beaches that are in need of nourishment projects would require a State commitment of \$10.5 to \$11.5 million per year.

## **APRIL 7<sup>TH</sup>**

The Committee held its second meeting on April 7, 2000, in Room 643 of the Legislative Office Building in Raleigh. The Committee meeting covered a variety of topics ranging from additional information on the State's policies on beach protection, to environmental concerns, to the positive economic impacts of nourishment projects.

Robin Smith, Assistant Secretary of DENR spoke about DENR's support for beach nourishment projects. She began by noting that the Department has acted in support of beach preservation referencing the Department's lobbying efforts to see that the Corps of Engineers made more of their dredge material available for beach nourishment projects. Ms. Smith said that the Coastal Resources Commission has adopted specific policies on the use of beach nourishment as a strategy for beach preservation. She also explained that the Department had approached the issue of State funding for federal beach nourishment projects on an individual project basis She concluded by stating that the Governor has recognized a need for a dedicated funding source for beach nourishment.

The second speaker on April 7<sup>th</sup> was Kevin Moody, Senior Staff Biologist with the U.S. Fish and Wildlife Service. Mr. Moody briefly discussed prohibitions on federal funding of projects in areas subject to the Coastal Beach Reserve Act. He then spoke at length about his concerns that beach nourishment, as it is currently practiced, is bad science. Mr. Moody stated that the U.S. Fish & Wildlife Service also has concerns about the frequency of beach nourishment and its impact on beach and near-shore birds and animals. The particular concern is that existing renourishment projects do not provide adequate time for mole crabs, coquina, and other organisms to recover. Inadequate recovery times could seriously impact migrating shore birds and other animals dependent on these organisms for survival.

Dr. Richard Levin, Professor of Economics, retired, UNC Kenan-Flagler School of Business, Chapel Hill, North Carolina, presented the Committee with his economic analysis of the value to North Carolina of beach nourishment projects. Dr. Levin presented materials that showed that the beaches are the number one tourist destination in the United States. 1999 beach tourism expenditures nationally were approximately \$195 billion and supported 2.82 million jobs. His figures for North Carolina indicated that coastal tourism expenditures were \$2.9 billion and supported 50,000 jobs. Dr. Levin further estimated that the State share of federal projects to preserve 72 miles of North Carolina's beaches would cost approximately \$7.5 million per year. His analysis of these numbers led him to conclude that there would be a 386:1 return on investment for beach nourishment dollars spent by the State. Dr. Levin pointed out that he reached this conclusion without considering other factors such as protection of

public infrastructure, preserving the local tax base, restoring and improving habitat for sea turtles and birds, and the public recreational value of the beach. Dr. Levin gave a number of additional cost-benefit analyses for individual coastal communities. He concluded that there is no investment that the State of North Carolina is considering that carries anywhere near the return provided by beach nourishment projects.

The final speakers of the day were Mayor Marty Bostic and Town Manager Tony Hammond of North Topsail Beach. They stated that North Topsail Beach has one of the best public beach access programs in the State. They dedicate 5% of the property tax toward dune stabilization and possible nourishment problems. North Topsail is currently lobbying Congress about the Coastal Barrier Resources Act (CBRA) areas in North Topsail.

## **APRIL 28<sup>TH</sup>**

The Committee's final meeting prior to the convening of the 2000 Regular Session of the General Assembly was held on April 28<sup>th</sup> in Room 544 of the Legislative Office Building in Raleigh. The primary focus of the meeting was on the Florida Shoreline Management Program.

Paden Woodruff, Environmental Programs Administrator of the Florida Office of Beaches and Coastal Systems was the first speaker. He discussed at length the history and implementation of the State of Florida's efforts to preserve its beaches and enhance tourism. First and foremost, Florida has declared beach restoration is in the public interest and has provided a dedicated funding source for beach restoration projects. The funding source is a percentage of a document stamp tax. The stamp tax is used to fund numerous programs in the State, only about 5% of the revenues collected from the tax go to support beach preservation and restoration. Mr. Woodruff stated that Florida had done extensive work in characterizing the coastline, delineating the problems and developing a shoreline management strategy. The State focuses on long-range solutions to coastal erosion problems.

The next speaker was Eric Olsen, President of Olsen and Associates, Inc., a private coastal engineering firm. Mr. Olsen noted early in his presentation that the reason Florida is ahead of North Carolina in funding beach preservation and restoration efforts is because it is

ahead of North Carolina in having problems with erosion. He also pointed out that Florida had elevated the issue of beach preservation by a legislative finding that beach restoration and nourishment is in the public interest.

Mr. Olsen next spent some time discussing more technical aspects of beach restoration projects. He stated that when properly designed and constructed, a beach restoration project should last six to eight years before renourishment is needed. He also argued that in light of advances in coastal engineering knowledge and techniques, that structures should not be completely prohibited in beach restoration projects. Early coastal engineering projects failed to properly consider the natural configuration of the beach including both the wet and the dry beach. Coastal engineers now take into account how sand moves along and across the beach. It is important to get sand back into the sand sharing system from navigational projects.

Donna Moffitt, Director of the Division of Coastal Management, DENR, addressed the Committee. Ms. Moffitt provided an overview of the North Carolina Coastal Management Plan discussing in particular the regulatory structure and the policies on beach nourishment as a beach management strategy. She stated that the Florida model is one that North Carolina should consider.

Finally, Dr. Douglas J. Wakeman, Professor of Business and Economics at Meredith College spoke to the Committee about the economics of beach nourishment. According to Dr. Wakeman, the most important issues in the beach nourishment controversy may be social and political, however economic analysis does offer some insights into the question of the best allocation of resources. While he is ambivalent about beach nourishment as a beach restoration tool, he does have some doubts about whether the practice is economically efficient.

Dr. Wakeman gave his opinion that no valid economic case has been made yet that beach nourishment in North Carolina is justified on economic grounds. The economic data necessary to reach either a positive or negative conclusion about its economic efficiency is not available. According to Dr. Wakeman, a valid conclusion cannot be reached without further study.

## OCTOBER 5<sup>TH</sup>, 6<sup>TH</sup> & 7<sup>TH</sup>

The Committee held its first meeting after the adjournment *Sine Die* of the 1999 General Assembly on October 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup>, 2000. The meeting on October 5<sup>th</sup> was held at the Royal Pavilion Hotel in Pine Knoll Shores, North Carolina. October 6<sup>th</sup> and 7<sup>th</sup> the meeting was held at the Faith Harbor United Methodist Church in Surf City, North Carolina.

The meeting on October 5<sup>th</sup> was a joint meeting of the Committee on Beach Movement, Beach Nourishment and Storm Mitigation and the Legislative Disaster Response and Recovery Commission. The first speaker was Dr. James Kleckley, Associate Director of Planning and Institutional Research at East Carolina University. Dr. Kleckley gave a slide presentation on the economics impacts of beach restoration projects entitled: *Shifting Sands: The Mystery of Beach Economics*. According to Dr. Kleckley, the tourism component of local economies can be shown. He spoke about the probability and timing of hurricane strikes along the coast and their impact on tourism. He noted some of the major issues faced by property owners and government when there is an erosion problem: What are the costs and paybacks? Who should pay? Should it be insured? Dr. Kleckley also spoke of Hilton Head Island as a model for beach nourishment projects. He stated that anecdotal evidence is that the economy of Beaufort, South Carolina and surrounding area (Hilton Head) are growing at a faster pace than much of the North Carolina coast. He argued that investment in a beach restoration project is an economic development investment for coastal communities much the same as an industrial park is an investment for inland communities.

After Dr. Kleckley's presentation, the Committee heard for the second time from Paden Woodruff of the Florida Office of Beaches and Coastal Systems. Mr. Woodruff emphasized that the Florida legislature had declared that beach restoration was in the public interest and has provided a dedicated funding source for beach restoration projects. He discussed Florida's long-range financial plan that looks at the critical erosion areas of Florida's ocean shoreline. Mr. Woodruff noted that in Florida, the inlets were a major cause of the erosion problem. All their critical erosion areas are located downdrift of the inlets. Mr. Woodruff cautioned that there were no simple solutions for erosion problems. Much depends on whether there is adequate sand in the system. Sand sources need to be inventoried. If there is a sand deficit,

there can be a negative impact on the beaches downdrift of a project. He also noted the need to consider the environmental impacts of a proposed project. It is necessary to determine how the project is going to affect the coastal system as a whole. Beach restoration projects can provide not only recreational benefits but also provide habitat restoration for sea turtles and can mitigate future storm damage. Mr. Woodruff concluded by saying that Florida has developed a strategic plan, and has a long-range budget to implement the plan.

The final speaker of the day was Tom Jarrett of the U.S. Army Corps of Engineers. Mr. Jarrett reviewed the various coastal projects the Corps of Engineers has underway in North Carolina. These projects include those ongoing projects located at Wrightsville, Carolina and Kure beaches, as well as those in various stages of study including the Dare County beaches from Kitty Hawk to South Nags Head, Bogue Banks, Brunswick County, including Ocean Isle, Holden Beach, and Oak Island-Caswell Beach. The Corps is also involved with the protection of Highway 12 south of Oregon Inlet to Ocracoke Island, an evaluation of the Morehead City Harbor project and its impact on Bogue Banks and Shackleford Banks, and the deepening of the Wilmington Harbor. He stated that the beach protection program in North Carolina was rapidly becoming one of the largest in the country and that within the next 10 – 15 years could include almost 60 miles of beachfront.

Mr. Jarrett said that it was important to remember that Corps projects are congressionally funded. To obtain Congressional funding a lengthy study and design process is required that can take up to five to ten years to complete. He also commented on the ability of beach nourishment projects to reduce damage from coastal storms and hurricanes. A review of the Carolina Beach project during Hurricane Fran showed that there was no significant damage from wave action or storm surge to the ocean front row at Carolina Beach while one mile south at Kure Beach, essentially all the ocean front structures experienced significant damage from wave action and storm surge.

After the main presentation, the Committees opened the proceedings to public comment. Among those who spoke were Calvin Peck, Town Manager for Carolina Beach, Don Morris from Newport, N.C., Joe Exum, member of the Bogue Banks Beach Preservation Association, and Buck Fugate, Mayor of Indian Beach.

On October 6, the Committee met in Surf City. The first presentation was made by Spencer Rogers, Coastal Construction and Erosion Specialist with the North Carolina Sea Grant Program. Mr. Rogers began by describing various kinds of erosion. He noted that for every erosion control option there is a series of tradeoffs. Mr. Rogers concluded his presentation with a discussion of the impacts of Hurricanes Dennis and Floyd in 1999. He stated that between the two storms, all the ocean front buildings in the State were threatened. Everyone was hit with moderate to severe erosion with 968 buildings threatened or destroyed by erosion. Importantly, however, the structures that were located in areas that had nourished beaches, Wrightsville, Carolina, and Kure beaches, had zero buildings threatened or destroyed by erosion.

Dr. Timothy Kana, President of Coastal Sciences and Engineering in Columbia, South Carolina spoke next. Dr. Kana addressed the issue of the perception by the general public that beach nourishment was very expensive and needed to be repeated every three years. He pointed out that erosion rates along the coasts are variable. Project costs are going to depend on three main factors. First, there needs to be a determination of the amount of sand to be placed on the beach. The volume of sand will depend on the goal of the project. Provision of storm protection requires building up of the dunes and dry beach and usually takes more sand than dealing with chronic erosion problems. The second factor is the site-specific erosion rate. Sites subject to greater erosion forces will be more expensive to nourish and to maintain. The third factor is the cost of sand. This is in large part dependent on the distance of the sand source from the project. A typical range of cost is from \$1 to \$10 per cubic yard.

Dr. Kana also spoke about the beach nourishment project undertaken by Myrtle Beach and the significant storm protection that the project had provided to that community's development. He noted that the 1987 New Years' Day storm had hit Myrtle Beach prior to completion of the project. Along the section of nourished beach, damage was estimated at approximately \$40,000 per mile. Along North Myrtle Beach, damage was estimated at \$260,000 per mile. Garden City/Surfside, which had no project experienced damages in the range of \$750,000 per mile.

Dr. Kana indicated that South Carolina's negotiations with FEMA and other federal agencies was made easier by the fact that the State had passed a \$10 million bond bill to pay its share of coastal projects and had developed a plan setting priorities for beach nourishment projects.

The final scheduled speaker for October 6<sup>th</sup> was Charles B. Chestnutt of the Planning Division, Civil Works of the U.S. Army Corps of Engineers. Mr. Chestnutt indicated that the Corps does not have the same authority to study the performance of its coastal projects as it does the performance of its flood control projects. The advent of Hurricanes Bertha and Fran gave them an opportunity, however, to go in and assess the storm protection offered to the beach communities that had engineered beaches and dune systems. The Corps of Engineers went in and analyzed the wind, wave and storm surge conditions that prevailed on the North Carolina coast during the storms. In particular they looked at the stretch from Kure Beach to North Topsail Beach. Although conditions throughout the area were similar, Wrightsville Beach and Carolina Beach suffered the least erosion-based damage with the unnourished beaches suffering the greatest amount of erosion damage.

The meeting concluded with public comment. Presentations were made by Reid Flincham, General Manager of the Onslow Inn, Larry Bergman, Town Manager of Topsail Beach, Jan Hobbs, Topsail Island Chamber of Commerce, Donna L. Giradot, Director of Governmental Affairs, Wilmington Regional Association of Realtors, John Flynn, Alderman of the Town of North Topsail Beach, Dr. Les King, Mitzi York, Joe Augustine, Steve Walter of the NC Shore and Beach Preservation Association, Andy Hedrick speaking for Carolyn Justice, Chair of the Pender County Board of Commissioners, Mayor Betty Medlin of Kure Beach, and A.D. (Zander) Guy Mayor of Surf City.

The Committee toured critically eroded areas of Topsail Island on October 7<sup>th</sup>.

## **DECEMBER 5<sup>TH</sup> AND 6<sup>TH</sup>**

The Committee held its 5<sup>th</sup> meeting on Oak Island. The first day of the meeting was held at the Oak Island Recreational Center. The Committee heard presentations from Hugh Morton and Mac Pearsall on behalf of the East-West Coalition which is sponsored by the North

Carolina Citizens for Support of the Arts, a nonprofit corporation.. Mr. Morton gave a slide presentation detailing the impact that air pollution and other environmental problems are having on the mountain areas of the State. He also presented information on a beach restoration technique known as the Holmberg Technology. Mr. Morton and Mr. Pearsall emphasized the need to link the needs of the coast and the mountains in order to get the funding necessary to address environmental problems in both areas.

The Commission then began its review of materials that had been presented in earlier meetings in an effort to develop its findings and recommendation for its report to the 2001 General Assembly. On the morning of the 6<sup>th</sup>, the Committee convened its meeting at the North Carolina Baptist Assembly in Caswell Beach.

At that meeting the Committee listened to staff reports on the revenues currently earmarked for different purposes. The Committee was presented with a number of potential options for a dedicated funding source including an increase in the sales tax rate, the imposition of a 1% Statewide occupancy tax, an increase in the excise tax on real estate transfers, an increase in the taxes on amusements, and finally appropriations from the General Fund. The Committee heard again from several members of the public.

## **DECEMBER 15<sup>TH</sup>**

The Committee held its 7<sup>th</sup> meeting on December 15, 2000 in Room 544 of the Legislative Office Building in Raleigh North Carolina. The purpose of the meeting was to finalize the Committee's findings and recommendation and to review legislation proposed for the Committee's report to the Legislative Research Commission. There was one formal presentation made to the Committee by John Morris, Director of the Division of Water Resources, DENR. The General Assembly in the 2000 Session tasked DENR with the responsibility of preparing a beach management plan and strategy. The report is due to be filed with the General Assembly on May 1, 2001. Mr. Morris commented on the progress being made in preparing the plan. Mr. Morris also provided the Committee with a report on nine beach nourishment projects that the Division of Water Resources is working on with the U.S. Army Corps of Engineers. The General Assembly appropriated \$10,655,000 for these projects

for fiscal year 2000-2001. Finally Mr. Morris shared with the Committee his Division's projections of State costs for beach protection over the next 30 years. Total State share for beach protection projects for the 30-year period should not exceed \$10.6 million per year.

After Mr. Morris' presentation, the Committee began its review of the legislation it had requested staff to prepare for consideration. The proposed legislation included provisions that established beach preservation and restoration as a public policy, created an independent commission housed within DENR to prepare and administer a beach protection plan and fund, created a beach preservation and restoration fund and provided for appropriations to cover the expenses of the Commission. The Committee requested a number of amendments to the legislation to be incorporated into the final recommendation of the Committee to the Legislative Research Commission. Before adjourning the Committee again opened the meeting to public comment.

#### **DECEMBER 28<sup>TH</sup>**

The Committee held its final meeting on December 28, 2000, in Room 545 of the Legislative Office Building in Raleigh, North Carolina. At the meeting the Committee discussed at length their recommendations and approved this report.

## **FINDINGS AND RECOMMENDATIONS**

After reviewing the information, public comments, and expert testimony received by the Committee regarding beach preservation and beach restoration issues, the Committee makes the following findings:

A recent study by the Department of Environment and Natural Resources evaluating the current conditions of North Carolina's beaches and mountains and recommending strategies to protect, conserve, preserve and restore these valuable resources notes the following: "North Carolina has 320 miles of oceanfront shoreline. Approximately 315 miles is found on 23 barrier islands cut by [numerous] inlets. The remaining five to six miles of shoreline is formed on the emergent edge of the coastal Plain between Carolina Beach and Fort Fisher and along a small portion of Oak Island." The report further notes that just over 50% or 161 miles of North Carolina's oceanfront is in public ownership: 112 miles is in National Seashores; 21 miles is in National Wildlife Refuges; 11 miles is in military facilities; nine miles is in National Estuarine Research Reserve; and eight miles is in State parks. One hundred fifty-six public beach access sites are owned and maintained by county or municipal governments. (See Beach and Mountain Restoration Plan, April 15, 2000, prepared by Department of Environment and Natural Resources, pages 2 and 3.)

North Carolina's beaches serve many functions. The beaches provide habitat for nesting birds and sea turtles and support a wide variety of animal life. North Carolina's ocean beaches and dune systems provide protection to property and infrastructure from storm and hurricane damage. They enhance and support the tourism industry, in particular the local economies of the coastal region. The beaches are a public recreational resource and belong to all the people of the State.

The importance of the beaches is recognized in the North Carolina Constitution. Article XIV, Section 5 of the North Carolina Constitution provides that the beaches of the State are to be preserved as part of our common natural heritage. Further, rules adopted by the Coastal Resources Commission provide that protection of the recreational use of the shorelines of the State is in the public interest. Those rules also provide that "the public right to use and enjoy the ocean beaches must be protected. The protected uses include traditional recreational uses (such as walking, swimming, surf-fishing, and sunbathing) as well as commercial fishing and emergency access for beach rescue services. Private property rights to oceanfront properties including the right to protect that property in ways that are consistent with public rights

should be protected.” (See 15A NCAC 7M.0201 and 15A NCAC 7M-0202.) While the Coastal Resource Commission rules note the constitutional provision to protect the State’s natural heritage, the Committee finds that there is a need to provide a legislative mandate that acknowledges the value of the beaches to the people of the State and declares that it is in the public interest to preserve and restore the beaches of the State.

The beaches of the State are part of a dynamic coastal system that is constantly being reshaped by the forces of wind, waves, sea level rise, and human activity such as channel and inlet maintenance.. These natural forces have caused, and will continue to cause serious erosion problems threatening public property, private property, public infrastructure, the regional economy, public access to the beach, and the general health, safety and welfare of the public. To protect against these threats, it is in the public interest for the State to establish policies and programs that provide for the preservation and restoration of the beaches of the State.

Beach preservation and beach restoration projects, in particular projects that replenish the sand on the wet and dry beach (beach nourishment) also have been demonstrated to dramatically reduce the damage to property and infrastructure from storm surge and wave action during severe storm events. North Carolina has a long history of successful beach nourishment projects constructed by the U.S. Army Corps of Engineers. Studies conducted by both the U.S. Army Corps of Engineers and North Carolina Sea Grant have revealed that nourished, engineered beaches have provided millions of dollars worth of protection to oceanfront structures. In the Sea Grant study, conducted by Spencer Rogers, assessments were done of damage caused by Hurricanes Dennis and Floyd. Dennis and Floyd impacted the entire North Carolina coast. 65 buildings were destroyed or substantially damaged and an additional 903 oceanfront structures were listed as threatened by erosion of the beach. Remarkably, none of the destroyed or threatened structures were located within the limits of existing beach nourishment projects. According to the report, not even one building behind the project dunes was damaged by erosion. The Committee finds therefore, that where beach preservation and restoration projects are found to be economically, environmentally and socially justified, beach preservation and restoration projects should be considered a public purpose and State funding made available.

The management of development along the coast is currently regulated under the Coastal Area Management Act (CAMA). Rules implementing CAMA are promulgated by the Coastal Resources Commission and administered by the Division of Coastal Management (DCM) in the Department of Environment and Natural Resources (DENR). In addition to the

programs administered by DCM, The Division of Water Resources has been responsible for coordinating the development of federal shoreline management projects. The nature of the relationship between DENR and the coastal communities is primarily regulatory. The coastal communities appear to have strong concerns that DENR has been unable to fully address the difficulties arising from the severe erosion problems that have resulted from both ongoing long-term factors and serious storm events. Among the problems these communities face from erosion are the loss of tourism dollars, the loss of public property and infrastructure and the reduction of their tax base. The Committee, therefore, finds that it would be in the public interest for the State to establish a separate commission, housed within DENR, whose function and purpose would be to assist local governments with assessments of beach erosion problems and the development and implementation of strategies to preserve and restore the beach. Such a commission would be responsible for coordinating the activities and resources of federal, State, and local governments in the process of developing beach preservation and restoration projects.

The Committee also finds that there is a serious need to develop a plan and strategy to preserve and restore the beaches of the State. A plan is needed that would identify and characterize the erosion problems of the coastal communities and assess the availability of sand resources for beach restoration. Priorities for State funding of beach preservation and beach restoration projects need to be established and provision made for adequate public access to the beaches for all the citizens of the State.

The Committee also finds that tourism is an important industry in North Carolina that is of great economic benefit statewide with tremendous growth potential. Both the coast and the mountains are popular tourist destinations. The tourism industry provides crucial economic support and tax bases for local governments located in the coastal and mountain regions. A recent study prepared by the Department of Environment and Natural Resources evaluating the current conditions of North Carolina's beaches and mountains noted the following: "The popularity of our beaches and mountains as a recreational and tourism destination, as places to live and work has increased dramatically in recent years. The economic impact of tourism has risen from \$5.0 billion in 1986 to more than \$10 billion in 1999."

While economists addressing the Committee did not agree on the economic impact that tourism has on the coastal area of the State, they did agree that it has an economic impact and an important one. One economist indicated that coastal tourism expenditures in North Carolina are approximately \$2.9 billion dollars and support 50,000 jobs. Another economist

suggested that investment in a beach restoration project is an economic development investment for coastal communities, much the same as an industrial park is an investment for inland communities. He stated that anecdotal evidence is that the economy of Beaufort, South Carolina and surrounding area (Hilton Head) are growing at a faster pace than much of the North Carolina coast.

To gain a broader perspective of tourism in North Carolina and how the coastal area fits in the overall statewide tourism industry, the Committee devoted a portion of its time to learn about tourism in the mountain area of the State. The Committee learned that air pollution poses a significant threat to the State's mountains and piedmont area. Unless addressed and remedied quickly, air pollution in the western and piedmont areas of the State may result in increasingly expensive health costs to North Carolina's citizens and severely damage those regions' share of the tourism industry.

The Committee finds that there is needed a timely and thorough economic study that assesses the role and value of the State's beaches with regard to local, regional, and State economies and that provides a cost benefits analysis of current and anticipated beach preservation and restoration projects. The Committee recognizes that its legislative charge focuses on the coastal area of the State; however, the Committee also recognizes that it is not possible to truly understand and appreciate the economic significance of tourism in the coastal area unless it can be considered within a statewide context. Therefore, the Committee also suggests that the economic study of tourism address the tourism industry in the piedmont and western areas of the State as well as the coastal area.

Another related issue considered by the Committee is the need to provide reliable, regular, and significant funding to address beach erosion, air pollution, and other environmental threats to the State's natural heritage and economic health. The Committee finds that while the tourism industry and its economic benefits are statewide, the threats posed to that industry tend to be regional and are best addressed on a regional basis. As noted above the Committee finds that there is a critical need for a dedicated source of funding for beach preservation and beach restoration projects in the coastal area. The Committee also notes that there are different needs in the other regions of the State that also require reliable funding that would be best spent on a regional basis. Again, while the Committee acknowledges that its charge is to focus on the coastal area of the State, the Committee suggests that consideration be given to providing a reliable, regular funding source that may be used regionally to address critical threats to the natural resources in the coastal, piedmont, and mountain areas of the State.

Based upon these findings, the Legislative Study Committee on Coastal Beach Movement, Beach Renourishment, and Storm Mitigation recommends the legislation in Appendix C to the 2001 General Assembly for its consideration.