

**South Carolina Responds to Beach Erosion:  
Is Beach Nourishment The Last Line of Defense Against an  
Armored Coastline?**

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Spring 2005

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## I. Introduction

South Carolina, one of the 30 coastal states in the United States, is home to 187 miles to coastal shoreline.<sup>1</sup> A \$14 billion tourism industry thrives along the South Carolina coast drawing more than 28 million visitors a year.<sup>2</sup> However, like 80 percent of the shorelines in the United States, the state is seeing one of its greatest natural resources disappear – South Carolina beaches are falling victim to erosion.<sup>3</sup> Like other coastal states, South Carolina has responded to erosion by using various means to control shoreline erosion. These means have included constructing hard erosion control devices such as seawalls, groins and jetties, and soft stabilization of beaches using beach nourishment.<sup>4</sup> South Carolina has also entertained a policy of retreat, prohibiting construction on its eroding coastline.<sup>5</sup> Today, the state's preferred policy in combating beach erosion is beach nourishment.<sup>6</sup>

Beach nourishment is a highly controversial solution to beach erosion because it is very expensive and only a temporary solution to erosion.<sup>7</sup> Generally, a beach nourishment project can cost anywhere from one to several million dollars and may only last a few years.<sup>8</sup> However, proponents for beach nourishment argue that it preserves the beach and a healthy beach is vital to South Carolina's \$14 billion tourism industry.<sup>9</sup>

This paper will provide an overview of the causes of beach erosion, technology used to combat erosion and the federal and state legislation addressing shoreline preservation. It will follow with a discussion weighing the benefits and consequences of beach nourishment and a conclusion that beach nourishment may not be the most economically and environmentally sound policy to preserve South Carolina's coastline. However, despite this conclusion, this paper argues that based on current laws, court

decisions, and agency policy, beach nourishment may be the only line of defense currently available to prevent the armoring of South Carolina's coastline. This argument is based on the following: 1) After the U.S. Supreme Court's ruling in *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992), South Carolina's policy of retreat, for all practical purposes, has not been actively pursued by South Carolina's Department of Health and Environmental Control, Office of Coastal Resources Management (OCRM) for fear of a "takings" challenge<sup>10</sup>; 2) South Carolina's Supreme Court found that although the Beachfront Management Act of 1988 prohibited construction of hard erosion control devices on land seaward of the baseline, it did not prohibit construction or reconstruction of groins<sup>11</sup>; 3) in 2002, the General Assembly passed Act 198 which amended the Coastal Zone Management Act to specifically authorize the "reconstruction, repair and maintenance of existing groins" and construction of new groins in conjunction with a beach nourishment project<sup>12</sup>; and 4) although the General Assembly has paved the way for construction of groins, it appears to be dedicated to beach nourishment as a solution to beach erosion and has established a trust fund specifically dedicated to such projects.<sup>13</sup>

Although this argument is based on the current trend in South Carolina's beach preservation policy, it is by no means a resignation to the status quo. Future considerations in this area should include solutions to coastal erosion that will reduce the adverse effects to both the economy and the environment. South Carolina should not be constrained to implementing the lesser of two evils – beach nourishment over hard structures. This paper will conclude with a discussion of alternative technologies and

policies in beach preservation that may provide South Carolina with a meaningful choice in combating erosion.

## **II. Background**

### **A. Possible Causes of Beach Erosion**

A majority of the research in the area of coastal engineering indicate that more than 80 percent of the shorelines in the United States are eroding.<sup>14</sup> Causes of erosion vary greatly according to location; however, three factors contribute greatly to a majority of shoreline erosion – natural disasters, coastal development, and a rise in sea level.<sup>15</sup>

#### **1. Natural Disasters**

Storms are the primary natural force that remove sand from the beaches and relocate it to the adjacent continental shelf.<sup>16</sup> Storms such as hurricanes or northeasters can rearrange the contours of a shoreline much more than any other force – natural or man-made.<sup>17</sup>

The hazards associated with hurricanes are direct wind impact, waves and storm surge.<sup>18</sup> Strong winds cause tremendous damage to vegetation and are responsible for transporting sediment onto and off of the shorelines. Waves that accompany hurricanes are also responsible for shoreline erosion, dune erosion, overwash, and destruction of vegetation. Waves from even a small hurricane can be highly erosive if the storm remains offshore for an extended period of time. Storm surge is a local rise in sea level caused by hurricane winds. Storm surge causes flooding and extends the zone of wave impact inland. The results are severe coastal erosion.<sup>19</sup>

More than 20 hurricanes have affected South Carolina within the twentieth century; however, the most devastating hurricane to hit South Carolina was Hurricane

Hugo which struck its coast on September 21, 1989.<sup>20</sup> Hugo produced some of the greatest short-term erosion of modern times.<sup>21</sup> The average erosion was 12.5 cubic yards of sand from each linear foot of the beach.<sup>22</sup> Along the Grand Strand, Hurricane Hugo caused landward recession of the upper beach by 80 to 150 feet. Beach erosion was experienced at elevations of 13 to 14 feet above mean sea level.<sup>23</sup>

Although hurricanes can cause massive devastation to the beaches and property, northeasters and cyclonic storms may cause even greater damage to coastal property and shorelines than hurricanes. Northeasters are far more common than hurricanes and can occur approximately thirty times a year.<sup>24</sup> These storms are also much larger and longer lasting than hurricanes. A northeaster is commonly spread out over a thousand miles and usually remains stationary on the Atlantic Coast for several days. South Carolina has experienced several devastating northeasters.<sup>25</sup> The Ash Wednesday Storm, a northeaster in 1962, was one of the most widespread and destructive winter storms of all time. From South Carolina to New York, houses, seawalls and groins were destroyed. In 1986 a northeaster destroyed several seawalls and caused erosion on beaches from the Grand Strand to Hilton Head. The northeaster winds of Winter 1995 caused the worst erosion problem along the South Carolina coast since Hurricane Hugo.<sup>26</sup>

## **2. Coastal Development**

Despite the ever-present threat of natural disasters, in recent decades, the U.S. population is migrating toward the coast at a rapid rate. In this time span, areas within five miles of the shorelines experienced population growth three times the national average.<sup>27</sup> According to a study conducted for the National Oceanic and Atmospheric Administration, 80 million people lived within U.S. coastal counties in 1960.<sup>28</sup> By 1990,

the number grew to 110 million and projections are for over 127 million people to live in U.S. coastal counties by 2010.<sup>29</sup>

South Carolina's coastal population has also increased. By 2010, it is expected that twenty-six percent of South Carolina's population will live on its coast.<sup>30</sup> This is an average density of 134 persons per square mile, up from 65 persons per square mile in 1960. Horry County, home of Myrtle Beach, alone experienced a 42 percent population growth from 1980 to 1990 with two-thirds of its residents living between the ocean and the Intracoastal Waterway.<sup>31</sup>

As population increases, so does development. Within the city limits of Myrtle Beach, its residents own more than \$1.4 billion worth of oceanfront real estate.<sup>32</sup> Overdevelopment brings with it a host of environmental consequences. Beach dunes, maritime forests, and marsh habitats are destroyed to make way for coastal construction. The loss of natural vegetation during construction is very costly to a shoreline because the vegetation provides a mechanism to trap and hold sediment in place allowing the floor of a dune to build upwards.<sup>33</sup> Furthermore, opening clearings in the maritime forests results in loss of stabilizing undergrowth and wind protection. An example of this occurred at Pawley's Island, South Carolina during Hurricane Hugo. Poorly vegetated properties were heavily damaged or destroyed while neighboring houses located behind or within the maritime forest sustained less wind damage.<sup>34</sup>

With the loss of these natural storm buffers, property owners soon seek out to construct artificial buffers to protect property. Seawalls, bulkheads, and revetments are built and designed to protect beachfront property. However, in some cases, these structures can result in increased erosion and a lowered beach profile.<sup>35</sup> The result of

attempting to protect beachfront property with these structures is that dry sand beaches disappear.

### **3. Rises in Sea Level**

A rising sea level has been recorded over the last century. Many scientists attribute this to global warming.<sup>36</sup> Global warming, also known as the “greenhouse effect,” occurs when the atmosphere experiences an increase in carbon dioxide (CO<sub>2</sub>). The CO<sub>2</sub> traps heat near the earth’s surface and the increased temperature melts polar ice caps causing a rise in sea level.<sup>37</sup> Because of global warming, sea level is expected to rise this century anywhere from one to three feet.<sup>38</sup> As the sea level rises, the shoreline responds by flooding or eroding. Generally, a one-foot rise in sea level can mean a 100 feet loss of shoreline.<sup>39</sup> With this estimate in mind, this could mean a loss of 200 feet of coastline in South Carolina.<sup>40</sup> This estimate would not appear far-fetched based on what South Carolina has already experienced in sea level rise. According to the NOAA monitoring station located in the Charleston harbor, the sea level has risen ten inches over the past 80 years.<sup>41</sup>

### **B. Remedial Measures**

Coastal states, including South Carolina, have responded to eroding shorelines using various measures; some have been successful, some have actually cost the beach itself. The following is an overview of both hard and soft erosion control devices and techniques used in South Carolina.

#### **1. Hard Erosion Control Devices**

Hard erosion control devices involve structures that either block and dissipate wave energy or that trap sand to widen a beach.<sup>42</sup> Properly designed hard erosion devices

provide effective means of halting shoreline retreat and protecting coastal property; however, the disadvantages are many. Hard erosion devices can cause a degradation of the recreational beach, are costly and their effects are irreversible.<sup>43</sup> There are a variety of types and designs, but the most commonly used are seawalls, bulkheads, revetments, groins, and jetties.<sup>44</sup>

#### **(a) Sea Walls**

Seawalls usually run parallel the shore and are often used on shorelines above the mean high-water line to protect the upland from the impact of waves and to halt the retreat of the shoreline into the line of buildings.<sup>45</sup> These structures are the most common type of hard erosion devices and are also used to reduce flooding due to storm surges. Seawalls are wood, steel, rock or concrete structures and are constructed as a vertical wall, facing the ocean. A common consequence of these structures is the loss of beach fronting the structure. However, the placement of rubble at the foot of the wall to dissipate wave energy reduces or distributes this erosive effect.<sup>46</sup>

#### **(b) Bulkheads**

Bulkheads are very similar to seawalls; however, the primary purpose of a bulkhead is to hold back the land from eroding into the sea and are not designed to absorb wave energy. These structures act as a retaining wall to the land on the upside.<sup>47</sup>

#### **(c) Revetments**

A revetment consists of either loose or interlocking pieces laid on a slope, from the upland to some point on the profile of the slope. Sometimes a revetment can consist of rock and debris and is placed as a “facing” on a dune or beach slope. The structure serves the same purpose as a bulkhead or seawall, which is to protect the upland. Because

a revetment occupies a larger land area, the existence of a slope may reduce the amount of erosion immediately seaward of the structure. While a revetment may be successful in reducing the rate of shoreline retreat, they completely destroy the value of the beach for swimming.<sup>48</sup>

#### **(d) Groins**

Groins are shore-perpendicular structures that serve to reduce the drift rate of sand by impounding the sand on the structure's updrift sides thereby rebuilding an eroding beach. They are used to protect a long segment of coastline and this is accomplished by the use of groin fields. Groins constructed of durable material such as stone are designed to have a life of fifty-plus years. The landward end of a groin typically extends into the dune line.<sup>49</sup> A common consequence of groin fields is that the downdrift beach will experience accelerated erosion and special treatment is necessary to protect this region.<sup>50</sup>

#### **(e) Jetties**

Jetties are similar to groins in construction, but are primarily used to stabilize navigational inlets and entrances. Jetties, however, are associated with more extreme downdrift erosion than groins because they interrupt the sediment transport system much more greatly. Jetties usually protrude so far out into the ocean that they can block all the sediment from being transported causing sand starvation on the downdrift side.<sup>51</sup>

## **2. Soft Erosion Control Techniques**

Hard erosion control devices were once thought to be the solution to shoreline erosion problems; however, use of these structures has increasingly gone out of favor.<sup>52</sup> The fact is that if there is an inadequate supply of sand, hard structures cannot control erosion. In the absence of an adequate sand supply, hard structures are effective in

protecting uplands but often at the expense of the beach by reflecting waves, causing greater turbulence, and thus a greater erosion rate.<sup>53</sup> The modern approach to maintaining a healthy beach is by the use of soft erosion control techniques. Soft techniques imply shoreline maintenance through the addition of new sand to replace the eroding beach, or planting vegetation to hold sediment in place.<sup>54</sup> The goal is to protect property and maintain the economic and environmental value of the beach.

#### **(a) Beach Nourishment**

Beach nourishment involves placing new sand, from an outside source, onto the dry sand beach. It is the most common form of soft stabilization of a beach; however, replenishing an eroding beach with sand is only a temporary solution.<sup>55</sup> Depending on the type and volume of nourishment sand, the temporary restoration may only last for five to ten years.<sup>56</sup> The temporary nature of beach nourishment is due to the fact that the processes that created the original erosion problem remain and continue to remove the nourishment sand.

#### **(b) Sandscraping**

Sandscraping is a redistribution of beach sand by scraping the beach itself. Scraping adds no new sand to the beach, but rather it moves sand from the low-tide beach to the upper beach.<sup>57</sup> In the past, sandscraping has been used on several South Carolina beaches to provide storm protection with varying amounts of success. However, it is a technique that is no longer permitted in South Carolina except in emergency situations.<sup>58</sup>

### **3. Policy of Retreat**

The policy of retreat is a prohibition of construction on the beach and dune systems of a coastline.<sup>59</sup> It may also include a relocation of existing structures that are in

danger of destruction because of the eroding beach. There are three basic ways to retreat from an eroding shoreline: 1) buildings can be moved as the shoreline approaches, 2) buildings can be written off and the remnants removed after being destroyed in storms, or 3) the construction of buildings near beaches can be avoided altogether.<sup>60</sup> A retreat can also occur as either a gradual process or as a total abandonment. A gradual process may mean removing buildings as they are threatened or as they interfere with the use of the beach. It would also include prohibiting major renovations of existing buildings or new construction that would be threatened by future high sea levels. Total abandonment may involve prohibiting the reconstruction of buildings destroyed or damaged by storms.<sup>61</sup> The consequences of a retreat policy is that if regulation goes too far, the courts may consider it a violation of the Fifth Amendment Takings Doctrine. If regulations prohibit a property owner from constructing on his property, the courts may find that the regulation renders the property valueless affording the owner to just compensation.<sup>62</sup>

### **III. Overview of Federal Legislation**

#### **A. Federal Coastal Zone Management Act of 1972 and Amendments**

Congress enacted the Coastal Zone Management Act of 1972 (CZMA) to address coastal environmental problems.<sup>63</sup> The broad purpose of the Act is to “preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation’s coastal zone.”<sup>64</sup> The CZMA provides funding for states to develop and administer coastal programs in accordance with the Act. State participation is on a voluntary basis; however, any participation must meet the consistency requirement within the Act. The consistency requirements for a state management program to receive federal funding are set out in 16 U.S.C.S. §§1455-1456. Although the requirements in the statute are very broad and

provide great flexibility for the states, state management programs must be approved prior to participation. The statute gives authority to the Secretary of Commerce, through the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resources Management, to approve state management programs. Approved programs are subject to continuing review by NOAA and approval may be withdrawn or suspended for a state's failure to implement or enforce its program.<sup>65</sup> The 1990 amendments to the CZMA set out procedures required for NOAA to withdraw funds of approval of a state program. South Carolina participates in this program through its Coastal Zone Management Act of 1977.

### **B. National Flood Insurance Act of 1968**

Federal flood insurance was made available in 1968 through the enactment of the National Flood Insurance Act.<sup>66</sup> The purpose of the 1968 Flood Insurance Act was to reduce the recovery costs by the Federal government as a result of losses from floods. The Act authorized the Federal Emergency Management Administration to develop a National Flood Insurance Program that would provide federally subsidized flood insurance to landowners in flood-prone areas.<sup>67</sup> This program is considered a contributing factor to the overdevelopment of the coastal shorelines because it mitigates a landowner's risks associated with constructing in hazardous flood-prone areas.<sup>68</sup>

### **C. Coastal Barrier Resources Act of 1982**

The Coastal Barrier Resources Act of 1982 enacted by the federal government is an effort to coordinate environmental protection with federal fiscal policy.<sup>69</sup> The Act's purposes include preserving the natural resources of coastal barrier islands, minimizing loss of human life from hazardous coastal development and restricting federal support for

such development. Specifically, the Act prohibits federal assistance or expenditures for new development in undeveloped coastal barrier areas. These restricted areas are designated by Congress as part of the Coastal Barrier Resources System. Federal assistance and expenditures include federal flood insurance coverage, government loans, non-emergency disaster relief, new bridges, roads and other infrastructure. Developers of coastal barrier island property would now bear the risk of building in these hazardous areas.

#### **D. Clean Water Act**

Section 404(a) of the Clean Water Act gives the U.S. Army Corps of Engineers (Corps) jurisdiction over “waters of the United States.”<sup>70</sup> The broad regulatory definition of this term includes all wetlands adjacent to navigable waters.<sup>71</sup> The beaches and its dune system fall within the category of wetlands. The statute gives the Corps authority to construct or maintain erosion control devices on the beach and its dune system and the Corps is the chief decision-making agency for beach nourishment projects. The Corps has authority to issue permits for beach nourishment if placement of fill (sand) occurs in nearshore coastal waters, below the mean high tide line.

### **IV. Overview of State Legislation in South Carolina**

#### **A. S.C. Coastal Zone Management Act of 1977**

The South Carolina Coastal Zone Management Act of 1977 was passed by the General Assembly to provide protection and enhancement of the state’s coastal resources.<sup>72</sup> The Act has a broad range of purposes to encourage coastal management and protection of natural coastal resources. The Act also created the South Carolina Coastal Council and gave it direct regulatory authority over “critical areas” of the coastal zone.

This included coastal waters, tidelands, beaches, and primary oceanfront sand dunes. However, it was soon evident that the Council could not effectuate these legislative goals because the Council lacked authority to prevent construction near eroding shorelines.<sup>73</sup> The regulations the Council promulgated only affected critical areas between the ocean and the landward area through of the first sand dune.

In response to the need for greater protection of beach and dune resources, the Blue Ribbon Committee on Beachfront Management was formed in 1986.<sup>74</sup> The Committee's report indicated that over 57 miles of South Carolina's beaches were critically eroding.<sup>75</sup> In response to the Committee's report, the General Assembly enacted the 1988 Beachfront Management Act.<sup>76</sup>

### **B. Beachfront Management Act of 1988**

The Beachfront Management Act of 1988 (BMA) was enacted because of the relative ineffectiveness of the S.C. Coastal Zone Management Act of 1977.<sup>77</sup> The primary purpose of the Act is to protect and maintain natural beach and dune systems in order to preserve their natural storm buffering functions. This purpose is accomplished by prohibiting new erosion control structures, eliminating existing structures and developing setback requirements. The Act also drastically expanded the designated critical areas and began implementing a retreat policy. Under this Act, the South Carolina Coastal Council now had jurisdiction to regulate all beachfront construction. The Coastal Council was charged with establishing a primary baseline along the South Carolina coast. According to the BMA, the location of the baseline is at the "crest of an ideal primary oceanfront sand dune."<sup>78</sup> BMA also required a drawing of a secondary setback line located at a minimum distance of twenty feet landward of the baseline. The twenty foot area between

the baseline and the setback line created a “dead zone” in which major construction is prohibited.<sup>79</sup> In the area past the initial twenty feet, only construction of habitable structures under 5000 square feet are permitted.<sup>80</sup> In 1993, the General Assembly passed Act 181 which merged the South Carolina Coastal Council with the South Carolina Department of Health and Environmental Control. The Council became the Office of Ocean and Coastal Resource Management (OCRM).<sup>81</sup>

### **C. Coastal Zone Management Program**

The Coastal Zone Management Program was promulgated as a result of the 1977 South Carolina Coastal Zone Management Act, and amended consistent with the 1988 Beachfront Management Act.<sup>82</sup> The regulations address the preservation of a dry-sand beach and public access opportunities, measures to nourish eroding beaches, and the protection of natural vegetation within the beach/dune system. The program seeks to implement South Carolina’s basic state policy towards preserving and restoring beaches through retreat and nourishment.

An important provision of the Act requires the adoption of local beachfront management plans by local governments.<sup>83</sup> If any of the state’s local governments wish to participate in funding programs available for beach nourishment, the governing body must adopt and enforce a local beachfront management plan consistent with the Beachfront Management Act.

## **V. Public Policy Concerns: Weighing the Benefits and Consequences of Beach Nourishment**

### **A. Benefits**

Proponents of beach nourishment argue that healthy wide beaches generate revenue, protect beachfront property and increase property values. Without it, they claim,

there is a potential for “environmental degradation, loss of natural habitat, larger human populations at risk, and economic decadence.”<sup>84</sup>

### **1. Healthy Beaches as a Major Contributor to S.C. Tourism Revenue**

South Carolina is a popular vacation spot for tourists. Beaches are the prime reason non-residents choose South Carolina as a vacation destination.<sup>85</sup> South Carolina’s coastal resorts account for more than 60 percent of total state tourism revenues.<sup>86</sup> In 1999, South Carolina attracted more than 28 million visitors to its 187 miles of beaches which generated over \$8.8 billion, with \$6.6 billion coming from out-of-state and international visitors.<sup>87</sup> In addition, South Carolina beaches generate \$1.54 billion in wages and earnings for its citizens.<sup>88</sup> Proponents claim that if South Carolina doesn’t nourish its beaches, it will experience the same drop in tourist revenues Miami experienced in the 1970s before its nourishment project.<sup>89</sup>

### **2. Protects Coastal Development**

Proponents for beach nourishment argue that, not only do healthy wide beaches generate tourism dollars, but they also provide beachfront property a protective barrier from storm surge damage.<sup>90</sup> Wide beaches, plus high dunes, protect even better.<sup>91</sup> However, high dunes do not occur naturally in South Carolina where shoreline change is rapid and higher dunes can only be created artificially by nourishment.<sup>92</sup> Although nearly fifty percent of South Carolina’s coast is undeveloped and does not need nourishment, one quarter of its developed coastline is eroding at a rate of more than three feet per year.<sup>93</sup> In the twentieth century, Folly Beach has lost several hundred acres of oceanfront beach.<sup>94</sup> Without the use of groins in conjunction with beach nourishment, two rows of houses along Folly Beach and Edisto beach would now be in the surf and most of the

high ground on the northern end of Pawleys Island would have been destroyed.<sup>95</sup> Beach nourishment advocates also claim that beach nourishment is more desirable than construction of seawalls. Since the 1980s, about forty miles of seawalls in South Carolina have been buried by beach nourishment projects and are now sites with vegetated dunes.<sup>96</sup>

Another argument for beach nourishment is that a policy of retreat is far more costlier to a community than it is to periodically nourish a beach. A recent study conducted on the Delaware shoreline concluded that it would cost \$291 million dollars over the next fifty years to relocate beachfront property back from eroding coastlines.<sup>97</sup> However, it would only cost \$60 million to nourish the beach over this same time period.<sup>98</sup>

### **3. Improves Property Values With Positive Impact on Government Revenues**

Beach nourishment is also responsible for increasing beachfront property values and producing more direct tax benefits for the government than most other infrastructure investments.<sup>99</sup> When a beach is nourished, it has the effect of mitigating risks of storm damage to beachfront property owners. These nourished sites are much more attractive for development, thereby increasing property value. Moreover, with development comes government infrastructure to support development such as roads, bridges, and sewage treatment facilities. This adds to the value of beachfront property. After a beach nourishment project in Long Island, New York, property values increased an average of \$250,000.<sup>100</sup> Similarly, in Sandbridge, Virginia, beachfront property values increased an average of fourteen percent in one year after its beach nourishment project.<sup>101</sup> In two coastal counties in South Carolina, property values increased an average of \$554 for

every foot of beach added during nourishment.<sup>102</sup> It also goes without saying that as property value increases, so does local government revenue in the form of property taxes.

Federal, state and local governments also benefit from revenue generated from coastal tourism. The federal government makes over \$80 billion in tax revenue from beach tourists while only spending \$135 million on beach nourishment.<sup>103</sup> In South Carolina, visitors to the coast paid an average of \$500 million in state and local taxes.<sup>104</sup>

## **B. Consequences**

Holding back the ocean as water level rises is usually possible; however, in some cases, it is not an economically or environmentally sound policy. Beach nourishment projects can have the adverse effect of encouraging coastal development in hazardous areas at a great expense to both federal and state taxpayers. Beach nourishment is also a costly temporary solution to coastal erosion and can impact the environment and the marine species in the coastal zone.

### **1. Encourages Coastal Development in Hazardous Areas**

Beach nourishment, which provides recreational and property protection benefits, also encourages coastal development.<sup>105</sup> These projects, which are partially paid for by the Federal government when constructed by the Army Corps of Engineers, protect developments that have been build in hazardous areas. When the costs are partially paid for by taxpayers, this operates as a government provided incentive to overdevelop vulnerable coastal areas because many areas of the coastline would be less habitable if erosion threatened beachfront property.<sup>106</sup> Prior to the enactment of the stringent coastal development laws in South Carolina, indiscriminate construction of housing and buildings on or in front of protective dunes occurred at a surprising rate. Beach

nourishment contributed to the dilemma because it creates wider beaches and wider beaches reduce the risk of damages by flooding. Most beach nourishment projects are funded by federal, state and local governments without direct funding from private beachfront property owners. When property owners do not have to pay for beach protection, they are more likely to choose riskier, more erosive locations to construct. An example of this occurred in Edisto Beach, South Carolina. Nearly all the cottages currently at risk of destruction by erosion were constructed after the S.C. Highway Department nourished that shoreline during the 1950s and built groins to hold the material in place.<sup>107</sup>

## **2. Cost vs. Effectiveness**

Since the 1920s, South Carolina has completed more than twenty-two projects involving nourishment of beaches with approximately 20 million cubic yards of sand.<sup>108</sup> During the 1990s, total state expenditures for nourishment projects were \$25.5 million.<sup>109</sup> The fact that beach nourishment is strictly a temporary solution to erosion, the cost versus the effectiveness is in constant controversy.<sup>110</sup> In 1991, Hunting Island State Park's nourishment program cost \$2.9 million and within ten years, the imported sand had completely eroded. By 2003, the General Assembly had budgeted an additional \$5 million for another Hunting Island State Park nourishment project.<sup>111</sup>

The effectiveness of beach nourishment is also highly questionable because funds are scarcely available to replenish the entire beach. Thus, only the upper beach is covered with new sand, creating a steeper beach. The steepened replenished beach may erode as much as 10 times faster than a natural beach.<sup>112</sup>

## **3. Taxpayers Subsidize Beachfront Development and are Unequally Burdened With the Cost of Nourishment**

Much of the development on South Carolina's coastline could not take place without federal and state assistance and subsidies. Federal and state programs such as flood insurance, highway programs, sewage treatment facility funding, and disaster relief, subsidize development on the coast.<sup>113</sup> Every taxpayer, whether a beachfront property owner or not, contributes to the cost of nourishment and storm-related damage to beachfront property. This occurs through underwriting disaster assistance, the national flood insurance program, loans to build and replace infrastructure, and temporary housing for those who are displaced because of storms.<sup>114</sup> Taxpayers at all levels support the federal costs of the U.S. Army Corps of Engineers to rebuild beaches.<sup>115</sup>

Opponents of beach nourishment also insist that costs to protect beachfront property is not equally allocated and should be paid for by those who benefit the most.<sup>116</sup> Although the beaches are a public good, not all nourished beaches provide the public with the benefit of ample public access. Federal funding for beach nourishment projects is only available to beaches with public access and parking; however, this requirement has not been strictly enforced.<sup>117</sup> Sea Bright, New Jersey, the location of one of the largest and most expensive beach nourishment projects, has almost no access and parking. Similarly, in Hilton Head Island, South Carolina, public access and public parking is also scarce for day visitors.<sup>118</sup> Because the U.S. Army Corps of Engineers is not enforcing public access at the national level, individual communities are free to restrict public access to nourished beaches.

Even residents of private beach communities are battling over who should pay for beach nourishment.<sup>119</sup> Because private communities lack public beach access, they are not eligible for federal or state funds for nourishment. At DeBordieu, a private

community in Georgetown County, South Carolina, the beach in front of eight homes guarded by a seawall is severely eroding. The remaining community beach is healthy and wide. However, all of the community's property owners had to share equally in the cost of the \$2 million beach nourishment project in 1998.<sup>120</sup>

#### **4. Environmental Consequences at Nourished Beach Locations**

Opponents of beach nourishment claim that one environmental consequence of beach nourishment is that it conflicts with efforts to protect sea turtle populations and diminishes nesting success.<sup>121</sup> A case study was conducted in Martin County, Florida after a nourishment project and the outcome suggests that if nourishment results in a change in beach profile and sediment compaction, nesting success declined dramatically.<sup>122</sup> In 2001 and 2002, the North Carolina Coastal Federation conducted a study on the environmental effects of beach nourishment projects in several North Carolina counties.<sup>123</sup> The group determined that nourishment projects that extended into nesting season actually deter turtles from selecting the location for nesting. Several factors cause these turtles to abandon their efforts such as the presence of dredging pipes, sand containing a high concentration of rocks and shells, and steep sand embankments.<sup>124</sup>

Another environmental consequence of beach nourishment occurs at the nearshore dredging location. Nearshore rock formations and seagrass meadows provide spawning and feeding habitat for fishes and invertebrates; however, when sand is dredged from these locations, this habitat is often destroyed due to the increased turbidity in the water, increased sedimentation, and damage caused by mechanical equipment.<sup>125</sup> Dredging can also harm or kill clams, crabs and other important marine life in the surf zone.<sup>126</sup> The North Carolina Coastal Federation's study discussed above, reported that

during two of North Carolina's nourishment projects, five adult turtles were sucked up and killed in the dredging pumps.<sup>127</sup>

Finally, the success rate of a beach nourishment project depends on using new sand that matches the sand on an eroding beach.<sup>128</sup> If the grains are too fine, the new sand will wash out to sea at a greater rate. However, communities are finding that nearshore sources of compatible sand for beach nourishment projects are greatly diminishing.<sup>129</sup> Often a search for similar sand will lead one community with an eroding beach seeking to remove sand from another community's accreting portion of the same beach. In 2003, the DeBordieu community discussed above, wanted to take sand from the public North Inlet for their private beach nourishment project.<sup>130</sup> At a public hearing conducted by OCRM, citizens voiced the concern that the public was being asked to sacrifice public land to temporarily fix problems that the DeBordieu residents created themselves by building their homes too close to the ocean.<sup>131</sup>

Because there is a scarcity of sand in nearshore locations, offshore locations for compatible sand are also sometimes utilized, but because of the increased distance to transport offshore sand, the cost of a beach nourishment project can dramatically increase.<sup>132</sup>

### **C. Do Benefits Outweigh Consequences?**

Looking at the benefits and consequences, it is easy to understand why beach nourishment is controversial because there really is no definitive answer. It depends on where one stands on the issue. Nourishing an eroding beach may help a state's economy, protect beachfront development and individual property rights, but it is clearly at the expense of the taxpayer, the environment and marine life. However, in South Carolina,

the scale may very well tip in favor of beach nourishment. In the State's current legal and regulatory environment beach nourishment may be the last line of defense against an armored coastline.

## **VI. Current Legal and Regulatory Environment Points to Beach Nourishment**

In 1988, South Carolina's General Assembly passed the Beachfront Management Act (BMA) because current legislation addressing beach erosion was ineffective in prohibiting construction on critically eroding shorelines.<sup>133</sup> The BMA prohibited construction of hard erosion control devices, sought to eliminate existing structures, and developed setback requirements for the purpose of implementing a policy of retreat.<sup>134</sup> The South Carolina Coastal Council (Council), the administrative agency charged with executing the provisions of the Act, established baselines along the coast at the crest of an ideal primary oceanfront sand zone.<sup>135</sup> The BMA also required a secondary setback line located at a minimum distance of twenty feet landward of the baseline. The area between the baseline and the setback line is a "dead zone" in which major construction is prohibited. Based on these requirements, the Council began denying applications for permits that involved construction in the dead zone.<sup>136</sup> However, it was not long before South Carolina's policy of retreat and the BMA was challenged in court.

### **A. South Carolina Retreating From Its Policy of Retreat**

In 1986, David Lucas purchased two beachfront lots on the Isle of Palms, South Carolina, with the purpose of constructing two single family homes.<sup>137</sup> Subsequently, the General Assembly passed the BMA and the Council followed with a denial of Lucas' permit application to construct the homes. Lucas appealed the decision on the grounds that the denial to construct deprived him of all "economically viable use" of his land in

violation of the takings clause of the Fifth and Fourteenth Amendments of the U.S. Constitution.<sup>138</sup> Lucas claimed he was entitled to just compensation and the South Carolina Circuit Court agreed. Lucas was awarded over \$1.2 million.<sup>139</sup> The South Carolina Supreme Court then reversed this decision on the grounds that the BMA was a valid exercise of the State's police power in preventing a serious public harm or nuisance and therefore, no compensation was merited under the Takings Clause.<sup>140</sup> The U.S. Supreme Court granted Lucas' writ of certiorari and reversed the South Carolina Supreme Court's decision. The U.S. Supreme Court found that when all "economically viable use" of property is prohibited by regulation, then a taking has occurred and the owner is entitled to just compensation.<sup>141</sup> On remand, the South Carolina Supreme Court held that a taking did occur and remanded the case to the circuit court for a determination on damages.<sup>142</sup> The case eventually settled prior to the damages hearing for \$1,575,000.<sup>143</sup> This amount included a purchase price of \$425,000 for each lot and the remainder for damages satisfying Lucas' taking claims. The Council also issued Lucas his permits for construction.<sup>144</sup>

The consequence of this decision is that judicial recognition of regulatory takings as it applies to beachfront construction limits South Carolina's ability to enforce its retreat policy.<sup>145</sup> In 1990, the General Assembly also added a special permit provision which allowed construction seaward of the baseline in certain circumstances.<sup>146</sup> In addition, in 1993, the General Assembly specifically prohibited the Council from adopting any unduly restrictive regulation that may result in a taking of property without just compensation.<sup>147</sup>

In light of the *Lucas* decision and subsequent legislative amendments, enforcing South Carolina's policy of retreat is no longer a top priority for the Council (now OCRM). In fact, Bill Eiser, with OCRM, stated that although construction in the dead zone is technically prohibited, the agency has not denied such permits on a consistent basis since the ruling.<sup>148</sup> Eiser stated that the internal policy of OCRM is to do what is necessary to avoid a takings challenge.<sup>149</sup> What this amounts to is that for all intents and purposes, South Carolina is quietly retreating from its policy of retreat.

### **B. BMA Takes Another Hit – Court Finds Groins are Permitted**

Another provision of the BMA prohibits construction of new hard erosion control devices.<sup>150</sup> In 1996, Port Royal Plantation located on Hilton Head Island, South Carolina, applied and was granted a permit to construct four new groins and to repair an existing groin field.<sup>151</sup> The South Carolina Coastal Conservation League and the Sierra Club filed an appeal on the grounds that the BMA prohibited construction and repair of hard erosion control devices on the “active beach.”<sup>152</sup> The permit was upheld by the Administrative Law Court and the South Carolina Circuit Court. However, the Court of Appeals reversed the decision based on the express language of S.C. Code Ann. 48-39-290(A) which prohibits construction of groins seaward of the baseline.<sup>153</sup> The Supreme Court granted certiorari and reversed the Court of Appeals.<sup>154</sup> The Supreme Court determined that the General Assembly did not intend to ban groins because after the Court of Appeals ruling, the General Assembly passed the Beachfront Restoration and Improvement Act (BRITA) which specifically authorizes groin construction and maintenance.<sup>155</sup>

Taking this case outcome in mind, along with the General Assembly's subsequent enactment of BRITA, the bright line rule prohibiting hard structures is no longer as

bright. For eight years after the enactment of the BMA, OCRM saw no permit applications for groins.<sup>156</sup> Since the 2003 ruling, OCRM has received two of these permit applications<sup>157</sup> and likely will see more now that the General Assembly has paved the way for the use of hard erosion control devices.

Now that groins were allowed on South Carolina's coastline, this left the door open for legal challenges on the BMA's ban of seawalls and bulkheads. Since the 1993 case, a beachfront property owner appealed OCRM's decision denying a permit application to construct a bulkhead on his property<sup>158</sup> This appeal was essentially based on a *Lucas* takings claim arguing that the denial of a permit to construct a bulkhead had the effect of turning the site of the proposed structure into a public beach. Although this cases had success with the lower courts in that the lower courts found a taking had occurred, the Supreme Court upheld OCRM's denial of the permit finding that the property owner lacked investment-backed expectations in the property; therefore, the denial to build a bulkhead did not constitute a compensatory taking of the property.

However, in 2004, a case before the Beaufort County Circuit Court was initiated by six property owners on Daufuskie Island, South Carolina who were fighting to keep a seawall that fronted several lots and homes on the island.<sup>159</sup> The owners were directly challenging the constitutionality of the BMA's ban on seawalls and claimed that the ban was unfair because since the enactment of the BMA in 1988, the state has allowed seawalls on two other coastal islands.<sup>160</sup> Bill Eiser of OCRM feared that if the case was successful, it could mean that 90 miles of coast could become eligible for seawalls.<sup>161</sup> The case was settled on the eve of trial and under the terms of the settlement, the property owners could temporarily keep their seawall, but would have six months to apply to

OCRM for a permit to install groins.<sup>162</sup> If approved, the property owners will be required to remove the seawall.<sup>163</sup> By settling the suit, however, the constitutionality of the BMA's ban on seawalls is still in question and because review of permit denials are done on a case by case basis, most likely the ban will be challenged again in the future.

### **C. What's Left of the BMA?**

Considering the legal implications of these cases and the General Assembly's subsequent passing of BRITA, the BMA has been gutted of its primary substance. Retreat, for all practical purposes has been quietly abandoned and there is no longer a bright line rule prohibiting hard structures. South Carolina's beaches are almost as vulnerable to indiscriminate construction as they were prior to the enactment of the BMA. It is evident that property owners will go to great lengths to protect their investment. In this current legal and regulatory environment, beach nourishment may be the only viable alternative to preserving South Carolina's coastline.

### **D. Beach Nourishment May Be The Last Line of Defense Against an Armored Coastline**

The bottom line is that unless the General Assembly begins taking steps necessary to enforce the BMA in a manner originally intended, beach nourishment may be the only option available to prevent a proliferation of groin, and possibly seawall construction along the South Carolina coast. Although research is needed to determine whether beach nourishment is an actual deterrent to construction of hard erosion control devices, signs indicate that when a beach is nourished, property owners feel less pressure to arm their property with hard structures. Bill Eiser with OCRM believes that a consistent program of beach nourishment may have an effect of decreasing the number of permit applications for hard structures.<sup>164</sup> Sentiment among coastal communities indicate

that nourishment is a preferable solution to erosion. Neil Robinson, a coastal development lawyer in South Carolina, stated that most property owners would rather beaches be nourished than protected by seawalls.<sup>165</sup> Even the property owners in the Daufuskie Island case discussed above preferred to pursue other means besides a seawall to protect their property.<sup>166</sup> Beach nourishment also appears to be solution of choice for the General Assembly.

#### **E. General Assembly Advocates Beach Nourishment**

Although the General Assembly has seen fit to allow for the construction and maintenance of groins to combat erosion, it also appears to be committed to beach nourishment. Within the provisions of BRITA, the General Assembly established a trust fund solely for the purpose of beach nourishment projects.<sup>167</sup> The Act requires that the trust fund be funded on an annual basis from general tax revenues.<sup>168</sup> Also required is an additional appropriation for emergency response by the State to rebuild the beach and dune systems of the public beach areas damaged by storms.<sup>169</sup>

In 2004, the General Assembly's commitment to beach nourishment was tested and confirmed. House Bill 4925 which appropriated funds for beach nourishment projects was vetoed by Governor Sanford.<sup>170</sup> The General Assembly followed the veto with a legislative override.<sup>171</sup> House Bill 3717 followed, appropriating \$5 million for beach nourishment projects in fiscal year 2005-2006.<sup>172</sup> Apparently, beach nourishment is the current policy of choice for the General Assembly.

#### **VII. Does This Mean a Resignation to the Status Quo?**

Although this argument for beach nourishment is based on the current legal and regulatory environment in South Carolina, it is by no means a resignation to the status

quo. Future considerations in this area should include solutions to coastal erosion that reduce the adverse effects to both the economy and the environment. Environmentalists and concerned citizens must press for discussions of alternative technologies and policies in beach preservation if South Carolina is going to have a meaningful choice in combating beach erosion.

### **A. Alternative Technologies in Beach Preservation**

Not long ago, beach nourishment was considered the “alternative technology” in beach preservation. It was introduced as an alternative to hard erosion control devices because policymakers realized that preserving and enhancing the recreational beaches of the state was equally as important as protecting beachfront property. However, if South Carolina is going to meet these goals in an improved way, it must take the next step towards developing new and improved technologies in beach preservation.

Currently in the state of Florida, several experimental projects have been implemented in various locations along its coast.<sup>173</sup> These experimental projects are the result of Florida legislation passed in 1989 which is designed to encourage the development of new and innovative methods for combating beach erosion.<sup>174</sup> The law enables the Florida Department of Environmental Protection, Division of Beaches and Shores (Division) to review and approve applications of beachfront property owners or governmental entities who wish to construct pilot projects utilizing alternative erosion control methods.<sup>175</sup> All applicants applying for a permit for such a project are required to establish a monitoring plan of the project’s performance.<sup>176</sup> The law further provides that all permits granted under this provision are conditioned on the applicant providing financial assurance on the project’s performance and must discontinue any pilot project

that the Division determines is having an adverse impact on the beach and dune system.<sup>177</sup> If an adverse impact does occur, then the applicant is required to correct it. The Division is required to evaluate the monitoring program three years from the date of implementation, and if effective, the applicant is released from its financial assurance.<sup>178</sup> Another provision of the law requires that all proposed alternative technologies projects must show that its implementation would not harm marine life and the beaches outside of the project area.<sup>179</sup>

Since enactment of this legislation, the Division has approved and the state has partially funded, many experimental projects such as submerging artificial reefs at nearshore locations to dissipate wave energy, dewatering beachfaces, and dune and seagrass proliferation projects.<sup>180</sup> Some projects have had moderate success while others had to be completely removed.<sup>181</sup> However, what this legislation has provided Florida is an opportunity for the state's administrative agency to scientifically test new alternative technologies on actual eroding shorelines. Currently in South Carolina there are no such programs in place to encourage the development of new and innovative methods for dealing with the coastal shoreline erosion problems. Unless there is motivation to introduce the next "alternative technology," South Carolina is resigned to beach nourishment as its only way to control erosion.

### **B. Alternative Public Policy Considerations**

In 1982, the federal legislature enacted the Coastal Barrier Resources Act partially to discourage development on designated coastal barrier islands by denying federal subsidies to coastal developers.<sup>182</sup> The legislature felt that without federal assistance, developers may decide that the prohibitive cost and risk of coastal

construction far outweigh the profit from new development.<sup>183</sup> Studies have indicated that the Act has decreased the density of development in areas where subsidies have been denied.<sup>184</sup> The Act also amended the National Flood Insurance Program which now prohibits federal flood insurance coverage for new or substantially improved structures within the designated coastal barrier islands.<sup>185</sup> Without federal assistance and the lack of federal flood insurance protection, developing on coastal barrier islands is much more cost prohibitive.

South Carolina would do well to follow in the same footsteps and adopt a similar policy at the state level. Instead of denying property owners a permit to construct in hazardous areas, allow for construction. This would appease property rights advocates and minimize any takings challenges. However, construction permits would be approved contingent on a full assumption of risks and costs associated with construction and would contain an environmental mitigation policy. Any property owner desiring to construct in flood prone or erosion prone areas would be responsible for all costs associated with necessary infrastructure and would be required to mitigate any environmental consequences associated with construction. Any construction for bridges, roads, or sewer systems required for development will be funded by the developer. If a dune system is destroyed by construction, then the owner must take the steps necessary to reconstruct a similar system at or near the destroyed dune site. Similarly, if coastal erosion is greatly accelerated because of construction, the owner would be responsible for renourishment in the affected area. Furthermore, any permit to construct will include a prohibition on construction of any hard erosion control devices.

While this policy would not eliminate coastal development, it may make it extremely cost prohibitive so as to discourage the fiscally prudent citizen from purchasing and developing beachfront property. However, most likely, there will still be that foolish man who builds his house upon the sand; but it will have to be an extremely wealthy foolish man and hopefully, they are few and far between.

### **VIII. Conclusion**

South Carolina, like other coastal states, has had its share of problems associated with coastal erosion. The problem of erosion is most likely to steadily increase this century due to both natural and man-made forces such as global warming and coastal development. While South Carolina has combated coastal erosion with various techniques including both hard and soft erosion control devices, its preferred policy today is beach nourishment. However, beach nourishment is highly controversial because it is merely a temporary solution to coastal erosion and it is usually accomplished at the expense of both the taxpayer and the environment. Moreover, based on South Carolina's current legal and regulatory environment, beach nourishment may be its only option to prevent a proliferation of armoring devices along the coastline. Environmentalists, concerned citizens and legislators alike can make a change in how the state addresses coastal erosion by encouraging research and development of alternative technologies in beach preservation and engaging in meaningful public policy debates to discourage hazardous beachfront development. Although beach nourishment is South Carolina's preferred policy today to combat beach erosion, it should not be the state's only choice. South Carolina must take the next step to find a more cost-efficient and environmentally safe way to preserve its beaches for future generations.

## Bibliography

- Act of March 27, 2002, No. 198, H.B. 4413, (codified as amended at S.C. Code Ann. § 48-39-290 (2005).
- American Shore & Beach Preservation Assoc., Beach Renourishment ... It's As Simple as 1-2-3!, available at <http://www.asbpa.org/> (Accessed 3/30/05).
- Associated Press, *Beach Erosion Could Cost S.C.*, The State B5 (Columbia, SC Jan. 24,2005).
- Beach & Shore Preservation Act, Fla. Stat. 161.082 (2004).
- Beach Restoration and Improvement Trust Act, S.C. Code Ann. 48-40-10 *et seq.* (2004).
- Beachfront Mgmt Act of 1988, S.C. Code Ann. § 48-39-250 *et seq.* (2004).
- Charles W. Finkl, *Potential Impacts of a Federal Policy Promoting "No New Beach Replenishment Activities" on U.S. Shorelines: Interations From SE Florida*, Nat'l Conference on Beach Preservation Technology ( Lawrence S. Tait ed. 1996).
- Clean Water Act, 33 U.S.C.S. § 1344(a) (2004).
- Coastal Barrier Resources Act of 1982, 16 U.S.C.S. §§ 3501 to 3510 (2004).
- Coastal Services Center, Nat'l Oceanic and Atmospheric Admin. *Beach Nourishment: A Guide for Local Government Officials*, available at <http://www3.csc.noaa.gov/beachnourishment/index.htm> (Accessed 3/26/2005).
- Coastal Zone Mgmt. Act of 1972, 16 U.S.C.S. § 1451 *et seq.* (2005).
- Coastal Zone Mgmt. Program, 15 C.F.R. § 923.121 (2005).
- Coastal Zone Mgmt. Program, S.C. Code Regs. 30-1(C)(2) (2004).
- Coastal Zone Mgmt. Program, S.C. Code Regs. 30-1(C)(3) (2004).
- Committee on Coastal Erosion Zone Mgmt., National Research Council, *Managing Coastal Erosion* (1990).
- Committee on Engineering Implications of Changes in Relative Mean Sea Level, National Research Council, *Responding to Changes in Sea Level: Engineering Implications* (National Academy Press 1987).
- David M. Bush, Orrin H. Pilkey Jr., & William J. Neal, *Living by the Rules of the Sea* (Duke Univ. Press 1996).
- Erin Reed, *State Takes Public Remarks on DeBordieu Sand Solution*, The Sun News, available at

<http://www.myrtlebeachonline.com/mld/myrtlebeachonline/news/local/7519521.htm?temp...>  
(Accessed 4/18/05).

Fla. Admin. Code § 16B-41.0075 (2004).

Gerald M. Finkel & Gilbert Scott Bagnell, *The Coast is Clear: Lucas Court Sheds Light on Regulatory Takings*, 2 S.C. Envtl. L.J. 28 (Winter 1992).

Gered Lennon, William J. Neal, David M. Bush, Orrin H. Pilkey, Matthew Stutz, & Jane Bullock, *Living With the South Carolina Coast* (Duke Univ. Press 1996).

H 3717, 116<sup>th</sup> Gen. Assem., Reg. Sess. (S.C 2004-2005) available at [http://www.scstatehouse.net/sess116\\_2005-2006/bills/3717.htm](http://www.scstatehouse.net/sess116_2005-2006/bills/3717.htm) (Accessed 3/30/05).

H. 4925, 115<sup>th</sup> Gen. Assem., Reg. Sess. (S.C. 2003-2004) available at [http://www.scstatehouse.net/sess115\\_2003-2004/appropriations2004/gab4925.htm](http://www.scstatehouse.net/sess115_2003-2004/appropriations2004/gab4925.htm) (Accessed 3/30/05).

Howard Marlowe, American Shore and Beach Preservation Association, *The Value of America's Beaches*, available at [http://www.netlobby.com/pdf/Econ\\_Packet.pdf](http://www.netlobby.com/pdf/Econ_Packet.pdf) (accessed 3/30/2005).

Howard Marlowe, *Beach Nourishment: Is It Worth The Cost? – Critique*, Beach Nourishment: A Guide for Local Government Officials available at <http://www3.csc.noaa.gov/beachnourishment/html/human/dialog/series1b.htm> (Accessed 4/17/05).

Jeffrey J. Pompe & James R. Rinehart, *Establishing Fees for Beach Protection: Paying for a Public Good*, Coastal Mgmt. Vol. 27 at 59 (1999).

Jessica Flathmann, *Sea Wall Can Stay For Now: Daufuskie Homeowners, State Officials Settle Dispute*, The Island Packet (Hilton Head, SC March 10, 2004) available at <http://www.islandpacket.com/news/local/story/3404884p-3025999c.html> (Accessed 4/19/2005).

John H. Tibbets, *A Line in The Sand: Nourishing South Carolina's Beaches*, Coastal Heritage, South Carolina Sea Grant Consortium, (Winter 2003-04).

Kevin R. Bodge, *Opening Comments*, Alternative Technologies in Beach Preservation, Seventh Annual National Conference on Beach Preservation Technology (Lawrence S. Tait ed. 1994).

*Lucas v. S.C. Coastal Council*, 505 U.S. 1003 (1992).

*McQueen v. S.C. Coastal Council*, n/k/a *S.C. Dept. of Health & Envtl. Control, Office of Coastal Resources Mgmt.*, 354 S.C. 142, 580 S.E.2d 116 (2003).

- Michael P. Walther, *Looking for Sand Sources Further Offshore Case Study: Venice Phase II, Sand Wars, Sand Shortages & Sand-Holding Structures*, National Conference on Beach Preservation Technology (Lawrence S. Tait ed. 1995).
- N.C. Coastal Federation, *available at* <http://www.nccoast.org/Newsroom/PressTurtles.html> (Accessed 4/16/2005).
- National Flood Insurance Act of 1968, 42 U.S.C.S. § 4001 *et seq.* (2004).
- National Flood Insurance Program, 44 C.F.R. §§ 59 to 78 (2004).
- Office of Coastal Resources Mgmt., South Carolina Dept. of Health & Env'tl. Control, *State of the Beaches 2005*, *available at* <http://www.scdhec.gov/ocrm/html/beaches05.htm> (Accessed 4/17/05).
- Orrin H. Pilkey & Andy Coburn, *Beach Nourishment: Is it Worth the Cost? – Perspective*, *Beach Nourishment: A Guide for Local Government Officials*, Nat'l Oceanic & Atmospheric Admin. *available at* <http://www3.csc.noaa.gov/beachnourishment/html/human/dialog/series1a.htm> (Accessed 4/17/05).
- Orrin Pilkey & Katharine L. Dixon, *The Corps and the Shore* (Island Press 1996).
- Paden E. Woodruff, *Florida's New Program on Experimental Beach Projects*, *Alternative Technologies in Beach Preservation*, Nat'l Conference on Beach Preservation Technology (Lawrence S. Tait ed. 1994).
- Paul A. Work, Fairlight Fehrenbacher, & George Voulgaris, *Nearshore Impacts of Dredging for Beach Nourishment*, *Journal of Waterway, Port, Coastal and Ocean Engineering* (Nov-Dec 2004).
- Recent Press, South Carolina Env'tl. Law Project, *available at* <http://www.scelp.org/press.php> (Accessed 4/19/2005).
- Recent Press, South Carolina Env'tl. Project, *available at* <http://www.scelp.org/press.php> (Accessed 4/19/2005).
- Richard H. Spadoni & Sandra L. Cummings, *Environmental Considerations for Beach Nourishment Projects in Florida*, *Alternative Technologies in Beach Preservation*, Nat'l Conference on Beach Preservation Technology (Lawrence S. Tait ed. 1994).
- Robert G. Ernest, R. Erik Martin, Bud Howard, & Angela Black, *The Effect of Beach Nourishment on Sea Turtle Nesting: A Case Study on Hutchinson Island, Florida*, *Rethinking the Role of Structures in Shore Protection*, Nat'l Conference on Beach Preservation Technology (Lawrence S. Tait, ed. 1998).
- Roger H. Charlier & Christian P. De Meyer, *Coastal Erosion: Response and Management* (Springer-Verlag Berlin Heidelberg 1998).

*S.C. Coastal Conservation League v. S.C. Dept. of Health & Env'tl. Control*, 548 S.E.2d 887, 888 (Ct.App.2001), rev'd 582 S.E.2d 410 (2003).

S.C. Code Ann. § 48-39-260(3) (2004).

S.C. Code Ann. § 48-39-280 (2004).

S.C. Code Ann. § 48-39-290 (2004).

S.C. Code Ann. § 48-39-30(C) (2004).

S.C. Code Ann. § 48-40-10 *et seq.* (2004).

S.C. Code Ann. § 48-40-30 (2004).

S.C. Code Ann. § 48-40-40(A) (2004).

S.C. Code Ann. § 48-40-60(A) (2004).

S.C. Code Regs. § 30-1(C)(6) (2004).

S.C. Code Regs. 30-1 through 30-21 (2004).

S.C. Code Regs. 30-1(A)(1) (2004).

S.C. Code Regs. 30-15 (2004)

S.C. Code Regs. 30-21(E)(1) (2004).

S.C. H.R. Jour., 2004 Reg. Sess. 1/15/2004.

Sammy Fretwell, *Court Urged to Jettison Sea-Wall Ban*, The State (Columbia, SC March 7, 2004) available at <http://www.thestate.com/mld/thestate/news/8126438.htm> (Accessed 4/19/2005).

Section 404 State Program Regulations, 40 C.F.R. 233 (2005).

*South Carolina Coastal Conservation League & Sierra Club v. S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt.; Port Royal Plantation; and Town of Hilton Head*, 345 S.C. 525, 548 S.E.2d 887 (Ct.App. 2001) rev'd at 354 S.C. 585, 582 S.E.2d 410 (2003).

South Carolina Coastal Zone Mgmt. Act of 1977, S.C. Code Ann. § § 48-39-10 *et seq.* (2005).

South Carolina Dept. of Parks, Recreation & Tourism, *Discover South Carolina*, available at <http://www.discoversouthcarolina.com/scfacts/fastfacts.asp> (Accessed 3/30/05).

- South Carolina Dept. of Parks, Recreation & Tourism, Discover South Carolina, *South Carolina Coastal Tourism Economic Indicators*, available at <http://www.discoversouthcarolina.com/documents/coaspr04.htm> (accessed 3/24/2005).
- Stephen P. Leatherman, Env'tl. Protection Agency, National Assessment of Beach Nourishment Requirements Associated With Accelerated Sea Level Rise (1998).
- Steven M. Silverberg & Mark S. Dennison, *Wetlands and Coastal Zone Regulation and Compliance* (Jon Wiley & Sons, Inc. 1993).
- Telephone Interview with Bill Eiser, Staff Oceanographer, S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt. (April 14, 2005).
- Thomas J. Culliton, Maureen A. Warren, Timothy R. Goodspeed, Davida G. Remer, Carol M. Blackwell, and John McDonough III, *Fifty Years of Population Growth Along the Nation's Coasts, 1960-2010* (National Oceanic and Atmospheric Administration 1990).
- Timothy W. Kana, *Beach Nourishment Saves More Than it Costs*, The Island Packet (Hilton Head, S.C., Oct. 5, 1995).
- Timothy W. Kana, *Conserving South Carolina Beaches Through the 1990s: A Case for Beach Nourishment* (1990).
- Timothy W. Kana, *Consider Site-Specific Beach Erosion Issues*, The Island Packet (Hilton Head, S.C., Oct. 5, 1995).
- Timothy W. Kana, *Stabilizing Our Beaches An Ongoing Controversy*, The State (Columbia, SC, June 24, 2000).
- Walter Edgar, *South Carolina: A History* (Univ. of S.C. Press 1998).

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<sup>1</sup> South Carolina Dept. of Parks, Recreation & Tourism, *Discover South Carolina*, available at <http://www.discoversouthcarolina.com/scfacts/fastfacts.asp> (Accessed 3/30/05).

<sup>2</sup> Howard Marlowe, American Shore & Beach Preservation Association, *The Value of America's Beaches* 4, available at [http://www.netlobby.com/pdf/Econ\\_Packet.pdf](http://www.netlobby.com/pdf/Econ_Packet.pdf) (Accessed 3/30/2005).

<sup>3</sup> Orrin Pilkey & Katharine L. Dixon, *The Corps and The Shore* 31 (Island Press 1996).

<sup>4</sup> Gered Lennon, William J. Neal, David M. Bush, Orrin H. Pilkey, Matthew Stutz, & Jane Bullock, *Living With The South Carolina Coast* 41-51 (Duke U. Press 1996).

<sup>5</sup> Lennon at 181.

<sup>6</sup> S.C. Code Regs. § 30-1 (C)(6) (2004).

<sup>7</sup> David M. Bush, Orrin H. Pilkey Jr., & William J. Neal, *Living by The Rules of The Sea* 84 (Duke Univ. Press 1996).

<sup>8</sup> Office of Coastal Resources Mgmt., South Carolina Dept. of Health & Env'tl. Control, *State of the Beaches 2005*, available at <http://www.scdhec.gov/ocrm/html/beaches05.htm> (Accessed 4/17/05).

<sup>9</sup> Marlowe at 4.

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- <sup>10</sup> Telephone Interview with Bill Eiser, Staff Oceanographer, S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt. (April 14, 2005).
- <sup>11</sup> *South Carolina Coastal Conservation League & Sierra Club v. S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt.; Port Royal Plantation; and Town of Hilton Head*, 345 S.C. 525, 548 S.E.2d 887 (Ct.App. 2001) *rev'd at* 354 S.C. 585, 582 S.E.2d 410 (2003).
- <sup>12</sup> Act of March 27, 2002, No. 198, H.B. 4413, (codified as amended at S.C. Code Ann. § 48-39-290 (2005)).
- <sup>13</sup> Beach Restoration and Improvement Trust Act, S.C. Code Ann. 48-40-10 *et seq.* (2004).
- <sup>14</sup> Pilkey at 31.
- <sup>15</sup> *Id.* at 31-34.
- <sup>16</sup> Bush at 19.
- <sup>17</sup> *Id.*
- <sup>18</sup> Bush at 19-32.
- <sup>19</sup> *Id.*
- <sup>20</sup> Walter Edgar, *South Carolina: A History* 583 (Univ. of S.C. Press 1998).
- <sup>21</sup> *Id.* at 33.
- <sup>22</sup> Lennon at 35.
- <sup>23</sup> *Id.*
- <sup>24</sup> *Id.* at 38.
- <sup>25</sup> *Id.* at 37-38.
- <sup>26</sup> *Id.*
- <sup>27</sup> Bush at 5.
- <sup>28</sup> Thomas J. Culliton, Mareen A. Warren, Timothy R. Goodspeed, Davida G. Remer, Carol M. Blackwell, & John McDonough III, *Fifty Years of Population Growth Along the Nation's Coasts, 1960-2010*, National Oceanic and Atmospheric Administration (1990).
- <sup>29</sup> *Id.*
- <sup>30</sup> Lennon at 2.
- <sup>31</sup> *Id.*
- <sup>32</sup> *Id.*
- <sup>33</sup> *Id.*
- <sup>34</sup> Bush at 37.
- <sup>35</sup> Pilkey at 38-40.
- <sup>36</sup> Committee on Engineering Implications of Changes in Relative Mean Sea Level, National Research Council, *Responding to Changes in Sea Level: Engineering Implications 1* (Nat'l Academy Press 1987).
- <sup>37</sup> Committee on Engineering Implications of Changes in Relative Mean Sea Level at 11.
- <sup>38</sup> *Id.* at 13-15.
- <sup>39</sup> Stephen P. Leatherman, Env'tl. Protection Agency, *National Assessment of Beach Nourishment Requirements Associated With Accelerated Sea Level Rise 2-1* (1998).
- <sup>40</sup> *Id.*
- <sup>41</sup> John H. Tibbets, *A Line in The Sand: Nourishing South Carolina's Beaches*, Coastal Heritage, South Carolina Sea Grant Consortium, Winter 2003-04 at 6.
- <sup>42</sup> Roger H. Charlier & Christian P. De Meyer, *Coastal Erosion: Response and Management 27* (Springer-Verlag Berlin Heidelberg 1998).
- <sup>43</sup> Charlier at 27.
- <sup>44</sup> Committee on Coastal Erosion Zone Mgmt., Nat'l Research Council, *Managing Coastal Erosion 56* (Nat'l Academy Press 1990).
- <sup>45</sup> Committee on Coastal Erosion Zone Mgmt. at 59.
- <sup>46</sup> *Id.*
- <sup>47</sup> Charlier at 209-210.
- <sup>48</sup> Charlier at 210.
- <sup>49</sup> *Responding* at 74.
- <sup>50</sup> Committee on Engineering Implications of Changes in Relative Mean Sea Level at 74.
- <sup>51</sup> Charlier at 212.
- <sup>52</sup> Kevin R. Bodge, *Opening Comments*, *Alternative Technologies in Beach Preservation*, Seventh Annual National Conference on Beach Preservation Technology 1 (Lawrence S. Tait ed. 1994).

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- <sup>53</sup> Bodge at 2.
- <sup>54</sup> Nat'l Oceanic & Atmospheric Admin., *Beach Nourishment: A Guide for Local Government Officials* available at <http://www3.csc.noaa.gov/beachnourishment/html/geo/shorelin.htm> (Accessed 3/26/05).
- <sup>55</sup> Bush at 84.
- <sup>56</sup> *Id.*
- <sup>57</sup> Lennon at 46.
- <sup>58</sup> Lennon at 47.
- <sup>59</sup> Responding at 91-93.
- <sup>60</sup> *Id.*
- <sup>61</sup> *Id.*
- <sup>62</sup> See later discussion of *Lucas v. S.C. Coastal Council*, 505 U.S. 1003 (1992).
- <sup>63</sup> Coastal Zone Mgmt. Act of 1972, 16 U.S.C.S. § 1451 *et seq.* (2005).
- <sup>64</sup> *Id.*
- <sup>65</sup> Coastal Zone Mgmt. Program, 15 C.F.R. § 923.121 (2005).
- <sup>66</sup> National Flood Insurance Act of 1968, 42 U.S.C.S. § 4001 *et seq.* (2004).
- <sup>67</sup> National Flood Insurance Program, 44 C.F.R. §§ 59 to 78 (2004).
- <sup>68</sup> Bush at 70.
- <sup>69</sup> Coastal Barrier Resources Act of 1982, 16 U.S.C.S. §§ 3501 to 3510 (2004).
- <sup>70</sup> Clean Water Act, 33 U.S.C.S. § 1344(a) (2004).
- <sup>71</sup> Section 404 State Program Regulations, 40 C.F.R. 233 (2005).
- <sup>72</sup> South Carolina Coastal Zone Mgmt. Act of 1977, S.C. Code Ann. § 48-39-10 *et seq.* (2005).
- <sup>73</sup> Coastal Zone Mgmt. Program, S.C. Code Regs. 30-1(C)(2) (2004).
- <sup>74</sup> Coastal Zone Mgmt. Program, S.C. Code Regs. 30-1(C)(3) (2004).
- <sup>75</sup> *Id.*
- <sup>76</sup> *Id.*
- <sup>77</sup> Beachfront Mgmt Act of 1988, S.C. Code Ann. § 48-39-250 *et seq.* (2004).
- <sup>78</sup> *Id.*
- <sup>79</sup> S.C. Code Ann. § 48-39-280 (2004).
- <sup>80</sup> S.C. Code Ann. § 48-39-290 (2004).
- <sup>81</sup> S.C. Code Regs. 30-1(A)(1) (2004).
- <sup>82</sup> S.C. Code Regs. 30-1 through 30-21 (2004).
- <sup>83</sup> S.C. Code Regs. 30-21(E)(1) (2004).
- <sup>84</sup> Charles W. Finkl, *Potential Impacts of a Federal Policy Promoting "No New Beach Replenishment Activities" on U.S. Shorelines: Interations From SE Florida*, Nat'l Conference on Beach Preservation Technology 285 (1996).
- <sup>85</sup> Marlowe at 4.
- <sup>86</sup> *Id.*
- <sup>87</sup> *Id.*
- <sup>88</sup> *Id.*
- <sup>89</sup> Timothy W. Kana, *Consider Site-Specific Beach Erosion Issues*, The Island Packet (Hilton Head, S.C., Oct. 5, 1995).
- <sup>90</sup> Howard Marlowe, *Beach Nourishment: Is It Worth The Cost? – Critique*, *Beach Nourishment: A Guide for Local Government Officials* available at <http://www3.csc.noaa.gov/beachnourishment/html/human/dialog/series1b.htm> (Accessed 4/17/05).
- <sup>91</sup> Timothy W. Kana, *Beach Nourishment Saves More Than it Costs*, The Island Packet (Hilton Head, S.C., Oct. 5, 1995).
- <sup>92</sup> *Id.*
- <sup>93</sup> *Id.*
- <sup>94</sup> See Note 87.
- <sup>95</sup> Timothy W. Kana, *Stabilizing Our Beaches An Ongoing Controversy*, The State (Columbia, SC, June 24, 2000).
- <sup>96</sup> *Id.*
- <sup>97</sup> Howard Marlowe, *Beach Nourishment, Is it Worth the Cost? – Critique*, *Beach Nourishment: A Guide for Local Government Officials*, Nat'l Oceanic & Atmospheric Admin. 3, available at <http://www3csc.noaa.gov/beachnourishment/html/human/dialog/series1b.htm> (Accessed 4/17/2005).

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- <sup>98</sup> *Id.*
- <sup>99</sup> *Id.* at 1.
- <sup>100</sup> Orrin H. Pilkey & Andy Coburn, *Beach Nourishment: Is it Worth the Cost? – Perspective 2*, Beach Nourishment: A Guide for Local Government Officials, Nat’l Oceanic & Atmospheric Admin. available at <http://www3.csc.noaa.gov/beachnourishment/html/human/dialog/series1a.htm> (Accessed 4/17/05).
- <sup>101</sup> *Id.*
- <sup>102</sup> Jeffrey J. Pompe & James R. Rinehart, *Establishing Fees for Beach Protection: Paying for a Public Good*, Coastal Mgmt. Vol. 27 at 59 (1999).
- <sup>103</sup> See Note 95 at 3.
- <sup>104</sup> Howard Marlowe, American Shore & Beach Preservation Association, *The Value of America’s Beaches 4*, available at [http://www.netlobby.com/pdf/Econ\\_Packet.pdf](http://www.netlobby.com/pdf/Econ_Packet.pdf) (Accessed 3/30/2005).
- <sup>105</sup> See Note 100 at 3.
- <sup>106</sup> *Id.*
- <sup>107</sup> John H. Tibbets, *A Line in the Sand: Nourishing South Carolina’s Beaches*, Coastal Heritage 6 (Winter 2003-2004).
- <sup>108</sup> American Shore & Beach Preservation Assoc., *Beach Renourishment ... It’s As Simple as 1-2-3!*, available at <http://www.asbpa.org/> (Accessed 3/30/05).
- <sup>109</sup> Tibbets at 6..
- <sup>110</sup> Tibbets at 4.
- <sup>111</sup> Associated Press, *Beach Erosion Could Cost S.C.*, The State B5 (Columbia, SC Jan. 24,2005).
- <sup>112</sup> Lennon at 43.
- <sup>113</sup> Bush at 3.
- <sup>114</sup> *Id.*
- <sup>115</sup> *Id.*
- <sup>116</sup> John H. Tibbets, *A Line in the Sand: Nourishing South Carolina’s Beaches*, Coastal Heritage 4 (Winter 2003-2004).
- <sup>117</sup> Pilkey, *Beach Nourishment: Is it Worth the Cost? – Perspective* at 4.
- <sup>118</sup> *Id.*
- <sup>119</sup> Tibbetts at 4.
- <sup>120</sup> *Id.*
- <sup>121</sup> Robert G. Ernest, R. Erik Martin, Bud Howard, & Angela Black, *The Effect of Beach Nourishment on Sea Turtle Nesting: A Case Study on Hutchinson Island, Florida*, Rethinking the Role of Structures in Shore Protection, 1998 Nat’l Conference on Beach Preservation Technology 93 (Lawrence S. Tait, ed. 1998).
- <sup>122</sup> Ernest at 93.
- <sup>123</sup> N.C. Coastal Federation, available at <http://www.nccoast.org/Newsroom/PressTurtles.html> (Accessed 4/16/2005).
- <sup>124</sup> *Id.*
- <sup>125</sup> Richard H. Spadoni & Sandra L. Cummings, *Environmental Considerations for Beach Nourishment Projects in Florida*, Alternative Technologies in Beach Preservation, 7<sup>th</sup> Nat’l Conference on Beach Preservation Technology 612-614 (Lawrence S. Tait ed. 1994).
- <sup>126</sup> *Id.*
- <sup>127</sup> N.C. Coastal Federation at Note 92.
- <sup>128</sup> Timothy W. Kana, *Conserving South Carolina Beaches Through the 1990s: A Case for Beach Nourishment* 8 (S.C. Coastal Council 1990).
- <sup>129</sup> Michael P. Walther, *Looking for Sand Sources Further Offshore Case Study: Venice Phase II*, Sand Wars, Sand Shortages & Sand-Holding Structures 1, National Conference on Beach Preservation Technology (Lawrence S. Tait ed. 1995).
- <sup>130</sup> Erin Reed, *State Takes Public Remarks on DeBordieu Sand Solution*, The Sun News, available at <http://www.myrtlebeachonline.com/mld/myrtlebeachonline/news/local/7519521.htm?temp...> (Accessed 4/18/05).
- <sup>131</sup> *Id.*
- <sup>132</sup> Walther at 1.
- <sup>133</sup> See Notes 71-81.
- <sup>134</sup> *Id.*

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- <sup>135</sup> *Id.*
- <sup>136</sup> Telephone Interview with Bill Eiser, Staff Oceanographer, S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt. (April 14, 2005).
- <sup>137</sup> *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1007 (1992)
- <sup>138</sup> *Lucas*, 505 U.S. at 1003
- <sup>139</sup> *Id.*
- <sup>140</sup> *Id.*
- <sup>141</sup> *Lucas* at 1027.
- <sup>142</sup> Gerald M. Finkel & Gilbert Scott Bagnell, *The Coast is Clear: Lucas Court Sheds Light on Regulatory Takings*, 2 S.C. Env'tl. L.J. 28, 41 (Winter 1992).
- <sup>143</sup> Finkel at 41.
- <sup>144</sup> Finkel at 41.
- <sup>145</sup> Telephone Interview with Bill Eiser, Staff Oceanographer, S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt. (April 14, 2005).
- <sup>146</sup> S.C. Code Regs. 30-15 (2004)
- <sup>147</sup> S.C. Code Ann. § 48-39-30(C) (2004).
- <sup>148</sup> Telephone interview with Bill Eiser, Staff Oceanographer, Office of Coastal Resource Mgmt., S.C. Dept. of Health & Env't'l Control. (April 14, 2005).
- <sup>149</sup> *Id.*
- <sup>150</sup> S.C. Code Ann. § 48-39-260(3) (2004).
- <sup>151</sup> *S.C. Coastal Conservation League v. S.C. Dept. of Health & Env'tl. Control*, 548 S.E.2d 887, 888 (Ct.App.2001), rev'd 582 S.E.2d 410 (2003).
- <sup>152</sup> *S.C. Coastal Conservation League*, 548 S.E.2d at 887.
- <sup>153</sup> *Id.* at 894.
- <sup>154</sup> *S.C. Coastal Conservation League*, 582 S.E.2d at 413.
- <sup>155</sup> S.C. Code Ann. § 48-40-10 *et seq.* (2004). *See also* S.C. H.R. Jour., 2004 Reg. Sess. 1/15/2004.
- <sup>156</sup> Telephone Interview with Bill Eiser, Staff Oceanographer, S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt. (April 14, 2005).
- <sup>157</sup> *Id.*
- <sup>158</sup> *McQueen v. S.C. Coastal Council, n/k/a S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt.*, 354 S.C. 142, 580 S.E.2d 116 (2003).
- <sup>159</sup> Recent Press, South Carolina Env'tl. Law Project, available at <http://www.scelp.org/press.php> (Accessed 4/19/2005). *See also* Sammy Fretwell, *Court Urged to Jettison Sea-Wall Ban*, The State (Columbia, SC March 7, 2004) available at <http://www.thestate.com/mld/thestate/news/8126438.htm> (Accessed 4/19/2005).
- <sup>160</sup> *Id.*
- <sup>161</sup> *Id.*
- <sup>162</sup> Recent Press, South Carolina Env'tl. Project, available at <http://www.scelp.org/press.php> (Accessed 4/19/2005). *See also* Jessica Flathmann, *Sea Wall Can Stay For Now: Daufuskie Homeowners, State Officials Settle Dispute*, The Island Packet (Hilton Head, SC March 10, 2004) available at <http://www.islandpacket.com/news/local/story/3404884p-3025999c.html> (Accessed 4/19/2005).
- <sup>163</sup> *Id.*
- <sup>164</sup> Telephone Interview with Bill Eiser, Staff Oceanographer, S.C. Dept. of Health & Env'tl. Control, Office of Coastal Resources Mgmt. (April 14, 2005).
- <sup>165</sup> Sammy Fretwell, *Court Urged to Jettison Sea-Wall Ban*, The State (Columbia, SC March 7, 2004) available at <http://www.thestate.com/mld/thestate/news/8126438.htm> (Accessed 4/19/2005).
- <sup>166</sup> Jessica Flathmann, *Sea Wall Can Stay For Now: Daufuskie Homeowners, State Officials Settle Dispute*, The Island Packet (Hilton Head, SC March 10, 2004) available at <http://www.islandpacket.com/news/local/story/3404884p-3025999c.html> (Accessed 4/19/2005).
- <sup>167</sup> S.C. Code Ann. § 48-40-30 (2004).
- <sup>168</sup> S.C. Code Ann. § 48-40-40(A) (2004).
- <sup>169</sup> S.C. Code Ann. § 48-40-60 (A) (2004).
- <sup>170</sup> H. 4925, 115<sup>th</sup> Gen. Assem., Reg. Sess. (S.C. 2003-2004) available at [http://www.scstatehouse.net/sess115\\_2003-2004/appropriations2004/gab4925.htm](http://www.scstatehouse.net/sess115_2003-2004/appropriations2004/gab4925.htm) (Accessed 3/30/05).
- <sup>171</sup> *Id.*

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<sup>172</sup> H 3717, 116<sup>th</sup> Gen. Assem., Reg. Sess. (S.C 2004-2005) available at

[http://www.scstatehouse.net/sess116\\_2005-2006/bills/3717.htm](http://www.scstatehouse.net/sess116_2005-2006/bills/3717.htm) (Accessed 3/30/05).

<sup>173</sup> Paden E. Woodruff, *Florida's New Program on Experimental Beach Projects*, Alternative Technologies in Beach Preservation, Nat'l Conference on Beach Preservation Technology 3 (Lawrence S. Tait ed. 1994).

<sup>174</sup> Beach & Shore Preservation Act, Fla. Stat. 161.082 (2004).

<sup>175</sup> Fla. Admin. Code § 16B-41.0075 (2004).

<sup>176</sup> *Id.*

<sup>177</sup> *Id.*

<sup>178</sup> *Id.*

<sup>179</sup> *Id.*

<sup>180</sup> Woodruff at 6-9.

<sup>181</sup> *Id.*

<sup>182</sup> Steven M. Silverberg & Mark S. Dennison, *Wetlands and Coastal Zone Regulation and Compliance* 126-127 (Jon Wiley & Sons, Inc. 1993).

<sup>183</sup> Silverberg at 126.

<sup>184</sup> Silverberg at 127 *quoting* E. Jones & W. Stolzenburg, *Building in the Coastal Barrier Resources System*, 1989 Coastal Zone Conference (Charleston, SC 1989).

<sup>185</sup> Silverberg at 127.