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Coastal Ecosystem Protection in Florida

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I. INTRODUCTION

The coasts of the United States, and of Florida in particular, have created an intrigue in a way that no other geological region has. The popularity created by this intrigue has created numerous problems for the ecosystems of the coastal zone.

The coastal zone itself is a "critical interface between the land, the sea, and the atmosphere."¹ Far from being a stable and constant environment, it is an ecosystem in a constant state of flux.² There is no permanence

1. ROBERT B. DITTON ET AL., COASTAL RESOURCES MANAGEMENT: BEYOND BUREAUCRACY AND THE MARKET 2 (1977) [hereinafter DITTON].

2. *Id.* at 16.

attached when the land itself can, and will, disappear with the water or the wind.

The coastal zone is comprised of numerous habitats in which "communities of plants and animals that are endemic and that carry out the functional activities of the system" exist.³ This includes the sandy beaches with dune systems and barrier islands, and the estuaries and coastal wetlands. Each one of these systems is fragile and unique, and contains its own delicate balance. When this balance is disrupted by population growth and development, danger can occur without stringent control mechanisms to protect it.

It is estimated that by the year 2000, eighty-five percent of Florida's population will be living in coastal counties.⁴ Florida will then have the fourth largest population in the United States filled with 14,000,000 residents and 55,000,000 tourists per year, all of whom love the coasts.⁵ In addition, by that same year, 153,000,000 Americans will be boating annually.⁶ What the state chooses to do today will determine whether this population boom will overdevelop and destroy our coasts, or whether this development will be sustainable, thus protecting the coasts for generations to come.

Sustainable development has been defined as "the use of natural resources to support economic activity without compromising the environment's carrying capacity, which is its ability to continue producing . . . goods and services."⁷ When this carrying capacity can be quantified, the limits of growth and development can be practically addressed.

According to one commentator, "[a]t a density of 1 person per square kilometer little of the natural functioning of the environment [will] be lost, (unless the person is using an off-road vehicle)."⁸ "At 10 persons per square kilometer the likelihood of being alone and of seeing wildlife [is] sacrificed."⁹ "At 100 persons per square kilometer most wildlife will depart[, and] in the absence of any management intervention, there will be

3. *Id.* at 4.

4. RICHARD G. HAMANN, CONSTITUTIONAL ISSUES IN LOCAL COASTAL RESOURCE PROTECTION 1 (1986).

5. *Id.*

6. FRANK E. MALONEY ET AL., LEGAL ASPECTS OF RECREATIONAL MARINA SITING IN FLORIDA 1 (1986).

7. Edward W. Manning & David T. Dougherty, *Sustainable Tourism*, CORNELL HOTEL & RESTAURANT ADMIN. Q., Apr. 1995, at 29, 30.

8. *Id.* at 39.

9. *Id.* at 40.

visible pollution[] and noticeable ecological degradation.”¹⁰ Finally, at a capacity of “1,000 persons per square kilometer urban densities are reached, and the experience is no longer a natural one[,] . . . and intensive management is needed to maintain the site and to remove trash and human waste.”¹¹ The state is going to be required to establish more maintenance and preservation policies as the population and tourism intensifies and the beaches all grow closer to this maximum carrying capacity.

Florida has established a system of protection for the coastal ecosystems of the state. In doing so, the legislature has addressed several problems which present themselves in separate and distinct ecosystems. Methods chosen by the state to address these problems include establishing protection from coastal construction on sandy beaches,¹² establishing a system by which the local government may acquire public beaches,¹³ and allowing for establishment of renourishment and replenishment programs.¹⁴

This article focuses on the impact that population growth has had on Florida’s coasts, what impact it may have in the future, and what the legislature has done to alter this impact and rectify any damage that may have occurred in the past.¹⁵ Distinct subsystems of the coastal zone ecosystem will be examined in turn, along with the steps taken by the state to protect or repair those systems. The first area examined is the sandy beaches, including the dune system and barrier islands, followed by the coastal estuaries and wetlands. Because both types of coastal areas, although not thoroughly independent, are unique and precious in their own way, each deserves and requires individual management techniques and policies. To treat the coast as one entity is to ignore the dynamics that make the coast important and special to both Floridians and persons worldwide who associate Florida with its endless coasts.

10. *Id.*

11. *Id.*

12. FLA. STAT. § 161.041 (1995).

13. FLA. STAT. § 259.045 (1995).

14. FLA. STAT. § 161.082 (1995).

15. This article will not address federal coastal management programs, nor will it address, more than briefly, county or municipal coastal management programs. While these programs are integral to the functioning of coastal growth management as a whole, they are beyond the scope of this article.

II. BEACHES AND SANDY SHORES

A. *Description of the Ecosystem and Problems Caused by Development*

The beach ecosystem includes not only the sandy coasts, but the beach dune system and the barrier island system as well. The ecosystem is probably the habitat which persons most immediately identify with the coast. Because of its beauty and popularity, it is also where many people choose to reside.

The sandy shore is an area in constant motion. This process begins when suspended particles are carried by the rivers into the ocean.¹⁶ The sediments and nutrients are then transported and dispersed by waves and currents along the coast.¹⁷ The process by which the beach is formed is called littoral drift or longshore transport of sand.¹⁸ This occurs when the waves approach the coastline at an angle, both eroding and further nourishing the shore. The sand particles which move within the waves are then transported and deposited along the shore to form the beach.¹⁹

This cycle of erosion and accretion is what creates and transforms the beach shores and the dunes. The wind is the greatest manipulator of these landforms.²⁰ The waves generated by the wind erode and accrete the shore, while the wind action erodes and accretes the dunes.²¹ One large storm may completely obliterate a dune.²² When a coastal area is undeveloped, the erosional phase of this cycle may completely eliminate the beach and dune system.²³

This unpredictability of the shoreline, which is completely natural and would be acceptable for an undeveloped coast, is considered thoroughly unacceptable where development has already occurred. The cyclic changes of the shoreline can be hostile and dangerous to a landowner on the beach. Most of the largest metropolitan areas in the United States are located within the coastal zone. It is unlikely, therefore, that people will stand by and

16. DITTON, *supra* note 1, at 4.

17. *Id.*

18. *Id.*

19. *Id.*

20. Karl F. Nordstrom, *The Concept of Intrinsic Value and Depositional Coastal Landforms*, GEOGRAPHICAL REV., Jan. 1990, at 68, 69.

21. *Id.*

22. *Id.*

23. *Id.* at 70.

watch their homes and buildings be destroyed by a natural erosion process.²⁴ Without human involvement in the natural processes, such as beach erosion, little fundamental damage will probably occur to the geologic system.²⁵ Unfortunately, people have chosen to play a very active role in manipulating the natural processes of the coastal system.

Some of the human influences which cause severe changes to beaches and dunes include: houses, grading, or bulldozing; stabilization structures (coastal armoring); beach and dune nourishment; sand fences; artificial vegetation planting; and introduction of exotic species.²⁶ Many other invasions such as tramping and vehicular use can cause change, although on a smaller scale.²⁷ As a result of these alterations, a rate of landform change occurs which exceeds that which existed prior to the changes made by humans.²⁸ Eventually, erosion caused by waves will have a greater impact on the altered beaches than it had on the unaltered beaches.²⁹

Although shore protection efforts, such as seawalls and groins,³⁰ are established to prevent erosion, they seem to actually exacerbate the process.³¹ Bulkheads and seawalls, which are parallel to the shore, tend to prevent the coastal formations which supply sediment to the beach.³² Groins and jetties, which are perpendicular to the shore, tend to trap the sand that moves parallel to the shoreline in the longshore-transport system.³³

Coastal barrier islands also are caused by accretion parallel to the coast, and consist of shell, sand, and gravel. These islands are similarly damaged by human alteration of the ecosystem.³⁴ Because these barrier islands are

24. DITTON, *supra* note 1, at 45.

25. Orrin H. Pilkey & Mark Evans, *Rising Sea, Shifting Shores*, in *COAST ALERT: SCIENTISTS SPEAK OUT* 13, 30 (Thomas C. Jackson & Diana Reische eds., 1981).

26. *Id.*

27. Nordstrom, *supra* note 20, at 69.

28. *Id.* at 71.

29. *Id.* at 72.

30. A seawall is "a wall or embankment to protect the shore from erosion or to act as a breakwater." WEBSTER'S NEW COLLEGIATE DICTIONARY 1035 (1973). A groin is "a rigid structure built out from a shore to protect the shore from erosion, to trap sand, or to direct a current for scouring a channel." *Id.* at 502.

31. Nordstrom, *supra* note 20, at 72.

32. *Id.*

33. *Id.*

34. John R. Clark, *Management of Coastal Barrier Biosphere Reserves*, BIOSCIENCE, May 1991, at 331, 331.

temporary and continually changing shape, many of the protection programs that have been implemented to protect them have been unsuccessful.³⁵

Despite the number of protective measures, sandy beaches in the United States are eroding at a phenomenal rate. Approximately ninety percent of this country's beaches are eroding.³⁶ Of Florida's 1000 miles of coastline, 440 miles are eroded, and 230 miles have an erosion problem deemed critical by the state because the coastline has been threatened by development and recreation.³⁷ As a solution to this problem, more than ninety beaches throughout the United States have been "renourished"³⁸ and Dade and Broward Counties in Florida have undertaken seventeen renourishment projects since 1970.³⁹ Renourishment, or replenishment, is the process by which the sand on an eroded beach is artificially replaced with sand mined from "backbays, inlets, offshore, and inland sources."⁴⁰ Often, the sand that is used is coarser than the natural sand. Furthermore, a nourished beach often results in an unnatural, widened, and oversteepened upper beach.⁴¹ The rate of erosion of a nourished beach is much higher than the rate of erosion of a natural beach due to the lack of equilibrium of the larger foreshore.⁴² Eventually, the high erosion rate of the nourished beach slows and conditions begin to resemble the natural processes once again.⁴³

As a result of the large number of renourishment projects undertaken in Florida, the supply of sand to renourish the Florida beaches is almost depleted.⁴⁴ Dade County, for example, is now considering importing sand from the Bahamas to fill eroded beaches. This action may have serious repercussions, however, because Bahamian sand does not contain the same type of material as Florida sand.⁴⁵ Additionally, non-native sand may not retain enough heat to allow marine turtles to reproduce adequately.⁴⁶

35. *Id.*

36. Kathy Kiely, *Letter From Kitty Hawk: Send for King Canute*, MGMT. TODAY, Aug. 1989, at 15, 15.

37. *Florida Running out of Sand*, Engineering News-Rec., Mar. 6, 1995, at 19.

38. Nordstrom, *supra* note 20, at 75.

39. Cyril T. Zaneski, *South Florida Short of Sand? Believe it*, TORONTO STAR, Dec. 4, 1993, at J12.

40. Nordstrom, *supra* note 20, at 75.

41. *Id.*

42. *Id.*

43. *Id.*

44. Zaneski, *supra* note 39, at J12.

45. Bahamian sand is made of argonite, "a dense crystallized mineral unlike common Florida sand." *Florida Running out of Sand*, *supra* note 37, at 19.

46. *Id.*

Solutions which may appear simplistic and non-problematic may indeed have severe consequences in an ecosystem so delicately balanced. Therefore, a complex solution is needed to protect a complex ecosystem such as the coast, particularly where past programs damaged the natural processes instead of improving them.

B. *The Regulation of Beaches, Shores, and Dunes*

The Florida Legislature has recognized that coastal areas are “dynamic geologic systems with topography that is subject to alteration by waves, storm surges, flooding, or littoral currents[,]” and that “coastal areas are among Florida’s most valuable resources and have extremely high recreational and aesthetic value which should be preserved and enhanced.”⁴⁷ Because of the extraordinary importance our beaches and shores hold, Florida has enacted a series of elaborate coastal protection measures. These measures include protection from construction of a variety of structures landward of the mean-high water line,⁴⁸ protection from vehicular traffic,⁴⁹ and specific enactments for barrier islands.⁵⁰

To Florida, beaches and shores hold unquestionable importance economically. They are the “backbone of tourism in the state of Florida.”⁵¹ Without specific protection, these economic resources would be lost. The legislature has declared that the “highest and best use of the seacoast of the state is as a source of public and private recreation[,]” and that “such use can only be served effectively by maintaining the coastal waters, . . . beaches, and public lands adjoining the seacoast in as close to a pristine condition as possible”⁵²

1. Construction Controls

There are several mechanisms by which the state controls construction and development of the beaches and shores. The primary mechanism by which it undertakes this control is through the Beach and Shore Preservation

47. FLA. STAT. § 161.53(2), (3) (1995).

48. FLA. STAT. §§ 161.052, .053 (1995).

49. FLA. STAT. § 161.58 (1995).

50. FLA. STAT. § 161.55(5) (1995).

51. Zaneski, *supra* note 39, at J12 (quoting Lonnie Ryder, Florida Department of Environmental Protection).

52. FLA. STAT. § 376.021(1), (2) (1995).

Act ("BSPA")⁵³ and the Coastal Zone Protection Act ("CZPA"),⁵⁴ which requires construction restriction lines.⁵⁵ The Florida Legislature recognizes the problem with "increasing growth pressures" upon the coastal regions of the state.⁵⁶ The CZPA states that "unless these pressures are controlled, the very features which make coastal areas economically, aesthetically, and ecologically rich will be destroyed."⁵⁷ Therefore, the CZPA sets forth construction restrictions upon the coasts to protect them from the adverse impacts which inevitably result from growth.

The primary impact which the CZPA protects against is beach erosion. The legislature declared erosion to be a menace and an emergency to the State of Florida, and stated that the government must protect the beaches and shores.⁵⁸ The *Florida Administrative Code* states that further degradation of the coastal ecosystem must be prevented and promotion of existing degraded portions of the coastal ecosystem must occur.⁵⁹ The only way to achieve these ends is to restrict coastal construction.⁶⁰

The state has established a fifty-foot setback line for coastal construction in section 161.052 of the *Florida Statutes*.⁶¹ By declaring the construction site a public nuisance, the statute makes it a misdemeanor to construct or excavate without a permit within fifty feet of the mean high water mark at any riparian coastal location.⁶² However, the statute does not apply to any "vegetation-type nonsandy shores," such as estuaries.⁶³ If the local construction restriction is stricter than the fifty-foot setback line, the more stringent requirements shall prevail.⁶⁴

Section 161.053 establishes coastal construction control lines ("CCCL") "on a county basis along the sand beaches of the state fronting on the Atlantic Ocean, the Gulf of Mexico, or the Straits of Florida."⁶⁵ This

53. Chapter 161 of the *Florida Statutes* is the Florida Beach and Shore Preservation Act. FLA. ADMIN. CODE ANN. r. 62B-33.002(1) (1995).

54. Sections 161.52-.58 of the *Florida Statutes* are known as the "Coastal Zone Protection Act of 1985." FLA. STAT. §§ 161.52-.58 (1995).

55. *Id.* § 161.55.

56. *Id.* § 161.53(1).

57. *Id.*

58. FLA. STAT. § 161.088 (1995).

59. FLA. ADMIN. CODE ANN. r. 62B-41.005(1) (1995).

60. *Id.*

61. FLA. STAT. § 161.052.

62. *Id.* § 161.052(7), (8).

63. *Id.* § 161.052(5).

64. *Id.* § 161.052(2)(b).

65. *Id.* § 161.053(1)(a).

section authorizes the Department of Environmental Protection ("Department") to establish CCCLs to protect the beach "from imprudent construction which can jeopardize the stability of the beach-dune system, accelerate erosion, provide inadequate protection to upland structures, endanger adjacent properties, or interfere with public beach access."⁶⁶ In addition, the CCCLs do not apply to those coastal areas dominated by vegetation, but only to those sandy beaches subject to erosion.⁶⁷

Generally, the CCCLs are established to define the portion of the beach-dune system subject to severe fluctuations based upon a 100-year storm surge.⁶⁸ The method for determining the location of the CCCL is extremely technical and involves "complex computer modeling and extensive surveying."⁶⁹ The construction line will be established only where necessary to protect upland properties and prevent erosion.⁷⁰ Under section 161.053, it is a misdemeanor to construct or excavate seaward of the line without a permit, and such construction or excavation is declared a public nuisance.⁷¹

Section 161.053 establishes that where a CCCL has not been designated, the fifty-foot setback line remains in place until the CCCL or a municipal control line is established.⁷² However, development and construction under these two sections are not entirely precluded. The *Florida Administrative Code* limits the construction and requires the person applying for the permit to clearly justify the need for the construction.⁷³ Only the Governor and Cabinet, the Executive Director, and the Division Director have the authority to issue a permit for excavation or construction.⁷⁴

The *Florida Administrative Code* identifies several policy criteria to be taken into account upon the application of a permit for construction or excavation. If construction occurs seaward of either of the two lines, the code requires the construction to conform to special siting, structural, and other design considerations for the protection of the beach-dune system.⁷⁵

66. FLA. STAT. § 161.053(1)(a).

67. *Id.* § 161.053(1)(c).

68. *Id.* § 161.053(1)(a).

69. Deborah A. Getzoff & Kenneth G. Oertel, *Beach, Shore, and Coastal Zone Regulation*, in II FLORIDA ENVIRONMENTAL AND LAND USE LAW, 14-1, 14-9 (2d ed. 1994).

70. FLA. STAT. § 161.053(2).

71. *Id.* § 161.053(7), (8).

72. *Id.* § 161.053(11).

73. FLA. ADMIN. CODE ANN. r. 62B-33.005(1) (1995).

74. *Id.* at r. 62B-33.006(2).

75. *Id.* at r. 62B-33.005(2).

In addition, elevated dune walkover structures are encouraged by the Department to protect the dunes.⁷⁶

The Department must also consider the cumulative effect of several structures or activities having an adverse impact on the beaches and dunes, even if the individual structure or activity alone may not have any adverse impact.⁷⁷ If, however, the "immediate contiguous or adjacent area" contains a number of structures which have "established a reasonably continuous and uniform construction line" closer to the high water mark than either the CCCL or the fifty-foot setback line, whichever is in effect, then a proposed structure may be built.⁷⁸ This is contingent, however, upon the existing structures not having been unduly affected by erosion and upon approval of the Department.⁷⁹ However, under section 161.052, a waiver or variance of the fifty-foot setback line is authorized.⁸⁰

Under section 161.053, this uniform construction line, described in section 161.052, is one condition which may justify the granting of a permit to construct beyond the CCCL.⁸¹ Other considerations under section 161.053 justifying the grant of a permit for construction seaward of the CCCL include: 1) the "shoreline stability;" 2) the "[d]esign features of the proposed structures;" and 3) the potential impacts, cumulative or individual, upon the beach-dune system.⁸² In addition, construction of structures which interfere with public access along the beach will be limited.⁸³

Although the applicant must clearly state and justify the necessity of the development,⁸⁴ the city need not demonstrate any other evidence to prove its acceptance of the applicant's justification of this necessity other than the application itself.⁸⁵ In a hearing contesting the application, the burden of proof is on the petitioner challenging it.⁸⁶ The petitioner "must identify the areas of controversy and allege a factual basis for the contention

76. *Id.* at r. 62B-33.005(4).

77. *Id.* at r. 62B-33.005(7).

78. FLA. STAT. §§ 161.052(2)(b), .053(5)(b).

79. *Id.*

80. *Id.* § 161.052(2).

81. *Id.* § 161.053(5)(a).

82. *Id.*

83. FLA. STAT. § 161.053(5).

84. FLA. ADMIN. CODE ANN. r. 62B-33.005(1) (1995).

85. *Woodholly Ass'n v. Department of Natural Resources*, 451 So. 2d 1002, 1004 (Fla. 1st Dist. Ct. App. 1984).

86. *Id.*

that the facts relied upon by the applicant fall short of carrying the . . . burden cast upon the applicant.”⁸⁷

Section 161.053 also provides that no permit will be authorized where the proposed location for construction is seaward of the seasonal high-water line within thirty years after the date of application for the permit.⁸⁸ This section defines “seasonal high-water line” as the “line formed by the intersection of the rising shore and the elevation of 150 percent of the local mean tidal range above local mean high water.”⁸⁹ In determining this thirty-year seaward area, the Department will not include any areas landward of the CCCL. This restriction does not include some “coastal or shore protection structure[s], minor structure[s], or pier[s].”⁹⁰

Additional protective requirements are specified under the *Florida Administrative Code*.⁹¹ For example, “[t]he proposed structure or other activity shall be located a sufficient distance landward of the beach-dune system to permit natural shoreline fluctuations and to preserve the dune stability and natural recovery following storm induced erosion.”⁹² In addition, structures must be designed to “minimize any expected adverse impact on the beach-dune system.”⁹³

The CZPA⁹⁴ was created to protect coastal areas because of their “important role in protecting the ecology and the public health, safety, and welfare of the citizens of the state”⁹⁵ The Act places requirements and restrictions upon construction within the “coastal building zone.”⁹⁶ This zone consists of:

the land area from the seasonal high-water line landward to a line 1,500 feet landward from the coastal construction control line as established pursuant to s. 161.053 . . . and not included under s. 161.053, the land area seaward of the most landward velocity zone (V-zone) line as established by the Federal Emergency Management Agency⁹⁷

87. *Id.* (quoting *Florida Dep’t of Transp. v. J.W.C., Inc.*, 396 So. 2d 778 (Fla. 1st Dist. Ct. App. 1981)).

88. FLA. STAT. § 161.053(6)(b).

89. *Id.* § 161.053(6)(a)2.

90. *Id.*

91. FLA. ADMIN. CODE ANN. r. 62B-33.007 (1995).

92. *Id.* at r. 62B-33.007(1).

93. *Id.* at r. 62B-33.007(2).

94. FLA. STAT. § 161.52.

95. *Id.* § 161.53(1).

96. *Id.* § 161.55.

97. *Id.* § 161.54(1).

Numerous requirements are established for construction within the coastal building zone.⁹⁸ The requirements for major structures⁹⁹ include anticipating loads resulting from a 100-year storm event when designing the foundation and constructing the structure.¹⁰⁰ With regard to minor structures,¹⁰¹ this section requires that structures be designed "to produce the minimum adverse impact on the beach and the dune system"¹⁰² Generally, no structure may be constructed unless it is a "sufficient distance landward of the beach to permit natural shoreline fluctuations and to preserve dune stability," with the exception of "elevated walkways, lifeguard support stands, piers, beach access ramps, gazebos, and coastal or shore protection structures"¹⁰³

With regard to coastal barrier islands, all requirements which apply to the coastal building zone apply to the barrier islands.¹⁰⁴ However, the zone for barrier islands is identified as "the land area from the seasonal high-water line to a line 5,000 feet landward from the coastal construction control line pursuant to s. 161.053, or the entire island, whichever is less."¹⁰⁵ This subsection identifies specific zone requirements for certain islands in identified inlets.¹⁰⁶

In summary, the coastal construction control line, the fifty-foot setback line, and the coastal building zone are methods whereby the state may

98. *Id.* § 161.55.

99. A "major structure" is defined in § 161.54(6)(a) as: "houses, mobile homes, apartment buildings, condominiums, motels, hotels, restaurants, towers, other types of residential, commercial, or public buildings, and other construction having the potential for substantial impact on coastal zones." FLA. STAT. § 161.54(6)(a).

100. *Id.* § 161.55(1)(e).

101. A "minor structure" is defined in § 161.54(6)(b) as:

pile-supported, elevated dune and beach walkover structures; beach access ramps and walkways; stairways; pile-supported, elevated viewing platforms, gazebos, and boardwalks; lifeguard support stands; public and private bathhouses; sidewalks, driveways, parking areas, shuffleboard courts, tennis courts, handball courts, racquetball courts, and other uncovered paved areas; earth retaining walls; and sand fences, privacy fences, ornamental walls, ornamental garden structures, aviaries, and other ornamental construction. It shall be a characteristic of minor structures that they are considered to be expendable under design wind, wave, and storm forces.

Id. § 161.54(6)(b).

102. *Id.* § 161.55(2).

103. *Id.* § 161.55(4).

104. FLA. STAT. § 161.55(5).

105. *Id.*

106. *Id.*

protect the coast from encroaching development. Through these procedures, the state agencies and officials have the discretion to permit development based upon the ecological consequences to the beach and shore. Specified nondiscretionary requirements and restrictions also exist. As long as this discretion is used wisely and permits and waivers are issued only in extraordinary circumstances, these systems will endure in protecting the shores from encroaching development.

2. Coastal Stabilizing and Armoring

Neither the coastal construction control line¹⁰⁷ nor the fifty-foot setback requirement¹⁰⁸ applies to shore protection structures or coastal armoring. Section 161.041 of the *Florida Statutes*,¹⁰⁹ as well as certain rules in the *Florida Administrative Code*,¹¹⁰ regulate these shore protecting structures by restricting construction below the mean-high water mark—those areas which constitute the sovereignty lands within the State of Florida.

These shore protecting measures can broadly be described by the term “rigid coastal structures,” which is defined as “structures characterized by their solid or highly impermeable design or construction.”¹¹¹ Included within this definition are “groins, breakwaters, mound structures, jetties, weirs, seawalls, bulkheads and revetments.”¹¹² “Armoring,” on the other hand, is a more limited term and is defined as the “placement of manmade structures or devices in or near the coastal system for the purpose of preventing erosion of the upland property or to protect upland structures from the effects of coastal wave and current activity.”¹¹³ This does not include jetties, groins, and other structures which are implemented to add sand to the beach or dune, alter natural coastal currents, or stabilize the mouths of inlets.¹¹⁴

The *Florida Administrative Code* states that these rigid coastal structures can cause damage to the beach by exacerbating erosion. Under the code, permits shall not be issued for this purpose “except as a last resort

107. *Id.* § 161.053(9).

108. *Id.* § 161.152(3).

109. FLA. STAT. § 161.041(1).

110. FLA. ADMIN. CODE ANN. r. 62B-41.001 (1995).

111. *Id.* at r. 62B-41.002(56)(a).

112. *Id.*

113. *Id.* at r. 62B-41.002(5).

114. *Id.*

to provide protection to eligible structures.”¹¹⁵ The code also requires that construction shall be limited and fully justified¹¹⁶ because rigid coastal structures “may be expected to have a long-term adverse effect on the beach in the immediate vicinity.”¹¹⁷

Therefore, coastal armoring is permitted only where several criteria are met. The Department of Environmental Protection requires that: 1) the structure to be protected is “vulnerable to erosion from a five (5) year return interval storm event”;¹¹⁸ 2) “[a]ll other alternatives, including dune enhancement, beach restoration, structure relocation, and modification of the structure’s foundation . . . are determined not to be economically and physically feasible”;¹¹⁹ and 3) there will be no significant adverse impact.¹²⁰ In addition, in reviewing applications for coastal armoring, the Department considers the historic erosion rates and sea level rise,¹²¹ and “[w]hether a permit for beach restoration or nourishment project . . . has been applied for . . .”¹²² It is important that the structure not interfere with the use by the public of the beach seaward of the mean high-water line. If this interference is unavoidable, the Department may require alternative access to the beach area for the benefit of the public.¹²³

The effect on marine turtles also is a factor in granting an application for coastal construction. All construction must be sited and designed so as to minimize any expected adverse impact to the marine turtles in the area.¹²⁴ Armoring structures are prohibited entirely in a federally designated critical habitat for marine turtles at the Archie Carr National Wildlife Refuge.¹²⁵

The *Florida Administrative Code* allows for permits for experimental coastal construction involving new technologies.¹²⁶ However, the criteria for this project are very strict and limited. The construction must occur in

115. FLA. ADMIN. CODE ANN. r. 62B-41.005(6) (1995).

116. *Id.* at r. 62B-41.005(2).

117. *Id.* at r. 62B-41.005(6).

118. *Id.* at r. 62B-41.005(6)(b).

119. *Id.* at r. 62B-41.005(6)(c).

120. FLA. ADMIN. CODE ANN. r. 62B-41.005(6)(e) (1995).

121. *Id.* at r. 62B-41.005(7)(c).

122. *Id.* at r. 62B-41.005(7)(d).

123. FLA. STAT. § 161.041(1).

124. FLA. ADMIN. CODE ANN. r. 62B-41.007(1)(a) (1995).

125. *Id.* at r. 62B-41.0055(4).

126. *Id.* at r. 62B-41.0075.

an area of erosion¹²⁷ which is not considered environmentally sensitive by the Department.¹²⁸ Applicants also must demonstrate that the project “has the potential to provide a positive benefit to the coastal system and is not expected to result in a significant adverse impact.”¹²⁹ A test plan and mitigation program must be submitted for permit approval.¹³⁰

The state also permits county control of construction of coastal armoring and rigid shore protection measures under certain circumstances. Under section 161.35, “the board of county commissioners may regulate and supervise all physical work or activity along the county shoreline which is likely to have a material physical effect on existing coastal conditions or natural shore processes.”¹³¹ This includes “installation of groins, jetties, moles, breakwaters, seawalls, revetments, and other coastal construction . . .”¹³² The board of county commissioners must first have the consent of the Department of Environmental Protection and of “any municipality or other political authority involved,” however, before assuming responsibility.¹³³

Rigid shore protection measures and coastal armoring is truly a pretentious idea. The idea that people can control the ocean and all the force and power behind it must be thrilling to some, while ludicrous to others. However, where mistakes upon the beaches and shores have already been made—construction where construction should not have taken place—perhaps rigid shore protection is the only solution. It is a solution, however, which is short-sighted, and therefore, must be eliminated as soon as possible.

3. State Acquisition of Beaches and Shores

Another method whereby the state undertakes protection of its beaches and shores is land acquisition. This is perhaps the most basic of the growth protection schemes. If the ever-growing population cannot own the lands, they cannot harm them—at least to the extent that they might be harmed in private hands. The state has established two major statutory schemes to acquire beaches for the use of the public and for the purpose of conserva-

127. The erosion area must be one which is identified in the Department’s beach restoration management plan. *Id.* at r. 62B-41.0075(1)(a).

128. *Id.*

129. FLA. ADMIN. CODE ANN. r. 62B-41.0075(1)(d) (1995).

130. *Id.* at r. 62B-41.0075(4).

131. FLA. STAT. § 161.35(1) (1995).

132. *Id.*

133. *Id.*

tion. These are the Land Conservation Act, under chapter 259 of the *Florida Statutes*,¹³⁴ and the Outdoor Recreation and Conservation provisions under chapter 375 of the *Florida Statutes*.¹³⁵

Chapter 259 identifies as the policy of the state an assurance to its citizens that "public ownership of natural areas for purposes of maintaining the state's unique natural resources" will be undertaken.¹³⁶ This chapter identifies coastal areas as those areas to be acquired for the purpose of conservation and protection.¹³⁷ It requires that lands acquired under section 259.032 will be managed in such a manner as to "provide the greatest combination of benefits to the public and to the resources."¹³⁸

Section 259.101 establishes the Florida Preservation 2000 Act,¹³⁹ which deals with the rapidly growing population contributing to the degradation of the environment.¹⁴⁰ The Act further states that "[i]mmminent development of Florida's remaining natural areas and continuing increases in land values necessitate an aggressive program of public land acquisition during the next decade to preserve the quality of life that attracts so many people to Florida."¹⁴¹

Additionally, the Act establishes that fifty percent of the proceeds of the Preservation 2000 Trust Fund will be given to the Department of Environmental Protection for the acquisition of public lands.¹⁴² Of that amount, one-fifth will be used for the acquisition of coastal lands.¹⁴³ Some of the criteria for acquisition include: 1) whether the land is in "imminent danger of development"; 2) whether development is likely within the next twelve months; and 3) whether a significant portion of the land will protect valuable natural resources.¹⁴⁴ The Act also specifies that in acquiring coastal lands, parcels in highly developed urban areas should be given special consideration.¹⁴⁵

134. FLA. STAT. ch. 259 (1995).

135. FLA. STAT. ch. 375 (1995).

136. FLA. STAT. § 259.032(1) (1995).

137. *Id.* § 259.032(3)(d).

138. *Id.* § 259.032(9)(a)1.

139. FLA. STAT. § 259.101 (1995).

140. *Id.* § 259.101(2).

141. *Id.* § 259.101(2)(b).

142. *Id.* § 259.101(3)(a).

143. *Id.*

144. FLA. STAT. § 259.101(4)(a)1.-3.

145. *Id.* § 259.101(4)(d)2.

The Florida Preservation 2000 Trust Fund is established for the purpose of carrying out section 375.031 of the *Florida Statutes*¹⁴⁶ and empowers the Department of Environmental Protection to identify lands for acquisition.¹⁴⁷ It specifies beaches as lands which may be acquired under this section.¹⁴⁸ In addition, chapter 375 authorizes the Department to provide financial assistance to local governments for the purpose of acquiring public beach properties.¹⁴⁹ As specified in chapter 259, public beaches in urban areas are to be given priority in the trust fund application process.¹⁵⁰

Although these beach acquisition programs are not complicated, they can be significant. If the state gains control of the few remaining beaches still in their natural state, their pristine condition may survive for future generations—perhaps longer than if the beaches remain in private control. In this manner, the state may be able to retain some of the beaches' natural qualities which appeal to so many people.

4. Comprehensive Planning

Florida requires a comprehensive plan of development of all municipalities "based on the area's needs, proposed improvements, and principles for future development."¹⁵¹ In addition, the state has enacted a comprehensive plan requirement to "provide long-range policy guidance for the orderly social, economic, and physical growth of the state."¹⁵² Each plan requires protection from beach and shore growth to be identified through a coastal element of the plan.¹⁵³ A major function of the comprehensive plan is the protection of natural resources. Because the beaches have been identified as a natural resource in great need of protection, they must be an integral part of comprehensive planning.¹⁵⁴

146. *Id.* § 259.101(3).

147. FLA. STAT. § 375.031(1) (1995).

148. *Id.* § 375.031(5).

149. FLA. STAT. § 375.065(1) (1995).

150. *Id.* § 375.065(4).

151. James Jay Brown, *A Brief Guide to Understanding Planning and Zoning*, in II FLORIDA ENVIRONMENTAL AND LAND USE LAW 1-1, 1-17 (2d ed. 1994).

152. FLA. STAT. § 187.101(1) (1995).

153. FLA. STAT. §§ 163.3177(6)(d), 186.009(2)(j) (1995).

154. The comprehensive planning statutes are extremely detailed and beyond the scope of this article. For an in-depth analysis of all elements of the comprehensive planning process, see Thomas Pelham et al., *Managing Florida's Growth: Toward an Integrated State, Regional, and Local Comprehensive Planning Process*, 13 FLA. ST. U. L. REV. 515 (1985).

Section 163.3178 requires the local governments to include a coastal management element into their comprehensive plan for the purpose of protecting the “significant interest in the resources of the coastal zone of the state.”¹⁵⁵ This element must be based upon “studies, surveys, and data,”¹⁵⁶ and must include: a land use map of public access to beach and shore resources;¹⁵⁷ an analysis of the effect of development upon the barrier islands, including beach and dune systems, and other fragile coastal resources;¹⁵⁸ and “[a] component which outlines principles for protecting existing beach and dune systems from man-induced erosion and for restoring altered beach and dune systems.”¹⁵⁹ The statute also requires counties to establish a “process for identifying and prioritizing coastal properties so they may be acquired as part of the state’s land acquisition programs.”¹⁶⁰ Additionally, the *Florida Administrative Code* implements this comprehensive planning requirement for coastal management by requiring an inventory and analysis of beach and dune systems, “including past trends in erosion and accretion, the effects upon the beaches or dunes of coastal or shore protection structures, and identification of existing and potential beach renourishment areas.”¹⁶¹

The Executive Office of the Governor is required to prepare a growth management portion of the state comprehensive plan which is strategic in nature.¹⁶² This includes “[e]stablish[ing] priorities regarding coastal planning and resource management.”¹⁶³ The coastal element of the state comprehensive plan includes: 1) accelerated public acquisition of coastal land to protect resources or “meet projected public demand”;¹⁶⁴ 2) ensuring the public’s right of access to beaches;¹⁶⁵ 3) protection of coastal resources and dune systems “from the adverse effects of development”;¹⁶⁶ 4) prohibition of “development and other activities which disturb coastal dune systems”;¹⁶⁷ and 5) ensuring and promoting the restoration of

155. FLA. STAT. § 163.3178(1) (1995).

156. *Id.* § 163.3178(2).

157. *Id.* § 163.3178(2)(a).

158. *Id.* § 163.3178(2)(b).

159. *Id.* § 163.3178(2)(e).

160. FLA. STAT. § 163.3178(8).

161. FLA. ADMIN. CODE ANN. r. 9J-5.012(2)(f) (1995).

162. FLA. STAT. § 186.009(1).

163. *Id.* § 186.009(2)(j).

164. FLA. STAT. § 187.201(9)(b)1. (1995).

165. *Id.* § 187.201(9)(b)2.

166. *Id.* § 187.201(9)(b)4.

167. *Id.* § 187.201(9)(b)9.

damaged coastal dune systems.¹⁶⁸ These comprehensive planning systems are primarily a building block to positive action by the state and local governments toward protecting the coast, and the beach and dune system.

5. Beach Renourishment and Replenishment

Beach renourishment or replenishment is not a protective measure, but one which attempts to reverse the adverse impacts of existing overgrowth and overdevelopment. Once the erosion process has occurred, either at its natural pace or accelerated due to human intervention, there is little that can be done to reverse this process. Renourishment of the beaches is one method by which the state can physically replace the loss which has occurred to the beach, thus possibly halting damage to structures upland and minimizing impacts on tourism.

The primary mechanism the state implemented for renourishment is codified in section 161.161 of the *Florida Statutes*.¹⁶⁹ Under this section, a comprehensive, long-term beach management plan must be adopted with regard to renourishment projects.¹⁷⁰ This section also establishes the criteria for approval of a beach renourishment project,¹⁷¹ and establishes how the project will be funded.¹⁷²

The elements which the beach management plan must address include: 1) "long-term solutions to the problem of critically eroding beaches in this state";¹⁷³ 2) whether each improved coastal beach inlet is a significant cause of beach erosion;¹⁷⁴ 3) design criteria for renourishment projects;¹⁷⁵ 4) evaluation of "the establishment of feeder beaches as an alternative to direct beach restoration";¹⁷⁶ 5) strategies for protection of marine turtles and their nests;¹⁷⁷ and 6) "alternative management responses to preserve undeveloped beach and dune systems, to restore damaged beach and dune systems, and to prevent inappropriate development and redevelopment on migrating beaches."¹⁷⁸ As problems arise in beach renourish-

168. *Id.*

169. FLA. STAT. § 161.161 (1995).

170. *Id.* § 161.161(1)(c).

171. *Id.* § 161.161(2).

172. *Id.* § 161.161(6).

173. *Id.* § 161.161(1)(a).

174. FLA. STAT. § 161.161(1)(b).

175. *Id.* § 161.161(1)(c).

176. *Id.* § 161.161(1)(d).

177. *Id.* § 161.161(1)(i).

178. *Id.* § 161.161(1)(j).

ment projects, this section outlines additional criteria for the approval of the project. The prospect for long-term success of the project,¹⁷⁹ total anticipated cost of the project,¹⁸⁰ proximity of the source of beach-compatible sand, and the sand quality are all considered.¹⁸¹ With regard to funding of the renourishment project, section 161.161 indicates that if approval of the project is granted by the Board of Trustees of the Internal Improvement Trust Fund, then seventy-five percent of the cost of the project will be authorized from the Beach Management Trust Fund.¹⁸²

The problem of locating sand for a renourishment project is partially answered by section 161.042 of the *Florida Statutes*. This section is implemented by the *Florida Administrative Code*, which identifies authorized construction or maintenance dredging as a source of sand to be used for renourishment projects.¹⁸³ When the sand has been determined by the Department of Environmental Protection to be suitable for a renourishment project, the sand will be deposited upon an adjacent beach in a location determined by a beach management plan, as adopted under section 161.161.¹⁸⁴ Although this type of sand is probably compatible in most instances, the state's supply is nearly depleted.

Another factor which must be taken into account when undertaking a beach renourishment project is the effect upon the marine turtle population. As stated previously, the temperature of the sand itself can have a huge impact on a turtle's ability to procreate.¹⁸⁵ The state, to this effect, has established standards to protect turtles from devastating renourishment projects. Under the *Florida Administrative Code*, "[b]each restoration, nourishment and mechanical sand bypassing projects shall be designed to provide habitat which is suitable for successful marine turtle nesting activity."¹⁸⁶ This reproductive process is a delicate one and, therefore, consideration must be taken prior to introducing foreign material into the turtles' nesting environment.

The state also allows for a review of innovative beach renourishment technologies. Under section 161.082, the Department of Environmental

179. FLA. STAT. § 161.161(2)(c).

180. *Id.* § 161.161(2)(e).

181. *Id.* § 161.161(2)(f).

182. *Id.* § 161.161(6). The Beach Management Trust Fund is enacted in § 161.091 of the *Florida Statutes*. FLA. STAT. § 161.091 (1995).

183. FLA. ADMIN. CODE ANN. r. 62B-41.005(15) (1995).

184. *Id.*

185. See *Florida Running out of Sand*, *supra* note 37, at 19.

186. FLA. ADMIN. CODE ANN. r. 62B-41.0055(3) (1995).

Protection may authorize, on a limited basis, and through the permitting process, alternatives to the "traditional dredge and fill projects to determine the most effective and less costly techniques for beach renourishment."¹⁸⁷

In summary, Florida requires that many facets of beach renourishment be taken into consideration prior to undertaking a project, thus demonstrating an understanding of the unique nature of the undertaking. However, introducing foreign substances into a delicate ecosystem is never a good idea, and it is not always one which is going to be able to successfully achieve the objectives for which it was designed. By utilizing the growth management techniques to protect beaches and sandy shores in Florida, these renourishment projects will not be needed as often. What is truly essential for the beaches and shores of Florida is protection from growth and development. By enforcing these established protection measures stringently and allowing construction and armoring permits and waivers only in rare circumstances, the state will have fewer erosion emergencies with which to contend.

III. COASTAL WETLANDS AND ESTUARIES

A. *Description of the Ecosystem and Problems Caused by Development*

The coastal wetlands and marshes are a vibrant and complex ecosystem, where fresh and salt water combine, nurturing incredible amounts of wildlife. As one commentator notes "[a]ll organic life is beautifully and variedly adjusted to the conditions of its environment, but it is doubtful if in any other zone of the organic world the accommodations are more exquisitely ordered than in the marshes of the ocean shore."¹⁸⁸

An estuary is defined as "a semi-enclosed coastal body of water which has a free connection with the open sea and within which seawater is measurably diluted with fresh water derived from land drainage."¹⁸⁹ The estuary is protected from the surge of the sea "by barrier islands, sand dunes, submerged reefs, peninsulas, or rocky promontories . . ."¹⁹⁰ Sea

187. FLA. STAT. § 161.082.

188. JOSEPH V. SIRY, MARSHES OF THE OCEAN SHORE: DEVELOPMENT OF AN ECOLOGICAL ETHIC 3 (1984) (quoting James Morris, *The Estuary: One of Nature's keystones*, in *ESSAYS IN SOCIAL BIOLOGY* 243-45 (Bruce Wallace, ed. 1972)).

189. William C. Boicourt, *Estuaries: Where the River Meets the Sea*, OCEANUS, Summer 1993, at 32 (relying on a definition provided by D.W. Pritchard, Professor of Oceanography at Johns Hopkins University).

190. SIRY, *supra* note 188, at 3.

water and fresh water combine in a dynamic circulation caused by the winds and tides.¹⁹¹ This flow causes the estuary to retain nutrients and sustain its extraordinary productivity.¹⁹²

Estuaries are bordered by coastal wetlands, a series of "low-lying, water-tolerant vegetation" which includes salt marshes, tidelands, swamps, and sloughs.¹⁹³ Tidal marshes are the "portions of the coastal wetlands formed by tidal action and sedimentation in certain river mouths and bays."¹⁹⁴ The marshlands of the estuarine system support greater numbers of wildlife than any other type of marshland because the waters which drain into the tidal marshes flow into the oceans. The tidal patterns distribute food into the river mouth, while sending the wastes into the sea.¹⁹⁵

Because the estuary is where the ocean and river meet, the convenience of access to inland areas caused commerce and cities to develop around estuarine areas very early on in history.¹⁹⁶ However, the mudflats which occur along estuaries are where seagrass grows and traps silt. Because of the possible hindrance to commerce, reclamation of coastal wetlands occurs and, in turn, threatens estuarine and wetland productivity.¹⁹⁷

191. Boicourt, *supra* note 189, at 32.

192. *Id.* at 33.

193. SIRY, *supra* note 188, at 3. Section 373.019(17) of the *Florida Statutes* defines wetlands as:

those areas that are inundated or saturated by surface water or groundwater at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate hydrophytic macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce, or persist in aquatic environments or anaerobic soil conditions. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps and marshes, hydric seepage slopes, tidal marshes, mangrove swamps and other similar areas. Florida wetlands generally do not include longleaf or slash pine flatwoods with an understory dominated by saw palmetto.

FLA. STAT. § 373.019(17) (1995).

194. SIRY, *supra* note 188, at 4.

195. *Id.* at 5-6.

196. *Id.* at 6; *see also* Boicourt, *supra* note 189, at 30.

197. SIRY, *supra* note 188, at 6-7.

Because of the popularity of living in a coastal region, the wetlands and estuaries are utilized for increased housing needs.¹⁹⁸ Dredge and fill projects provide development-ready land parcels. These lands are located near settled urban areas and are generally lower in cost.¹⁹⁹

The effects of the urbanization of estuaries are widespread and potentially disastrous. In their natural state, wetlands are able to filter and cleanse runoff waters. When these wetlands are destroyed, they are unable to filter this pollution. As a result, the adjacent waters are impacted by increased pollution.²⁰⁰ The natural storage capacity for excess water is likewise destroyed when a wetland is destroyed. This causes changes in flooding patterns during storms which could cause damage to the surrounding homes and businesses.²⁰¹

In addition to their ability to control floods, reduce pollution, and produce enormous sources of food, wetlands are needed to maintain global cycles of carbon, nitrogen, sulfur, and other vital elements.²⁰² Studies indicate that the methane produced by the wetlands plays an important role in maintaining the earth's ozone layer as well.²⁰³ The repercussions of a destroyed wetland and estuarine system can be felt around the globe.

Estuarine damage and human impact are not quickly or easily detectable, though it may seem so.²⁰⁴ The changes in the system, however, are "typically subtle, creeping changes in sometimes unexpected indicators, [which] slowly manifest over many decades."²⁰⁵ Human impact is not limited to urban estuaries. Apparently pristine estuaries which may seem untouched by humans are increasingly facing threats from human impact and damage.²⁰⁶

The estuary and wetland systems are vibrant havens for biodiversity. The competition for their resources, a long and endless battle,²⁰⁷ is perhaps becoming increasingly inevitable as the population increases. People will utilize these ecosystems for their personal use as long as protection systems

198. DITTON, *supra* note 1, at 45.

199. *Id.*

200. *Id.* at 26.

201. *Id.*

202. Eugene P. Odum, *A New Ecology for the Coast*, in *COAST ALERT: SCIENTISTS SPEAK OUT* 145, 149 (Thomas C. Jackson & Diana Reische eds., 1981).

203. *Id.*

204. Boicourt, *supra* note 189, at 34.

205. *Id.*

206. *Id.* at 31.

207. For a history of development of coastal wetlands and estuaries, see SIRY, *supra* note 188.

are not imposed. Thus, protective measures are essential to keep the coastal wetlands and estuaries alive because, although man has historically developed these areas, “‘man’s way is not always the best.’”²⁰⁸

B. *The Regulation of Coastal Wetlands, Estuaries, and Marshes*

The estuaries and coastal wetlands are vital to all parts of the Florida ecosystem and are vulnerable to development. Therefore, they must be protected as stringently as possible to avoid possible permanent loss. Florida has taken several measures to protect and preserve the estuarine and wetland system. These measures primarily entail selecting certain coastal wetland systems for protection and conservation. This includes designating certain Florida lands as areas of critical state concern,²⁰⁹ and implementing land acquisition programs.²¹⁰ In addition, comprehensive planning statutes signify the importance of the coastal wetland system, and identify it as one in need of special protection and conservation.²¹¹

1. Areas of Critical State Concern

The “areas of critical state concern” program, enacted in section 380.05, is a limited program whereby the state land planning agency may identify up to five percent of the state’s land as an area of critical state concern.²¹² An area of critical state concern is one which contains or has a significant impact on “environmental or natural resources of regional or statewide importance”²¹³ This includes estuaries.

The criteria considered in designating an area as one of critical state concern include: 1) “[w]hether the ecological value of the area . . . is of substantial regional or statewide importance”;²¹⁴ 2) whether the area is one which is designated by any state or federal agency as one for threatened or endangered plant or animal species;²¹⁵ and 3) “[w]hether any existing or planned substantial development within the area will directly, significantly, and deleteriously affect any or all of the environmental or natural resources

208. SIRY, *supra* note 188, at 17 (quoting Paul Brooks, *THE HOUSE OF LIFE: RACHEL CARSON AT WORK* 226 (1989)).

209. FLA. STAT. § 380.05 (1995).

210. FLA. STAT. § 259.01 (1995).

211. *Id.* § 163.3177.

212. *Id.* § 380.05.

213. *Id.* § 380.05(2)(a).

214. *Id.* § 380.05(2)(a)2.

215. FLA. STAT. § 380.05(2)(a)3.

of the area which are of regional or statewide importance.”²¹⁶ No person may undertake development in an area of critical state concern except in accordance with the regulations established for these areas.²¹⁷ The affected local governments under this section must submit land development regulations or a local comprehensive plan within 180 days following the adoption of a rule designating an area under that government’s control as an area of critical state concern. If they do not, or if the regulation or plan submitted does “not comply with the principles for guiding development set out in the rule designating the area of critical state concern,” within 120 days, regulations and a plan which is in compliance will be recommended by the state land planning agency.²¹⁸

In addition, a fund was established under section 380.0558 of the *Florida Statutes* to reimburse “actual costs incurred by the Department of Environmental Protection” for injury and damage to natural resources within an area of critical state concern.²¹⁹ This fund was established because “natural resources within areas of critical state concern are subject to instantaneous injury or loss from a variety of negligent and willful acts, in ways that cannot be foreseen and provided for in the normal budget process.”²²⁰ Therefore, under this section “extraordinary expenses” which are incurred by the state from injury or damage to natural resources, such as those within coastal wetlands and estuaries, may be reimbursed on behalf of the residents of the state.²²¹

The Florida Keys is one area which has been designated as an area of critical state concern. This area, comprised of approximately 400 islands and about 700 square miles, is an extremely fragile ecosystem and is extremely vulnerable to development.²²² Tourism is plentiful in the Keys with 6,000,000 tourists in 1993 alone.²²³ In addition, the Keys held 78,000 residents in 1990.²²⁴ With these enormous numbers, it is difficult, if not impossible, to sustain the attractive qualities which attracted these people to the Keys in the first place.²²⁵ Problems from excessive salinity

216. *Id.* § 380.05(2)(a)5.

217. *Id.* § 380.05(16).

218. *Id.* § 380.05(8).

219. FLA. STAT. § 380.0558(4) (1995).

220. *Id.* § 380.0558(3)(a).

221. *Id.*

222. Patricia Byrnes, *In the Kingdom of the Keys; Ecoregion Destruction in the Keys; The Bankruptcy Files*, WILDERNESS, June 22, 1994, at 19, 19.

223. *Id.* at 20.

224. *Id.*

225. *Id.*

in the Florida Bay, a result of diversion of freshwater from the Everglades, has resulted in extreme destruction of seagrass in the Keys.²²⁶

The Florida Keys were designated as an area of critical state concern by the Florida Keys Area Protection Act pursuant to section 380.0552.²²⁷ This Act was created to: "establish a land management system that protects the natural environment of the Florida Keys,"²²⁸ "establish a land management system that conserves and promotes the community character of the Florida Keys,"²²⁹ and promote "orderly and balanced growth"²³⁰ The comprehensive plans implemented in the Florida Keys area must be consistent with certain requirements. These requirements include protection of "shoreline and marine resources, including mangroves, coral reef formations, seagrass beds, wetlands, fish and wildlife, and their habitat."²³¹

The designated purpose of chapter 380 is to "provide optimum utilization of our limited water resources, facilitate orderly and well-planned development, and protect the health, welfare, safety, and quality of life of the residents of this state"²³² With regard to areas within the areas of critical state concern program, these purposes are achieved by designating certain portions of the state as being entitled to special and specific protection because of their importance and fragility. Where coastal wetlands and estuaries are concerned, this is only one small piece in an important puzzle which merely begins with identifying and protecting those areas in the greatest danger.

2. State Acquisition of Coastal Wetlands and Estuaries

As was done with sandy beaches and shores, the state has established a system whereby it may acquire parcels of land for the purposes of conservation and the good of the public. As stated previously, this system has its advantages because less damage will result to wetlands owned by the state. The legislation implemented to achieve this purpose is: the Land Conservation Act under chapter 259 of the *Florida Statutes*,²³³ the Outdoor

226. George Barley, *Integrated Coastal Management: The Florida Keys Example From an Activist Citizen's Point of View*, OCEANUS, Fall 1993, at 15, 18.

227. FLA. STAT. § 380.0552 (1995).

228. *Id.* § 380.0552(2)(a).

229. *Id.* § 380.0552(2)(b).

230. *Id.* § 380.0552(2)(c).

231. *Id.* § 380.0552(7)(b).

232. FLA. STAT. § 380.021 (1995).

233. *Id.* ch. 259.

Recreation and Conservation provisions of chapter 375,²³⁴ and the Water Resources provisions of chapter 373.²³⁵

Under chapter 259, money from the Conservation and Recreation Lands Trust Fund may be allocated to protect coastal resources.²³⁶ In acquiring these lands, priority will be given to counties of high population, as well as those lands designated as areas of critical state concern.²³⁷ Under the Florida Preservation 2000 Act, one-fifth of half of the proceeds under the Trust Fund are designated for the acquisition of coastal lands.²³⁸ This section also specifies that in the acquisition of coastal lands, “[t]he value of acquiring identified parcels, the development of which would adversely affect coastal resources” will be taken into consideration.²³⁹ This would include estuaries and coastal wetlands, as these are extremely valuable coastal resources.

Section 375.031 of the *Florida Statutes* authorizes the Department of Environmental Protection to acquire lands for the Board of Trustees of the Internal Improvement Trust Fund.²⁴⁰ The lands which may be acquired specifically include wetlands and water access sites.²⁴¹ After acquisition, the Department has authority to improve, maintain, sell, or develop the land.²⁴²

Finally, chapter 373 provides for the acquisition of property for the purpose of conservation of water-related resources.²⁴³ The policy specified

234. *Id.* ch. 375.

235. FLA. STAT. ch. 373 (1995).

236. FLA. STAT. § 259.032(3)(d).

237. *Id.* § 259.032(1).

238. *Id.* § 259.101(3)(a).

239. *Id.* § 259.101(4)(d)3.

240. *Id.* § 375.031(1).

241. FLA. STAT. § 375.031(5). The Internal Improvement Trust Fund is established under § 253.01, which states that:

So much of the 500,000 acres of land granted to this state for internal improvement purposes by an Act of Congress passed March 3, A.D. 1845, as remains unsold, and the proceeds of the sales of such lands heretofore sold as now remain on hand and unappropriated, and all proceeds that may hereafter accrue from the sales of such lands; and all of the swampland or lands subject to overflow granted this state by an Act of Congress approved September 28, A.D. 1850, together with all the proceeds that have accrued or may hereafter accrue to the state from the sale of such lands, are set apart, and declared a separate and distinct fund called the Internal Improvement Trust Fund of the state

FLA. STAT. § 253.01(1)(a) (1995).

242. *Id.* § 375.031(1), (2).

243. FLA. STAT. § 373.139 (1995).

by the legislature includes: providing “for the management of water and related land resources;”²⁴⁴ promoting “the conservation, development, and proper utilization of surface and groundwater;”²⁴⁵ and preserving “natural resources, fish, and wildlife”²⁴⁶ Section 373.139 specifies that wetlands specifically may be acquired by the governing board of the water management district.²⁴⁷ Any lands acquired through the methods in this section may also be open to recreational use by the public whenever practicable.²⁴⁸

Preservation of lands for the enjoyment and pleasure of the growing population can be positively achieved through these land acquisition programs. Once held in public trust, the wildlife and plant life which exists in such huge quantities in estuaries and wetlands can be protected to some extent from human development. However, the undertaking must be cautious. Keeping the land for the benefit of the public cannot mean excessive use by the public or the purpose of conserving these lands will be lost. The coastal wetlands’ and estuaries’ extraordinary practical benefits must be weighed against their equally extraordinary aesthetic benefits.

3. Comprehensive Planning

As previously discussed in Section II, the comprehensive plan is the means by which the state and local governments may identify and plan for problems in growth and development which would threaten the standard of life desired by the residents of that area. In the case of coastal wetlands and estuaries, planning for the future is needed to prevent possible irrevocable damage to these fragile ecosystems today. The state requires a coastal element of the local comprehensive plans. Thus, local comprehensive plans must necessarily include the estuaries and wetlands which lie on the coast.

The state comprehensive plan identifies that Florida must ensure that development does not negatively impact natural resources along the coast.²⁴⁹ To this end, the state’s policies regarding the coast include: avoiding expenditures which “subsidize development in high-hazard coastal areas”;²⁵⁰ protecting coastal and marine resources “from the adverse effects

244. FLA. STAT. § 373.016(2)(a) (1995).

245. *Id.* § 373.016(2)(b).

246. *Id.* § 373.016(2)(f).

247. *Id.* § 373.139(2).

248. *Id.* § 373.139(5).

249. FLA. STAT. § 187.201(9)(a).

250. *Id.* § 187.201(9)(b)3.

of development”;²⁵¹ encouraging “land and water uses which are compatible with the protection of sensitive coastal resources”;²⁵² and avoiding “the exploration and development of mineral resources which threaten marine, aquatic, and estuarine resources.”²⁵³

Chapter 163 requires that a coastal element be integrated into every local government’s comprehensive plan when that local government exists in a coastal area.²⁵⁴ This element must be implemented with respect to: “[m]aintenance, restoration, and enhancement of the overall quality of the coastal zone environment, including, but not limited to, its amenities and aesthetic values”;²⁵⁵ “[c]ontinued existence of viable populations of all species of wildlife and marine life”;²⁵⁶ “[a]voidance of irreversible and irretrievable loss of coastal zone resources”;²⁵⁷ and “[e]cological planning principles and assumptions to be used in the determination of suitability and extent of permitted development.”²⁵⁸ In addition to the coastal element of the plan, the plan must also include “[a] conservation element for the conservation, use, and protection of natural resources in the area, including . . . wetlands, . . . [and] estuarine marshes.”²⁵⁹ A land use map must also be integrated into the plan which identifies and depicts estuarine systems and wetlands.²⁶⁰

The local comprehensive plan must include an inventory and analysis of estuarine pollution conditions and actions needed to maintain estuaries.²⁶¹ This includes the impacts of future development as proposed in the future land use element and the impacts of sewage, drainage, and natural groundwater aquifer recharge elements upon water quality of the estuary.²⁶² This element must also identify action needed to correct existing pollution problems, as well as local programs which are going to be used to maintain the quality of the estuary.²⁶³

251. *Id.* § 187.201(9)(b)4.

252. *Id.* § 187.201(9)(b)6.

253. *Id.* § 187.201(9)(b)8.

254. FLA. STAT. § 163.3177(6)(g).

255. *Id.* § 163.3177(6)(g)1.

256. *Id.* § 163.3177(6)(g)2.

257. *Id.* § 163.3177(6)(g)4.

258. *Id.* § 163.3177(6)(g)5.

259. FLA. STAT. § 163.3177(6)(d).

260. *Id.* § 163.3177(6)(d)2., 4.

261. FLA. ADMIN. CODE ANN. r. 9J-5.012(2)(d) (1995).

262. *Id.*

263. *Id.*

The state must also inventory and analyze the effect of future land use on wetland areas, areas subject to coastal flooding, wildlife habitats, and living marine resources.²⁶⁴ Maps of these areas which are of special concern to the local government must also be prepared for the plan.²⁶⁵ Provisions must be made in the plan for wetlands and estuaries which have already been damaged. A policy must be made and management techniques identified for “[r]estoration or enhancement of disturbed or degraded natural resources including . . . estuaries, wetlands, . . . and programs to mitigate future disruptions or degradations.”²⁶⁶

Protection of wetlands and estuaries which are not damaged or pristine, are addressed by the conservation element of the plan. The *Florida Administrative Code* requires identification and analysis of wetlands and estuaries under this portion of the plan.²⁶⁷ Under this rule, policies regarding wetlands are specifically addressed. This rule indicates that wetlands must be protected and conserved. This “shall be accomplished through a comprehensive planning process which includes consideration of the types, values, functions, sizes, conditions and locations of wetlands”²⁶⁸ Land use planned for the future must be “directed away from the wetlands” and be designed for minimal impact on wetlands.²⁶⁹ This rule also allows for mitigation “as one means to compensate for loss of wetlands functions” where incompatible land uses are allowed to occur.²⁷⁰

If a coastal wetland or estuary is within one or more local government’s jurisdiction, each government must provide policies and management techniques within their plan for protecting that wetland or estuary.²⁷¹ This includes “methods for coordinating with other local governments to ensure adequate sites for water-dependent uses, prevent estuarine pollution, control surface water runoff, protect living marine resources, reduce exposure to natural hazards, and ensure public access”²⁷²

In summary, the coastal comprehensive plan with regard to estuary systems and coastal wetlands consists of the objectives needed to protect these regions and the resources within them from growth. The potential for

264. *Id.* at r. 9J-5.012(2)(b).

265. *Id.*

266. FLA. ADMIN. CODE ANN. r. 9J-5.012(3)(c)2. (1995).

267. *Id.* at r. 9J-5.013(1)(a)1.

268. *Id.* at r. 9J-5.013(3)(a).

269. *Id.* at r. 9J-5.013(3)(b).

270. *Id.*

271. FLA. ADMIN. CODE ANN. r. 9J-5.012(3)(c)14. (1995).

272. *Id.*

state and local plans that would be sufficiently protective of coastal wetlands and estuaries is created by the provisions established by the state. These governments must first, however, choose to take these steps.

IV. CONCLUSION

The coastal regions over the years have come to represent more than merely the freedom and power of the ocean. They have emerged as a place which we have the power and ability to destroy. Yet we now begin to fear the repercussions of what we would lose if the ecosystem is destroyed. Hopefully, years of pollution and development of the coasts have begun to teach us some lessons.

The importance and use of our coasts has grown as our country has grown. The early settlers saw little need for coastal development, as they anxiously explored the new world. Coastal villages were primarily established for fishing.²⁷³ Shortly after the American Revolution, some coastal communities developed around ports.²⁷⁴ Wetlands and estuaries were long viewed as wastelands.²⁷⁵ As the population began to concentrate in the cities, development on the coasts began to grow. However, depleting and developing these "wastelands" was not seen as problematic.²⁷⁶ An appreciation of coastal wetlands only emerged later, as naturalists and poets romanticized a region of the coast never before romanticized. Sydney Lanier described, in the poem *The Marshes of Glynn*:

Sinuous southward and sinuous northward the shimmering band
Of the sand-beach fastens the fringe of the marsh to the folds of the
land.²⁷⁷

This romantic notion of the coast will only serve to protect the shores, however, if it is accompanied by a practical plan of action for their protection. As the economic value of coastal lands rises, forced protection of them is necessary to avoid damage from development. Realism, as well as an understanding of the implications of population growth, will save our

273. DITTON, *supra* note 1, at 6.

274. *Id.*

275. SIRY, *supra* note 188, at 4.

276. DITTON, *supra* note 1, at 6.

277. SIRY, *supra* note 188, at 60 (quoting Sydney Lanier, *The Marshes of Glynn* (1868), reprinted in *AMERICAN POETRY AND PROSE: PART II, SINCE THE CIVIL WAR 1059-61* (Norman Foerster & Houghton Mifflin eds., 1934)).

coasts from having the sickly state which they are in now to be worsened. Scientific insights have led to the conclusion that:

The coast body is sick. Most of its systems function weakly, or not at all. The coast no longer protects us from storms and floods in many places, cannot provide suitable habitats for many of its creatures. Consistently, sandy beaches disappear, salt marshes vanish, species decline; some have ended their time on earth. Poisons, penetrating deep in estuaries and offshore water, affect the entire food chain, man included.²⁷⁸

In Florida, where the coasts are particularly popular, a special challenge emerges. Florida is not famous for its industry or its sprawling cities, but rather for its beauty and its beaches. Ecological consequences aside, the destruction of the coasts would cause a significant financial impact on Florida. This is apparently recognized and understood by the Florida Legislature, as the legislation enacted identifies a specific need to keep these beautiful areas open for the public to enjoy and use with as little destruction as possible.

However, the financial future of Florida is not the only area jeopardized should development continue to destroy the coasts. If coastal governments do not take an aggressive approach to systematically address these problems, the damage will be beyond imagination. If we do manage to kill the natural shore and its biodiversity along with it, it is not the ocean nor the earth that will die, but we as human beings.

Joy R. Brockman

278. Anne W. Simon, *Foreword* to *COAST ALERT: SCIENTISTS SPEAK OUT* vii, vii (Thomas C. Jackson & Diana Reische eds., 1981).