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# SEA LEVEL RISE AND COASTAL WETLANDS: OPPORTUNITIES FOR A PEACEFUL MIGRATION

*Lisa A. St. Amand\**

## I. INTRODUCTION

The consensus of a growing number of climatologists is that increasing concentrations of carbon dioxide and other "greenhouse gases" in the atmosphere have committed the Earth to gradual global warming.<sup>1</sup> Researchers predict these higher temperatures will cause sea level to rise as a result of the melting of polar ice and the thermal expansion of ocean waters.<sup>2</sup> Estimates of the extent of sea level rise over the next century range from one to seven feet.<sup>3</sup> As the sea rises, it will inundate a large percentage of existing coastal wetlands, which are composed of salt marshes, swamps, and shallow waters.<sup>4</sup> These vulnerable coastal wetlands currently serve as nesting and feeding areas for waterfowl and other migrating birds, provide essential habitat for shellfish, and contain vital nursery and spawning grounds for many commercially valuable fish.<sup>5</sup> Along gently sloping stretches of undeveloped coastline, wetlands conditions may be able

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<sup>1</sup> Richard A. Houghton & George M. Woodwell, *Global Climatic Change*, SCI. AM., April 1989, at 36, 36.

<sup>2</sup> Stephen Leatherman, *Implications of Climatic Change*, in CLIMATE CHANGE CONFERENCE PROCEEDINGS, 5, 5 (South Carolina Sea Grant Consortium 1990).

<sup>3</sup> James G. Titus, *Greenhouse Effect and Coastal Wetland Policy: How the Americans Could Abandon an Area the Size of Massachusetts at Minimum Cost*, ENVTL. MGMT. Nov.-Dec. 1990, at 39, 40.

<sup>4</sup> See RALPH W. TINER, JR., FISH & WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, WETLANDS OF THE UNITED STATES: CURRENT STATUS AND RECENT TRENDS 2 (1984).

<sup>5</sup> *Id.* at 13-14.

to migrate landward as the sea rises, causing a gradual transition from upland<sup>6</sup> to new wetland.

In the United States, an expanding population in search of recreation has subjected coastal property to the pressure of intense development, and many existing wetlands lie adjacent to upland areas that are or soon will be developed. As the sea rises, unrestricted owners of coastal property undoubtedly will seek to protect their investments through the use of seawalls, bulkheads, or similar constructions that are incompatible with wetlands migration. Preservation of coastal wetlands ecosystems in these areas therefore will require a commitment by federal, state, and local governments.

The uncertain dimensions of the threat that sea level rise poses to coastal wetlands, however, limit the options for anticipatory government action. There are three basic strategies that governmental entities could adopt in providing for wetlands migration: preventing development now in sensitive upland areas; allowing development now and deferring any government action until sea level rise reaches a critical stage; and allowing development now, but with restrictions that would require the relocation of humanly constructed structures as sea level rises.<sup>7</sup>

A government could pursue the first strategy through the exercise of eminent domain, preventing development by purchasing and preserving critical uplands now. This solution, however, would require the government to buy lands that could be prohibitively expensive, and that ultimately may not be needed to accommodate wetlands migration.<sup>8</sup> Another option for implementing this strategy, simply prohibiting development in areas upland of existing coastal wetlands, likely would meet strong political opposition from development interests, because it would take highly prized real-estate out of the market.<sup>9</sup>

Under the second strategy, a government would defer action until property became crucial for imminent wetlands migration. At this point, the government would purchase the property through exercise of eminent domain. This strategy of waiting, however, is expensive and entails the risk that property owners, who have not been prepared adequately for such a transition, will seek to protect their property interests through political or legal action.<sup>10</sup>

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<sup>6</sup> The term "upland" as used in this article, refers to well-drained dry land adjacent to a wetland area. *See id.* at 2.

<sup>7</sup> Titus, *supra* note 3, at 44-45.

<sup>8</sup> *Id.* at 48.

<sup>9</sup> *Id.* at 54.

<sup>10</sup> *Id.* at 55.

The third strategy involves institutionalizing the presumption that humanly constructed structures will have to give way to migrating wetlands as sea level rises.<sup>11</sup> One example of this strategy in action would be a prohibition on the construction of bulkheads,<sup>12</sup> thus requiring the abandonment of buildings as water inundates upland areas and converts them to wetlands.<sup>13</sup> In another example, the government could purchase property through the exercise of eminent domain and lease it back to the property owners for a term that would expire when sea level reached a critical stage.<sup>14</sup> The purchase price would be discounted substantially, because possession would not vest in the government for decades. Under this concept of "presumed mobility,"<sup>15</sup> the risks associated with sea level rise shift from wetlands ecosystems to property owners. Development can proceed, but the risk of abandonment becomes one of the forces shaping the market for coastal property.<sup>16</sup>

While the precise issue of coastal wetlands migration has not yet reached the agenda of many legislators, a number of states and municipalities have responded to other issues regarding coastal protection through creative land use initiatives. Private conservation efforts also have added to the inventory of protected coastal wetlands.<sup>17</sup> In addition, federal and state conservation endeavors in noncoastal areas, such as inland parks and nature reserves, have provoked from property owners responses that are analogous to those likely to result from government efforts to enable coastal wetlands migration.

This Article analyzes the adaptability of these existing public and private land use mechanisms to the problems of sea level rise and coastal wetlands migration. It focuses particular attention on those mechanisms that embody the concept of presumed mobility. Section II illustrates the opportunities and limitations that accompany coastal zone planning through the experience of the states of Maine, North Carolina, and South Carolina, and the town of Chatham, Massachusetts. The coastal planning regimes that these entities en-

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<sup>11</sup> *Id.* at 44-45.

<sup>12</sup> A "bulkhead" is a "retaining wall along a waterfront." WEBSTER'S NEW COLLEGIATE DICTIONARY (1973).

<sup>13</sup> Titus, *supra* note 3, at 45.

<sup>14</sup> *Id.*

<sup>15</sup> *Id.* at 44-45.

<sup>16</sup> *See id.* at 49.

<sup>17</sup> For example, the Nature Conservancy, a membership organization committed to preserving biodiversity through ecosystem protection and management, has purchased and maintains tens of thousands of acres of threatened wetlands. *See* John Madson, *Wetlands*, NATURE CONSERVANCY NEWS, Dec.-Jan. 1987, at 3.

acted all contain prohibitions on rebuilding within specified "setback" zones following storm damage.<sup>18</sup> They thus institutionalize the presumption that humanly constructed structures can be mobile.

Section III of this Article proposes to adapt particular land use tools to the problem of wetlands migration. For example, when the National Park Service creates national parks, it occasionally grants original property owners reservations of use and occupancy, generally of lifetime duration, in order to ease the transition from private to public ownership. Very similar to a traditional lease, the reservation effectively transforms the property owner into a long-term tenant. In addition, the reservation reduces the government's purchase price for the property by the value accorded the reservation, while it curtails the original owner's rights in the property.

Government-subsidized flood insurance programs and private land trusts are additional land use mechanisms that are potentially applicable to the issue of coastal wetlands migration. While the National Flood Insurance Program<sup>19</sup> acts to compensate owners of coastal structures for water damage, it could be adapted to discourage upland development. Land trusts could involve the private sector in acquiring sensitive upland areas.

Section IV examines, through the experiences of Utah and Michigan, what a government can, as well as what it cannot, accomplish if it delays action until a rise in water level reaches crisis proportions. During the 1980s, both states experienced drastic rises in lake levels, resulting in property damage and abandonment. After a period of indecision, Utah chose to pump water into the desert, where the water evaporated.<sup>20</sup> Michigan, on the other hand, chose to subsidize an orderly retreat from the shoreline.<sup>21</sup> Finally, Section V draws conclusions about the advantages of both planning for an orderly retreat from the coastline and institutionalizing the concept of presumed mobility.

## II. COASTAL ZONE PLANNING: EXISTING SCHEMES AS POTENTIAL MODELS

There are many uncertainties associated with coastal wetlands migration, including the extent of sea level rise, the impact of global

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<sup>18</sup> A "setback zone," as used in this Article, refers to "a distance from the shoreline within which building is prohibited or restricted." TINER, *supra* note 4, at 2.

<sup>19</sup> 42 U.S.C. §§ 4001-4128 (1988).

<sup>20</sup> See *infra* notes 170-90 and accompanying text.

<sup>21</sup> See *infra* notes 191-206 and accompanying text.

warming on weather patterns, and the ability of wetlands vegetation to relocate successfully in a relatively short time period.<sup>22</sup> Through careful planning, however, state and local governments can institute policies that allow them to respond with solutions that are adaptable to a range of contingencies. The following four case studies illustrate the advantages of coastal zone planning and the need for careful and consistent implementation of planning mechanisms. They also demonstrate the resistance to land use restrictions that some coastal property owners inevitably manifest.

### A. *Maine's Coastal Sand Dunes Rules*

Faced with a sea level rise of close to an inch per decade,<sup>23</sup> Maine has implemented coastal management policies that demonstrate the state's concern over the threat the rising sea poses to the preservation of its coastal resources. Adopted in 1985, these policies include a legislative directive to discourage development in coastal areas where storms, flooding, landslides, and sea level rise may pose hazard to human health and safety.<sup>24</sup> Maine's efforts to protect its sandy beaches exemplify the practical application of this policy, providing insight into a framework of setback mechanisms that may be appropriate for enabling coastal wetlands migration.

In Maine, only thirty-six miles of the state's 3,500 miles of coastline are sandy beaches, and fourteen of these miles are already seawalls.<sup>25</sup> When severe storms in 1978 caused \$47 million in damage to beachfront property,<sup>26</sup> the state was spurred into addressing the issue of regulating beachfront development. The legislature amended the existing statute regulating the alteration of coastal wetlands through its passage of the Coastal Sand Dunes Law in 1979.<sup>27</sup>

Now incorporated into the Natural Resources Protection Act,<sup>28</sup> the Coastal Sand Dunes Law extends to coastal sand dune systems the construction permitting requirements that were already applicable to coastal wetlands. The statute defines "sand dune systems" as sand deposits that exist within a marine beach system, and that

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<sup>22</sup> See Houghton, *supra* note 1, at 39-43.

<sup>23</sup> Karen A. Massey, *Protecting Sand Dunes: The Maine Experience* in PROCEEDINGS OF THE NINTH ANNUAL CONFERENCE OF THE COASTAL SOCIETY 9, 11 (1984).

<sup>24</sup> ME. REV. STAT. ANN. tit. 38, § 1801(4) (West 1989).

<sup>25</sup> Massey, *supra* note 23. A "seawall" is "a wall or embankment to protect the shore from erosion or to act as a breakwater." WEBSTER'S NEW COLLEGIATE DICTIONARY (1973).

<sup>26</sup> Massey, *supra* note 23, at 9.

<sup>27</sup> ME. REV. STAT. ANN. tit. 38, §§ 471-478 (West 1989) (repealed 1987).

<sup>28</sup> *Id.* at § 480-A-S.

“may extend into the coastal wetlands.”<sup>29</sup> Under the statute, the state Board of Environmental Protection (BEP) may issue a permit for construction only if an applicant can show that its proposed development will not have any of the following deleterious effects: causing unreasonable erosion or inhibiting the natural transfer of soil from the terrestrial environment to the marine environment; unreasonably harming any significant wildlife habitat, aquatic habitat, travel corridor, estuarine or marine fishery, or other aquatic life; unreasonably interfering with the natural flow of water; unreasonably interfering with the natural supply or movement of sand within or to the sand dune system; or unreasonably increasing the erosion hazard.<sup>30</sup>

The regulations that followed from the Coastal Sand Dunes Law directly address sea level rise. The preamble to the Coastal Sand Dunes Rules requires that the BEP consider future sea level rise in determining size, density, and location restrictions for proposed developments.<sup>31</sup> For example, any applicant for a sand dunes permit for a building larger than 2,500 square feet must demonstrate to the BEP that the site will remain stable after allowing for a three-foot sea level rise over 100 years.<sup>32</sup> In addition, the regulations prohibit the construction of seawalls on any sand dune system and create a “no-build area,” called the “V-zone,” that encompasses the frontal dune in each system.<sup>33</sup> Less drastic restrictions upon construction apply within so-called “A-zones” and “B-zones,” which are at less risk of erosion and flooding.<sup>34</sup> The regulations also bar development if, within 100 years, structures “may reasonably be expected to be damaged as a result of changes in the shoreline.”<sup>35</sup> If storm damage

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<sup>29</sup> *Id.* § 480-B(1).

<sup>30</sup> *Id.* § 480-D.

<sup>31</sup> “[T]he Board will evaluate proposed developments with consideration given to future sea level rise and will impose restrictions on the density and location of development, and on the size of development.” Code Me. R. ch. 355, § 3 (1988).

<sup>32</sup> No construction is permitted for any building “greater than 2500 square feet . . . unless the applicant demonstrates by clear and convincing evidence that the site will remain stable after allowing for a three-foot rise in sea level over 100 years.” *Id.* at § 3(B)(2)(c).

<sup>33</sup> *Id.* at § 3(B)(1)-(2), (F). The “frontal dune” is “the area consisting of the most seaward ridge of sand and includes former frontal dune areas modified by development. Where the dune has been altered from a natural condition, the dune positions may be inferred from the present beach profile, dune positions along the shore, and regional trends in dune width.” *Id.* at § 1(O). The V-zone is “[t]hat land area of special flood hazard subject to a one percent or greater chance of flooding in any given year, and subject to additional hazard from high velocity water due to wave action.” *Id.* at § 1(BB).

<sup>34</sup> *Id.* at § 3(B). The A-zone encompasses the one-hundred year flood area, while the B-zone is the five-hundred year flood area. *Id.* at § 1(A)-(B).

<sup>35</sup> *Id.* at § 3(A)(2).

to a structure exceeds fifty percent of its appraised value, the structure's owner must obtain a sand dunes permit prior to rebuilding.<sup>36</sup>

Maine's Coastal Sand Dune Rules anticipate wetlands migration. If shoreline conditions change so that coastal wetlands extend to any part of a structure, even to its support posts, for a period of at least six months, the structure must be relocated.<sup>37</sup> This provision for wetlands protection embodies the concept of presumed mobility by shifting the disadvantages of sea level rise from the wetland to the property owner. Coastal residents are on notice that wetlands migration may require the relocation of their shorefront structures, because the regulations institutionalize the idea that wetlands preservation takes precedence over protection of property values.

Since their promulgation, the coastal sand dune regulations have survived legal challenge. The most notable challenge occurred in the case of *Hall v. Board of Environmental Protection*,<sup>38</sup> which involved a family that attempted to rebuild a structure lost to erosion. The Halls' cottage was almost complete when they learned that, under the regulations, they needed to apply to the Board of Environmental Protection (BEP) for a permit.<sup>39</sup> The BEP subsequently denied their application on the basis that the structure would interfere with the natural supply and movement of sand, present an erosion hazard, and likely be in a V-zone within twenty-five years.<sup>40</sup> The case twisted back and forth through the state's courts and reached the Maine Supreme Court twice on appeal.<sup>41</sup> In 1987, the court applied traditional takings doctrine to the case and held that the Halls did not meet their burden of showing that the permit denial had rendered their property substantially useless, particularly because the family had been occupying a motor home on the lot during the summer.<sup>42</sup>

The Coastal Sand Dunes Rules have been successful in controlling coastline development in order to protect coastal wetlands. For example, in 1987, the BEP denied the application of the Atlantic Condominium Development Corporation (ACDC) for a permit to construct a ninety-six-unit condominium in Old Orchard Beach.<sup>43</sup> Upon

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<sup>36</sup> *Id.* at § 2(c) note.

<sup>37</sup> *Id.* at § 3(B)(1)(b).

<sup>38</sup> 528 A.2d 453 (Me. 1987).

<sup>39</sup> *Id.* at 454-55.

<sup>40</sup> Brief for Intervenor Maine Audubon Society at 8, *Hall v. Board of Env'tl. Protection*, 528 A.2d 453 (Me. 1987).

<sup>41</sup> *Hall*, 528 A.2d at 455.

<sup>42</sup> *Id.* at 455-56.

<sup>43</sup> A. David Rapaport, *Alteration of Coastal Wetlands Act: Sand Dunes*, 1 (Me. Dep't of Env'tl. Protection 1987) (order).



review of a subsequently amended application, the BEP issued a draft order stating that ACDC had not shown clearly that the project would not be located in a coastal wetland or intertidal area within 100 years as a result of shoreline retreat, sea level rise, and the absence of seawalls.<sup>44</sup> ACDC withdrew its application in April 1988.

While Maine's Coastal Sand Dunes Rules have yet to face significant public pressure in favor of rebuilding after major storm damage, they generally have been accepted by property owners. The Rules have not stopped coastal development, but have directed the location and type of development. State officials credit a strong effort at public education for their success in convincing coastal residents of the certainty of sea level rise and continued beach erosion.<sup>45</sup> During public hearings over the latest revisions to the Rules in 1988, debate centered not on the question of whether sea level rise would occur, but rather on the issue of which estimate regarding the rate of sea level rise to follow—the National Academy of Sciences' or the United States Environmental Protection Agency's.<sup>46</sup> The public recognition in Maine of the concept of sea level rise and the presumption of mobility built into the Coastal Sand Dunes Rules combine to make Maine perhaps the premier testing ground for the ability of coastal wetlands to migrate over previously developed land.

### *B. North Carolina's Coastal Area Management Act*

The coastal area of North Carolina is primarily rural, composed of extensive wetlands, forests, farmlands, and sandy barrier islands.<sup>47</sup> This rich resource is fragile, however, and is subject to rapidly increasing pressure for recreational development, particularly on the barrier islands.<sup>48</sup> The rate of coastal erosion is great—eighteen percent of the shoreline has an annual erosion rate of six feet.<sup>49</sup>

In response to these threats to its coast, the state of North Carolina has crafted a strong set of beachfront development restrictions that include comprehensive local planning. These restrictions, au-

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<sup>44</sup> Atlantic Condominium Dev. Corp., *Alteration of Coastal Wetlands Act: Sand Dunes*, 1 (Me. Dep't of Env'tl. Protection 1988) (order).

<sup>45</sup> Telephone Interview with Stephen Dickson, Marine Geologist, Me. Dep't of Conservation (Jan. 22, 1990).

<sup>46</sup> *Id.*

<sup>47</sup> David W. Owens, *Coastal Management in North Carolina*, APA JOURNAL 322, 322 (1985).

<sup>48</sup> *Id.*

<sup>49</sup> *Id.* at 325.

thorized in the 1974 Coastal Area Management Act (CAMA),<sup>50</sup> have succeeded despite both local antipathy to state government interference and significant challenges by development interests.

Before the enactment of CAMA in 1974, comprehensive land use planning was almost nonexistent in coastal North Carolina. Most rural counties and towns did not have land use plans or even zoning ordinances, and there was opposition to the mere idea of coastal resource management.<sup>51</sup> The idea of a state coastal management program, first discussed in the late 1960s, was met with skepticism from municipalities that felt such a scheme unfairly would compel them to enforce unpopular rules.<sup>52</sup> Despite this climate of unfavorable local opinion, state planners decided that the potential power of local regulations was vital to the success of a coastal management plan.<sup>53</sup>

To overcome the resistance that arose against CAMA upon its proposal in the state's General Assembly, the North Carolina Department of Natural Resources and Community Development embarked on an extensive effort to educate local planners about the importance of resource management.<sup>54</sup> State personnel presented the idea of local planning to the citizens of each region in a manner fitting the character of the region, using low-key meetings and non-technical language.<sup>55</sup> This approach, over time, allowed the state to gain widespread popular support for the CAMA bill and adapt its provisions to the needs of individual localities.<sup>56</sup> A primary lesson that one may draw from this case study is that a sensitivity to local concerns and a willingness to invest in the labor-intensive process of educating the public can be vital to the success of long-term natural resource management.

Under CAMA, local officials are responsible for enforcement, including the issuance of permits for smaller structures.<sup>57</sup> CAMA mandates the development of comprehensive local land use plans, each including a survey of resources, policy discussion, and the subdivision of the locality by "permissible use."<sup>58</sup> In return, the state grants

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<sup>50</sup> N.C. GEN. STAT. §§ 113A-100 to -113A-129 (1989).

<sup>51</sup> Owens, *supra* note 47, at 322-24.

<sup>52</sup> *Id.*

<sup>53</sup> *Id.* at 324.

<sup>54</sup> *Id.*

<sup>55</sup> *Id.*

<sup>56</sup> *Id.* at 324-25.

<sup>57</sup> N.C. GEN. STAT. § 113A-119 (1989).

<sup>58</sup> *Id.* at § 113A-110.

subsidies for beach renourishment and provides technical assistance and a staff liaison to each locality.<sup>59</sup> Every permit application requires an on-site inspection and consultation, which cuts down on misunderstandings and controversies.<sup>60</sup> Currently, all twenty coastal counties, as well as seventy-five municipalities, have land use plans under CAMA, and these plans are updated every five years.<sup>61</sup>

Pursuant to CAMA, the General Assembly created the Coastal Resources Commission (CRC) in 1974 to develop specific guidelines for municipal implementation of the Act.<sup>62</sup> In these guidelines, the CRC designated four categories of "areas of environmental concern": the estuarine system, the "ocean hazard" system, public water supplies, and natural and cultural resource areas.<sup>63</sup> The CRC's State Guidelines for Areas of Environmental Concern provide local governments with a blueprint for the treatment of these areas in land use plans by establishing uniform "policies, criteria, standards, methods and processes."<sup>64</sup> The guidelines for the ocean hazard system constitute a coastal planning mechanism that may enable wetlands migration.

Under the guidelines, development in the ocean hazard system must be landward of the "erosion setback line," which is measured from the first line of stable vegetation and equals thirty times the long-term annual erosion rate.<sup>65</sup> The guidelines specify a minimum distance of sixty feet between the proposed structure and the erosion setback line.<sup>66</sup> Setbacks of no less than 120 feet are required for larger, multi-family structures.<sup>67</sup> The guidelines also contain specific

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<sup>59</sup> *Id.* at § 113A-107.

<sup>60</sup> Telephone interview with Rich Shaw, Coastal Program Analyst, Bureau of Technical Assistance, Div. of Coastal Management, N.C. Dep't of Natural Resources (Feb. 6, 1990).

<sup>61</sup> *Id.*

<sup>62</sup> N.C. GEN. STAT. § 113A-107 (1989).

<sup>63</sup> The estuarine system includes "estuarine waters, coastal wetlands, public trust areas, and estuarine shorelines." N.C. ADMIN. CODE tit. 15A, r. 7H.0201 (Dec. 1989).

The ocean hazard system includes "beaches, frontal dunes, inlet lands, and other areas in which geologic, vegetative and soil conditions indicate a substantial possibility of excessive erosion or flood damage." *Id.* at r. 7H.0301.

Public water supplies include "valuable small surface water supply watersheds and public water supply well fields." *Id.* at r. 7H.0401.

Natural and cultural resource areas contain "environmental, natural or cultural resources of more than local significance in which uncontrolled or incompatible development could result in major or irreversible damage to natural systems or cultural resources, scientific, educational, or associative values, or aesthetic qualities." *Id.* at r. 7H.0501.

<sup>64</sup> *Id.* at r. 7H.0101.

<sup>65</sup> *Id.* at r. 7H.0306.

<sup>66</sup> *Id.*

<sup>67</sup> *Id.*

use standards that prohibit erosion control structures such as bulkheads, seawalls, revetments, jetties, groins, and breakwaters.<sup>68</sup> Each applicant for a development permit in an ocean hazard area must provide a written acknowledgment that it is aware of both the risks associated with development in the area and the area's unsuitability for permanent structures.<sup>69</sup>

The CRC first elicited public comment on its setback rule in 1978. While there was little opposition during these public hearings, the Council was confronted in 1980, one year after the rule was adopted, by angry property owners and other real estate interests who realized that enforcement of the rule rendered many substandard coastal lots undevelopable.<sup>70</sup> After an intense public outcry, the CRC agreed to reexamine its position. It eventually adopted two changes: an exemption for low-intensity uses such as camping; and a grandfather clause for lots that were subdivided before the year 1979.<sup>71</sup> Although these changes still left about 500 lots undevelopable, the controversy subsided, and the setback rule remained in place.<sup>72</sup>

Three years later, the CRC decided that, because relocation was not a viable economic option for large structures, the setbacks required for them should be increased. After ten months of public hearings, it doubled the minimum erosion rate setback for structures of over four dwelling units or 5000 square feet. This change produced a second outcry, most notably from Dare County, a major tourist destination, which withdrew from administering the local permit program.<sup>73</sup> When faced with a strong stand by the CRC and a promised loss of state subsidies, however, Dare County relented and rejoined the program.<sup>74</sup>

CAMA has survived seventeen years of controversy and currently enjoys widespread support. As the statute has gotten older, it has become more accepted and less open to criticism.<sup>75</sup> Among the rea-

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<sup>68</sup> *Id.* at r. 7H.0308. A "revetment" is "a facing (as of stone or concrete) to sustain an embankment"; "jetty" is "a structure extended into a sea, lake, or river to influence the current or tide or to protect a harbor"; "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"; and a "breakwater" is "an offshore structure (as a wall) used to protect a harbor or beach from the force of waves." WEBSTER'S NEW COLLEGIATE DICTIONARY (1973).

<sup>69</sup> N.C. ADMIN. CODE tit. 15A, r. 7H.0306 (Dec. 1989).

<sup>70</sup> Owens, *supra* note 47, at 326.

<sup>71</sup> *Id.*

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*; Shaw, *supra* note 60.

<sup>74</sup> Shaw, *supra* note 60.

<sup>75</sup> *Id.*

sons that CAMA has not faced organized opposition may be the fact that the tourist industry in North Carolina is relatively undeveloped.<sup>76</sup> Another key to the statute's success may be that its regulatory scheme stresses protecting property and life, rather than preserving the beach or the environment.<sup>77</sup> Property owners thus perceive that CAMA directly serves their interests. The view that the public is only concerned with protecting life and property, however, ignores the fact that a beach devoid of erosion control devices has great recreational and aesthetic appeal. In the case of coastal wetlands migration, educating the public to the value of wetlands ecosystems is a key to obtaining the necessary support for any setback restrictions.

### *C. South Carolina's Beachfront Management Act*

South Carolina's attempt to restrict development on its beaches by enacting the 1988 Beachfront Management Act (BMA)<sup>78</sup> has faced stiff opposition from the state's booming tourism industry. This conflict reached a critical point in the aftermath of Hurricane Hugo, which in September 1988 damaged or destroyed thousands of coastal properties.<sup>79</sup> In June 1990, the state legislature amended BMA, weakening some of its coastal protection measures while strengthening others.<sup>80</sup> Moreover, BMA's validity has been at issue in the courts since before Hurricane Hugo.<sup>81</sup> The outcome of these challenges may determine the state's ability to control coastal growth. All in all, South Carolina's experience illustrates the resistance that government entities may confront in their attempts to restrict property rights in upland areas adjacent to coastal wetlands.

In 1986, the South Carolina Coastal Council, a state agency, set up a Blue Ribbon Committee on Beachfront Management to make recommendations regarding how to address the continuing erosion of the state's shoreline.<sup>82</sup> In 1988, the Committee sent the results of its work, including a statement recognizing the role that sea level rise will play in shoreline erosion, to the state legislature in the form

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<sup>76</sup> *Id.*

<sup>77</sup> *Id.*

<sup>78</sup> S.C. CODE ANN. §§ 48-39-270 to -360 (Law. Co-op. Supp. 1990).

<sup>79</sup> Bill McAllister, *A Hurricane's Fury Fast Forgotten*, WASH. POST, April 9, 1990, at A1.

<sup>80</sup> See *infra* notes 101-14 and accompanying text.

<sup>81</sup> *Id.*

<sup>82</sup> Erick B. Ficken, *Prefatory Letter* to REPORT OF SOUTH CAROLINA BLUE RIBBON COMMITTEE ON BEACHFRONT MANAGEMENT (1987).

of the BMA bill. During the public debate on the bill, environmental lobbyists clashed with representatives of coastal property owners and lending institutions over the determination of setback lines and the ability to rebuild after a storm. Banks were particularly adamant in opposing the bill, because they believed that the mortgages they held would be jeopardized.<sup>83</sup>

The state legislature enacted BMA in 1988, putting into place some of the strongest restrictions on coastal development in the nation. For example, the Act barred both new construction and the replacement of destroyed buildings in an "erosion control zone"—commonly referred to as the "dead zone"—extending twenty feet back from the "primary," or frontal, dune.<sup>84</sup> BMA also restricted development in a "setback zone" behind the dead zone.<sup>85</sup> Lastly, the Act prohibited rebuilding seawalls that were more than fifty-percent damaged, and mandated that property owners replace all seawalls with approved erosion control devices within thirty years of the passage of the law.<sup>86</sup>

The "post-Hugo" 1990 amendments to BMA eliminated the dead zone, are more lenient in their restrictions on reconstructing seawalls and no longer require replacement of existing seawalls with approved erosion control devices.<sup>87</sup> The new law, however, does prohibit the construction of new erosion control devices, including new seawalls, seaward of the "baseline," which is the crest of the primary dune.<sup>88</sup> The amendments also retain the setback zone, which must extend landward of the primary dune for a distance of forty times the average annual erosion rate, or a minimum of twenty feet.<sup>89</sup> The state must revise the setback line at least every ten years.<sup>90</sup> Within the setback zone, the reconstruction of buildings destroyed beyond repair by natural causes is allowed, but replacement structures can be no farther seaward than the originals.<sup>91</sup> In addition, a reconstructed building must be rebuilt as far landward as possible and cannot be larger than the original building.<sup>92</sup>

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<sup>83</sup> Telephone Interview with Nancy Tecklinburg, Attorney, South Carolina Coastal Council (April 16, 1990).

<sup>84</sup> S.C. CODE ANN. §§ 48-39-290(B)(8), 48-39-300 (Law. Co-op. Supp. 1988).

<sup>85</sup> *Id.* at §§ 48-39-290, 48-39-300.

<sup>86</sup> *Id.* at § 48-39-290(C).

<sup>87</sup> *Id.* at § 48-39-290(B).

<sup>88</sup> *Id.*

<sup>89</sup> *Id.* at § 48-39-280(B).

<sup>90</sup> *Id.* at § 48-39-280(C).

<sup>91</sup> *Id.* at § 48-39-290(B)(1).

<sup>92</sup> *Id.*

The 1990 amendments bar any reconstruction seaward of the primary dune, although they also provide a procedure by which a property owner may obtain a variance from this prohibition.<sup>93</sup> This "special permit" provision gives the Council the power to permit construction or reconstruction seaward of the baseline with the understanding that the Council also has the power to order the structure's removal if erosion causes it to become located on an "active beach."<sup>94</sup> An active beach is the area seaward of the "escarpment," or the first line of stable natural vegetation.<sup>95</sup>

The original BMA had required local governments to formulate their own beachfront management plans by July 11, 1990, and to implement the plans within one year from that date.<sup>96</sup> The 1990 BMA amendments retained these planning requirements, but gave local governments another year to prepare the plans.<sup>97</sup> The goal of the planning requirement is to allow municipalities to adapt the statute to their own circumstances and thereby make it stronger and more effective.<sup>98</sup> For its part, the state offers assistance in base mapping, photography, and preparation of beach profiles and publishes a planning guidebook.<sup>99</sup> In addition, a staff member from the Coastal Council is assigned to each municipality as a liaison.<sup>100</sup> This attempt at involving local governments seems promising, particularly because the state is taking an active role in educating and advising local officials. There are some less-developed coastal towns in South Carolina that have no existing land use planning or zoning scheme,<sup>101</sup> however, and the Coastal Council has recognized that it will encounter significant difficulties in trying to implement beachfront management plans in these areas.

Even before Hurricane Hugo wreaked havoc on South Carolina's coastline, owners of property along the coast were challenging BMA in lawsuits. In August 1988, a South Carolina Circuit Court ordered the Coastal Council to pay the owner of property on a barrier island near Charleston \$1.2 million in compensation after finding that the owner's inability to build anything other than a deck or walkway on

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<sup>93</sup> *Id.* at § 48-39-290(D).

<sup>94</sup> *Id.*

<sup>95</sup> *Id.* at § 48-39-270(13).

<sup>96</sup> *Id.* at § 48-39-350.

<sup>97</sup> *See id.* at §§ 48-39-260, 48-39-350.

<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

<sup>100</sup> *Id.*

<sup>101</sup> Tecklinburg, *supra* note 83.

his two "dead zone" lots rendered them "valueless" and thus constituted a taking.<sup>102</sup> On appeal, the South Carolina Supreme Court held that the restrictions amounted to a proper exercise of the state's police power, that there was no taking, and, accordingly, that the state had no obligation to compensate the property owner.<sup>103</sup>

The state has obtained similarly favorable results in federal court. In *Chavous v. South Carolina Coastal Council*,<sup>104</sup> the U.S. District Court for the District of South Carolina held that the Council's preventing the plaintiff from building a vacation home within twenty feet of the coastal baseline constituted a taking and warranted compensation.<sup>105</sup> In *Esposito v. South Carolina Coastal Council*,<sup>106</sup> the same court found no evidence that the Council actually had denied the plaintiffs permission to build or rebuild in the dead zone.<sup>107</sup> The United States Court of Appeals for the Fourth Circuit, however, upheld the Coastal Council's application of BMA as to the landowners in both of these cases, finding that prevention of shoreline erosion was a legitimate state interest, and that there were no takings.<sup>108</sup> The elimination of the dead zone in the 1990 BMA amendments renders the precise issues in these cases moot. The court's acceptance of stringent setback restrictions as a rational method of advancing the state interest in shoreline protection, however, indicates that similar provisions aimed at enabling coastal wetlands migration through the institutionalization of presumed mobility could survive a challenge based on a takings theory.

Following the damage that Hurricane Hugo caused in September 1988, BMA regulated the rebuilding of approximately 150 coastal properties, allowing most of these structures to be rebuilt, but restricting them to sites further inland on the same lots.<sup>109</sup> The Coastal Council came under heavy criticism for being too lenient in determining whether a building was so damaged that it could not be rebuilt.<sup>110</sup> Although the Council vigorously defended its implemen-

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<sup>102</sup> *Lucas v. South Carolina Coastal Council*, C/A No. 88-CP-10-66, slip op. (C.P. Charleston County, Aug. 10, 1989). See generally, Harold N. Skelton, *Houses on the Sand: Takings Issues Surrounding Statutory Restrictions on the Use of Oceanfront Property*, 18 B.C. ENVTL. AFF. L. REV. 125 (1990) for a discussion of takings law as applicable in coastal zone situations, particularly South Carolina and Chatham, Massachusetts.

<sup>103</sup> *Lucas v. South Carolina Coastal Council*, 404 S.E.2d 895 (S.C. 1991).

<sup>104</sup> No. D:89-0216-1, 1989 U.S. Dist. LEXIS 17228 (D. S.C. Oct. 13, 1989).

<sup>105</sup> *Id.* at \* 6-7.

<sup>106</sup> No. D:88-2055-1, slip op. (D. S.C. Oct. 13, 1989).

<sup>107</sup> *Id.* at 6.

<sup>108</sup> *Esposito v. South Carolina Coastal Council*, 939 F.2d 165 (4th Cir. 1991).

<sup>109</sup> Tecklinburg, *supra* note 83.

<sup>110</sup> McAllister, *supra* note 79, at A8.



tation of BMA in the aftermath of Hurricane Hugo,<sup>111</sup> there were approximately fifty lawsuits filed over its decisions not to permit rebuilding after the hurricane.<sup>112</sup> This litigation, however, has involved structures other than actual houses, such as swimming pools and seawalls.<sup>113</sup>

While the case study of South Carolina may seem discouraging in light of the success that development interests have had in loosening BMA's original restrictions, there are reasons for optimism. First, inland South Carolina residents remain solidly in favor of restrictions on beachfront construction. Hugo has made them realize the tremendous costs that the entire state must bear in allowing unwise shorefront development.<sup>114</sup> Second, the recent BMA amendments retain the setback zone requirement and the restrictions on rebuilding within that zone—restrictions that embody the concept of presumed mobility.

#### *D. Chatham, Massachusetts: The Breach at North Beach*

The town of Chatham, located on Massachusetts's Cape Cod, provides an example of the confusion that can ensue, despite seemingly adequate coastal planning mechanisms, when a vague and distant threat suddenly becomes an immediate and urgent hazard. Chatham sits on Pleasant Bay, which is separated from the Atlantic Ocean by a barrier island known as North Beach. Historically, the ocean has breached North Beach at intervals of roughly 100 to 150 years, after which the beach gradually reforms.<sup>115</sup> A 1978 study predicted that a breach in North Beach would occur sometime during the 1980s.<sup>116</sup> On January 2, 1987, as foreseen, a severe winter storm coupled with extremely high tides effected a breach in North Beach and exposed Pleasant Bay and Chatham to the force of ocean waves.<sup>117</sup> As the breach widened, it quickly became obvious that the beach erosion resulting from the increased wave action would threaten up to twenty shoreline residences.<sup>118</sup>

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<sup>111</sup> *Id.*

<sup>112</sup> Tecklinburg, *supra* note 83.

<sup>113</sup> *Id.* Many of these cases will be resolved in favor of the property owners if it is determined that the 1990 amendments are to be applied retroactively.

<sup>114</sup> *Id.*

<sup>115</sup> Timothy J. Wood, *BREAKTHROUGH: THE STORY OF CHATHAM'S NORTH BEACH* 9 (1989).

<sup>116</sup> *Id.* at 13.

<sup>117</sup> *Id.* at 33.

<sup>118</sup> *Id.* at 36. Coastal erosion specialists predict that sea level rise will increase dramatically the effects of large storms on the Massachusetts coastline. The south shore of Martha's

Massachusetts's Wetlands Protection Regulations prohibit any new construction of engineered structures—bulkheads, seawalls, revetments, and the like—on sand dunes.<sup>119</sup> The implementation of these rules in Chatham following the January 1987 breach of North Beach led to confusion, contradictory rulings, and, ultimately, bitterness.<sup>120</sup> In March 1987, state officials, following the regulations as promulgated under the Massachusetts Wetlands Protection Act,<sup>121</sup> advised the Chatham Conservation Commission to approve only “soft” erosion control measures, such as beach nourishment, dune grass planting, and sandbag placement.<sup>122</sup> In November of that year, the Commission granted an emergency work permit for the construction of a temporary soft structure, but local homeowners, who had organized into a group that went by the acronym BREACH, failed to agree on an engineering method; as a result, the soft structure was never built.<sup>123</sup>

In December 1987, the state Department of Environmental Quality Engineering's (DEQE's) Coastal Zone Management office refused to permit the construction of a rock revetment on the Chatham beach.<sup>124</sup> The affected property owners obtained a temporary restraining order prohibiting federal, state, and local governments from interfering with the building of a temporary rock revetment.<sup>125</sup> The property owners had rocks placed haphazardly along the beach in front of their threatened homes, causing a worsening of the erosion.<sup>126</sup> Although subsequent court orders in January 1988 required the removal of some of the rocks and prohibited the placement of more,<sup>127</sup> further truckloads of rocks were dumped illegally along the beach.<sup>128</sup> This stop-gap measure was insufficient to stop the destruction of six of the beachfront homes due to erosion,<sup>129</sup> and two of the

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Vineyard, for example, may retreat 1000 feet over the next century, with storms like August 1991's Hurricane Bob causing the most damage. Some Vineyard dunes lost 20 to 25 feet during Hurricane Bob. Dianne Dumanoski, *Latest Assault Took Bites Out of Islands' Beaches*, BOSTON GLOBE, Aug. 21, 1991, at A24.

<sup>119</sup> See MASS. REGS. CODE tit. 310, § 10.28 (1988).

<sup>120</sup> See Wood, *supra* note 115, at 43–66.

<sup>121</sup> MASS. GEN. LAWS ANN. ch. 131, § 40 (West 1990).

<sup>122</sup> Wood, *supra* note 115, at 37.

<sup>123</sup> *Id.* at 50–52.

<sup>124</sup> *Id.* at 51.

<sup>125</sup> *Id.* at 54.

<sup>126</sup> *Id.*

<sup>127</sup> *Id.* at 55.

<sup>128</sup> *Id.* at 55–57.

<sup>129</sup> *Id.* at 43, 69.

homeowners now have suits pending against the state.<sup>130</sup> Eventually, DEQE and local officials permitted rock structures on the coastal bank areas.<sup>131</sup> To date, twenty-eight Chatham property owners affected by the breach have built revetments.<sup>132</sup>

The underlying problem with the enforcement of the Massachusetts beach protection regulations was that the state, the officials of the town of Chatham, and the public had not adequately confronted the probability that such enforcement would lead to the destruction of private residences.<sup>133</sup> The legal and political issues presented by a regulatory scheme that institutionalizes the concept of presumed mobility therefore were unresolved when houses began falling into the sea. In developing any plan to allow for coastal wetlands migration, the sometimes painful process of public discussion must be complete before sea level rise threatens private property.

As the four preceding examples of coastal zone planning indicate, public understanding and acceptance is vital to the success of any program that aims to have property owners abandon their shoreline residences as the sea encroaches. The institutionalization of the concept of presumed mobility involves more than the passage of legislation and a commitment on the part of regulatory agencies, although these are essential elements. It also requires a broad-based willingness to give precedence to natural coastal processes over traditional property rights.

As the next section of this Article demonstrates, mechanisms other than coastal setback restrictions may be useful in enabling wetlands migration. Reservations of use and occupancy, flood insurance provisions, and land trusts all can incorporate the concept of presumed mobility, providing a means for facilitating wetlands migration in the future at a relatively low cost today.

### III. LAND USE MECHANISMS ADAPTABLE TO THE PROMOTION OF WETLANDS MIGRATION

#### *A. Reservations of Use and Occupancy*

In creating national parks, Congress occasionally gives the National Park Service the authority to grant "reservations of use and

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<sup>130</sup> Plaintiffs seek damages in amount of \$1.5 million. *See id.* at 69; Telephone interview with Nicholas Soutter, attorney for plaintiffs Wilson and Rolfe, Feb. 21, 1990.

<sup>131</sup> Wood, *supra* note 115, at 69.

<sup>132</sup> Telephone Interview with Timothy J. Wood, Cape Cod Chronicle (Sept. 13, 1991).

<sup>133</sup> *See* Wood, *supra* note 115, at 64.

occupancy" to landowners who otherwise would be displaced because their property falls within the boundaries of the new park.<sup>134</sup> The Park Service acquires the property through donation, purchase, or condemnation, but allows the previous owner to retain use of the property for either a term of years or for life.<sup>135</sup> The reservation is an interest in real property and is transferable. There are currently about 1600 such reservations on Park Service lands.<sup>136</sup>

Reservations of use and occupancy provide two distinct advantages to outright government purchase of land. First, holders of these reservations may stay on "their" land, although they often are prohibited from making improvements to the property without Park Service permission, in order to prevent further development.<sup>137</sup> The Park Service has encountered few problems in enforcing the terms of its reservations of use and occupancy,<sup>138</sup> perhaps because the areas affected are relatively small and easily monitored. Second, reservations of use and occupancy not only ease the transition from private to public ownership, but also reduce the government's cost in acquiring property. Purchase price is calculated as the current value of the property less one percent for each year of the term of the reservation (or of the life expectancy of the reserver for a lifetime reservation).<sup>139</sup>

A mechanism like a reservation of use and occupancy, which most closely resembles a long-term lease, could be useful in protecting upland areas adjacent to existing coastal wetlands, whether or not the areas have been developed. Preserving these areas will provide locations into which coastal wetlands can move naturally as the sea level rises. The reservation mechanism would serve to institutionalize the concept of presumed mobility by giving reservation holders a relatively set time frame for their occupancy. Moreover, because current predictions hold that the sea will rise gradually over the next century, the term of a reservation for use and occupancy of coastal areas could be measured in decades, enabling the government to take advantage of a substantial discount rate. The use of reser-

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<sup>134</sup> Telephone Interview with Will Kriz, Land Acquisitions, National Park Service (June 27, 1990).

<sup>135</sup> *Id.*

<sup>136</sup> *Id.*

<sup>137</sup> *See, e.g.*, Offer to Sell Real Property, Contract No. CX408740065, U.S. Dep't of the Interior, (1973) (on file with author).

<sup>138</sup> Kriz, *supra* note 134.

<sup>139</sup> *Id.*

vations to enable wetlands migration therefore could be a cost-effective means of acquiring ecologically sensitive private property.

### *B. Federal Flood Insurance*

In 1968, following several disastrous floods around the United States earlier in the decade,<sup>140</sup> Congress enacted the National Flood Insurance Act (NFIA).<sup>141</sup> The statute directed the Federal Emergency Management Agency (FEMA), under the National Flood Insurance Program (NFIP), to identify and map flood-prone areas, make flood insurance available to property owners, and promote state and local land use controls that would guide development away from flood hazard zones.<sup>142</sup> The NFIP has great potential to direct development away from areas threatened by sea level rise and encroaching wetlands. This potential, however, is far from being realized.

While, under the NFIP, FEMA has succeeded in identifying hazard areas and providing low-cost flood insurance to property owners, the agency generally has not required state and local governments participating in the program to restrain development in flood-prone areas. Instead, FEMA requires participating communities to adopt and enforce minimum floodplain construction standards.<sup>143</sup> These include requirements to locate all new structures landward of mean high tide; elevate structures above the base flood level; anchor structures against a 100-year flood; and prohibit alterations of sand dunes and mangrove stands when those alterations will increase potential flood damage.<sup>144</sup> These requirements clearly do not guide development away from flood-prone areas, but rather seek to reduce damages to humanly constructed structures in the event of a major flood.

The adoption of stricter building standards may have boosted confidence in the ability of structures to withstand flooding. In addition, flood insurance, which previously was not available to many homeowners in coastal areas, now provides new security to lenders as well as individuals desiring to build along the coast.<sup>145</sup> Flood insurance policies issued under the NFIP may have limitless repeat

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<sup>140</sup> Beth Millemann, *Time, Tide and Federal Insurers*, WASH. POST, Aug. 4, 1991, at C3.

<sup>141</sup> 42 U.S.C. §§ 4001-4128 (1988).

<sup>142</sup> *Id.*

<sup>143</sup> 44 C.F.R. § 59.22 (1990).

<sup>144</sup> *Id.*

<sup>145</sup> U.S. General Accounting Office, *National Flood Insurance: Marginal Impacts on Flood Plain Development—Administrative Improvements Needed*, 7 (GAO/CED-82-105, Aug. 16, 1982).

claims made against them without any increase in the premiums.<sup>146</sup> The combination of these factors, rather than directing development away from coastal lands, actually may encourage building on sensitive lands.

Amendments to NFIA in 1988 addressed some of the shortcomings of the program and provided it with the flexibility to adapt to the specific problems associated with sea level rise and wetlands migration. Fostering the idea of presumed mobility, the amendments encourage homeowners to demolish or relocate their houses when erosion subjects the houses to imminent collapse. For example, a homeowner may receive 100% of the cash value of the house plus up to ten percent of that figure to cover demolition costs.<sup>147</sup> Homeowners opting for relocation are eligible for relocation costs of up to forty-percent of the cash value of the house.<sup>148</sup> Since 1988, only 360 claims for demolition or relocation have been filed.<sup>149</sup> Of these, 160 have been approved, 130 for demolition.<sup>150</sup> The greatest barrier to eligibility for demolition or relocation funds has been a requirement that the local government condemn the structure.<sup>151</sup>

Legislation introduced in Congress in the 1991 session would address some of the NFIP's shortcomings.<sup>152</sup> The bill would require FEMA to establish erosion setbacks for all structures.<sup>153</sup> It also would mandate that the agency take the risk of sea level rise into account in establishing flood insurance premiums; use ten percent of premiums collected to increase funding for its purchases of extremely flood-prone properties; and set aside five percent of premiums collected for the mitigation, through relocation and removal, of repetitive losses.<sup>154</sup>

### C. Land Trusts

Recognizing that government efforts at conservation often come too little and too late, private groups are becoming increasingly

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<sup>146</sup> Millemann, *supra* note 140.

<sup>147</sup> 42 U.S.C. § 4013.

<sup>148</sup> *Id.*

<sup>149</sup> Telephone Interview with Mike Buckley, Federal Emergency Management Agency (July 2, 1990).

<sup>150</sup> *Id.*

<sup>151</sup> *Id.* Perhaps local governments fear both the bad press involved in condemning shorefront property and the loss of taxable property.

<sup>152</sup> H.R. 1236, 102nd Cong., 1st Sess. (1991).

<sup>153</sup> *Id.*

<sup>154</sup> *Id.*

active in the acquisition of property rights for conservation purposes. Land trusts are private, nonprofit corporations that use a variety of techniques either to acquire property outright or to negotiate conservation easements.<sup>155</sup> For example, the Nature Conservancy, the nation's largest land trust organization, has an active program for acquiring wetlands threatened with development.<sup>156</sup> The Conservancy raises money from corporations, foundations, private individuals, and governments.<sup>157</sup> The methods it employs to protect vulnerable lands include purchasing property, soliciting land donations and bequests, and arranging land trades.<sup>158</sup> The acquisitions program focuses on areas that provide a special habitat for threatened or endangered species, or that represent unique biological systems.<sup>159</sup> The Conservancy's agenda easily could encompass the acquisition of undeveloped upland areas that should be preserved in order to enable wetlands migration. The organization currently allows for a possible sea level rise when developing designs for its preserves.<sup>160</sup>

In addition to the Nature Conservancy, there are two national organizations that promote the formation and development of local land trusts: the Land Trust Exchange in Alexandria, Virginia, and the Trust for Public Land (TPL) in San Francisco, California. Unlike the Nature Conservancy, these organizations do not have a specific agenda such as the protection of endangered species. Rather, they serve as resources for regional land trusts and assist in the structuring of property transfers.<sup>161</sup> Their services would be valuable to any local group interested in securing property rights in areas adjacent to coastal wetlands.

Since 1973, TPL has assisted over 200 local land trusts nationwide.<sup>162</sup> TPL also has worked to "preacquire" land that is for sale, with the goal of transferring the title to the government or local trusts.<sup>163</sup> The organization often intervenes at the request of state governments when the state cannot get involved, either because it

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<sup>155</sup> Chris Elfring, *Preserving Land through Local Land Trusts*, BIOSCIENCE, Feb. 1989, at 71, 71-73.

<sup>156</sup> See Madson, *supra* note 17, at 3.

<sup>157</sup> See *id.*

<sup>158</sup> *Id.*

<sup>159</sup> *Id.*

<sup>160</sup> Letter from Will Murray, Director, Stewardship Administration, Nature Conservancy (Jan. 17, 1990) (on file with author).

<sup>161</sup> Martin J. Rosen, *Preface to LAND AND PEOPLE 2* (The Trust for Public Land, Summer 1989).

<sup>162</sup> *TPL and Land Trusts*, in *LAND AND PEOPLE*, *supra* note 161, at 3.

<sup>163</sup> *Id.*

will encounter anti-government sentiment, or because it does not have the resources to take action.<sup>164</sup>

In Washington, for example, wetlands conservation is a primary concern of many coastal citizens as the state economy booms and development pressures increase. The Northwest Regional Office of the TPL works with the state's Department of Ecology (DOE) and the Capitol County Land Trust, a local organization, to secure conservation easements. One of the Capitol County Land Trust's first cases involved Woodland Creek, a salt marsh area near Puget Sound.<sup>165</sup> A coalition of environmental groups opposed a local landowner who tried to develop his wetland property.<sup>166</sup> Working with the TPL, the Capitol County Land Trust mediated the dispute and obtained funding through the DOE to purchase the property for future conveyance to the county parks department.<sup>167</sup>

Land trusts could preserve undeveloped uplands adjacent to existing coastal wetlands. A trust could be created through the outright purchase of property, although this method would be expensive. A less costly alternative would be for a land trust to negotiate the terms for the creation and purchase of a "wetlands migration easement." This type of easement would prevent a landowner from interfering with the encroachment of water and the subsequent creation of new wetlands as sea level rises, thus incorporating the concept of presumed mobility. The land trust, in turn, would have the ability to enforce the terms of the easement. The landowner would surrender a property right, but the event triggering compliance with the terms of the easement, a rise in sea level, would occur decades in the future. Therefore, the land trust would be able to discount the cost of purchasing the easement.

While reservations of use and occupancy, flood insurance, and land trusts all have the potential to assist in enabling coastal wetlands migration through the institutionalization of presumed mobility, they have not yet been tested. The two case studies in the following section show how two states actually responded to water level rise, and the relative success of those responses. One state chose a costly and temporary engineering solution that bypassed natural processes, while the other enacted a program that institutionalized the concept of presumed mobility.

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<sup>164</sup> *Fact Sheet*, THE TRUST FOR PUBLIC LAND, Nov. 1989 (on file with author).

<sup>165</sup> Jim Scott, *Woodland Creek Safe with Land Trust*, WASH. COASTAL CURRENTS, May 1988, at 1, 1.

<sup>166</sup> *Id.*

<sup>167</sup> *Id.*



#### IV. RESPONDING TO LAKE LEVEL FLUCTUATION: ENGINEERING VERSUS RETREAT

During the past decade, shoreline residents of both the Great Lakes and Utah's Great Salt Lake experienced a situation akin to sea level rise. Unusually high water levels in these lakes during the mid-1980s provoked a variety of reactions from both citizens and government officials, giving some indication of how different interests may respond to sea level rise in the future. In Utah, a tremendous rise in the Great Salt Lake found lakeshore residents unprepared, and led to the implementation of large-scale, short-term engineering projects.<sup>168</sup> Michigan, on the other hand, took the more long-term approach of reducing the threat to property by creating incentives to retreat from the shoreline.<sup>169</sup> This difference in response probably is due in part to the fact that the water level changes in Utah were almost completely unexpected, while those in Michigan were variations on a known hundred-year cycle. The degree to which policymakers can engender a popular understanding that sea level may rise will determine how effectively society can respond to the challenge of coastal wetlands preservation.

##### A. Utah

In the case of the Great Salt Lake, the twelve-foot rise in water level between the years 1982 and 1986 was unprecedented in the memory of shoreline residents.<sup>170</sup> Records of the lake's normal twenty-foot fluctuation cycle, however, date back to the 1840s<sup>171</sup> and should have made long-term planning an imperative.

In 1975, the Utah legislature established the Division of the Great Salt Lake and the Great Salt Lake Board within the state's Department of Natural Resources.<sup>172</sup> It charged these units with the task of developing a comprehensive management plan for the lake.<sup>173</sup> While the resulting plan included statements emphasizing the importance of floodplain and hazard zone delineation,<sup>174</sup> it was based

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<sup>168</sup> See *infra* notes 160-79 and accompanying text.

<sup>169</sup> See *infra* notes 180-95 and accompanying text.

<sup>170</sup> See Peter M. Morrisette, *The Rising Level of the Great Salt Lake: An Analogue of Societal Adjustment to Climate Change*, in SOCIETAL RESPONSES TO REGIONAL CLIMATE CHANGE: FORECASTING BY ANALOGY, 169, 173 (M.H. Glantz ed., 1988).

<sup>171</sup> *Id.* at 173, 175.

<sup>172</sup> *Id.* at 182.

<sup>173</sup> UTAH CODE ANN. § 65-8a (1986).

<sup>174</sup> Morrisette, *supra* note 170, at 182.

on a narrow range of lake-level fluctuations, with the estimated high-water level set at 4202 feet.<sup>175</sup> Unfortunately, in light of subsequent events, the state never implemented the comprehensive plan.<sup>176</sup> In 1979, after three years of both receding waters and rapid shoreline development, the legislature mandated that, if necessary in the future, the lake level would be manipulated so as to be maintained at a level below 4202 feet.<sup>177</sup>

From 1982 to 1984, the state government watched passively as lake levels rose dramatically, surpassing the 4202-foot mark in 1983.<sup>178</sup> The lake eventually reached a new historical record-high level at 4211.85 feet in 1986.<sup>179</sup> Flooding hit the shoreline hard, with serious damage to public roads and other infrastructure, mineral companies—which lost valuable evaporation ponds and were forced to ship salt in by train from San Francisco Bay—railroads, waterfowl preserves, and recreation areas.<sup>180</sup> The federal government decided that it would not pay for substantial flood mitigation programs in Utah, thus leaving the cost of such projects to the state.<sup>181</sup>

State resource management agencies devised plans to either pump water away from the lake or divert incoming rivers.<sup>182</sup> A group of state agencies lobbied hard for the project to pump water into the desert, where it would evaporate. Pumping is expensive,<sup>183</sup> however, and many legislators found it difficult to support a plan that called for wasting water in traditionally arid Utah.<sup>184</sup> Private lobbying focused on more radical plans, such as a complicated inter-island diking scheme that would have created a profitable fresh-water bay at one end of the lake.<sup>185</sup> Policymakers did not entertain seriously the idea of using the unimplemented comprehensive plan for the lake's management; in their minds, the decision was between inaction and an array of expensive flood mitigation programs.

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<sup>175</sup> *Id.* at 183.

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

<sup>177</sup> UTAH CODE ANN. § 65-81-7 (1979) (repealed 1983).

<sup>178</sup> Morrisette, *supra* note 170, at 179, 185.

<sup>179</sup> *Id.* at 173.

<sup>180</sup> *Id.* at 176, 184.

<sup>181</sup> *Id.* at 184–85.

<sup>182</sup> *Id.* at 186.

<sup>183</sup> One report cited costs of pumping at between \$20 and \$50 million per year. DEP'T OF NATURAL RESOURCES, STATE OF UTAH, RECOMMENDATIONS FOR A GREAT SALT LAKE CONTINGENCY PLAN FOR INFLUENCING HIGH AND LOW LEVELS OF GREAT SALT LAKE 43 (1983).

<sup>184</sup> Morrisette, *supra* note 170, at 187.

<sup>185</sup> *Id.* at 186.

In 1985, the Utah Division of Comprehensive Emergency Management designated the Great Salt Lake's shoreland as a Beneficial Development Area (BDA) where development would be restricted; local governments, however, would not cooperate in implementing the BDA concept on a large scale.<sup>186</sup> Several highly developed counties, such as Davis County near Salt Lake City, opposed the plan on the grounds that it would result in a loss of local control over zoning and could jeopardize very profitable shorefront developments.<sup>187</sup> Other counties, such as Weaver County, did adopt setback rules on their own, but now are considering dropping these rules as lake levels fall again.<sup>188</sup>

In 1986, the state began large-scale funding for flood mitigation. It ultimately spent about \$60 million to construct a water pumping project that pumped the lake's excess water to the Nevada desert. The pumping continued in full force until lake levels began to recede in 1987.<sup>189</sup>

During the high-water period, property owners did not push the state to compensate them for loss of property due to flooding. Most of the damage was to industry or infrastructure, and the state did not want to set a precedent by offering compensation. Interestingly, there appears to have been no attempt to sue the state for compensation using the argument that the statute had mandated the lake be maintained at the 4202-foot level.<sup>190</sup>

At the present time, there is almost no effort in Utah to plan for future lake-level fluctuations. Because local governments are wary of losing profitable shoreline development, and the state is not taking a stand on the issue, the lessons presented by hundreds of millions of dollars of flood damage have been ignored. Flood mitigation projects, such as the water pumping system, are still in place and provide an expensive, publicly funded safety net for shorefront residents and development interests alike. With the current drought in the area and falling lake levels, Utah's citizens seem to have forgotten that lake levels will continue to fluctuate dramatically in the future.

The Utah experience indicates that any attempt to restrict coastal development in order to permit coastal wetlands migration must begin with a campaign to educate residents and local officials on the

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<sup>186</sup> *Id.* at 189-90.

<sup>187</sup> Telephone Interview with Peter Morrisette, Fellow, Resources for the Future (Feb. 23, 1990).

<sup>188</sup> *Id.*

<sup>189</sup> Morrisette, *supra* note 170, at 187-89.

<sup>190</sup> Morrisette, *supra* note 187; *see also supra* note 177 and accompanying text.

hazards of sea level rise. Following this education effort must be the promulgation *and implementation* of a comprehensive plan to control coastal development in a manner that will allow for a gradual retreat in the face of an unrelenting rise in sea level.

### B. Michigan

In contrast to Utah, Michigan responded to rising Great Lakes levels with a program that provided for an orderly retreat from the shoreline. Michigan borders on four of the five Great Lakes and has witnessed significant lake-level fluctuations several times during this century.<sup>191</sup> In 1985, the lakes began to rise again, this time more dramatically than in the past.<sup>192</sup> The governor and the state legislature responded quickly and unanimously by creating the Emergency Home Moving Program (EHMP), an innovative pilot program to provide loan interest subsidies for the relocation of erosion-threatened houses.<sup>193</sup> These subsidies covered the costs of moving houses, septic systems, water lines, and electric cables, and of demolishing and removing houses that would not survive a move inland.<sup>194</sup> Michigan's experience demonstrates the value of adopting a regulatory strategy based upon the concept of presumed mobility.

The EHMP, which the Michigan Department of Natural Resources (DNR) administered, offered eligible homeowners two options for receiving a relocation subsidy. One option was to take out a loan from a public lending institution and then apply to the DNR for a three-percent interest rate subsidy on the first \$25,000 in costs.<sup>195</sup> The other option was to accept a one-time payment directly from the DNR of up to \$3500 to defray the costs of relocation.<sup>196</sup> To meet the conditions for the subsidy, a homeowner was required to move its building at least forty-five feet inland.<sup>197</sup> A counterpart to the EHMP, the Emergency Home Flood Protection Program, provided subsidies for the elevation of endangered buildings.<sup>198</sup> This program specifically excluded permanent structures such as seawalls and dikes.<sup>199</sup>

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<sup>191</sup> Lisa Pittman, *Plugs to Pull: Proposals for Facing High Great Lakes Water Levels*, U.C.L.A. J. of Env'tl. L. 213, 215 (1989).

<sup>192</sup> *Id.*

<sup>193</sup> 1985 Mich. Pub. Acts 108, § 64.

<sup>194</sup> *Id.*

<sup>195</sup> *Id.*

<sup>196</sup> *Id.*

<sup>197</sup> *Id.*

<sup>198</sup> *Id.*

<sup>199</sup> *Id.*

The legislature appropriated \$2,000,000 for the EHMP in 1986 and reauthorized it for \$1,000,000 in 1987. All funds were designated for subsidies, with staff costs absorbed by the DNR's Coast Zone Management office. Between August 1986 and February 1987, the DNR received 273 applications, of which it accepted 199 as eligible for the program.<sup>200</sup> It paid out subsidies totalling \$267,000 to seventy-two people, sixty-four for relocation and eight for shoreline protection.<sup>201</sup>

Michigan did not renew the EHMP after lake levels began to fall in 1987, and there are no plans to reactivate the program in the near future. DNR attributes some of the success of the program to its keeping paperwork to a minimum; the agency processed applications over the telephone and developed one-page forms for both applicants and banks.<sup>202</sup> The agency found that direct subsidies to homeowners were preferable to interest subsidies, because the latter discriminated against poorer homeowners who could not qualify for loans.<sup>203</sup>

One commentator, however, recently noted some of the weaknesses of the EHMP.<sup>204</sup> First, the program presupposed that property owners had either land on which to relocate or sufficient capital to buy new land. Second, the program probably did not appear attractive to owners of buildings that were too large or structurally weak to relocate; their only option was demolition.<sup>205</sup> The commentator did point out that the estimated \$36,000 relocation cost per building was much less than the cost of rebuilding.<sup>206</sup>

It appears that the success of a program like Michigan's EHMP depends on the ability of an administering agency to convince shoreline property owners of an imminent hazard, and on the payment of a subsidy large enough to make relocation the most attractive option. This type of subsidy could be established on either the federal or state level for the owners of property in upland areas that are threatened by sea level rise and have been deemed suitable for wetlands migration.

## V. CONCLUSION

While there are many uncertainties associated with coastal wetlands migration, one fact is certain: a community that can develop a

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<sup>200</sup> LAND AND WATER MANAGEMENT DIVISION, MICHIGAN DEPARTMENT OF NATURAL RESOURCES, *Emergency Home Moving Program: Final Report 3* (May 18, 1987).

<sup>201</sup> *Id.*

<sup>202</sup> *Id.* at 5.

<sup>203</sup> *Id.* at 3.

<sup>204</sup> Pittman, *supra* note 191, at 257.

<sup>205</sup> *Id.*

<sup>206</sup> *Id.*

detailed, workable plan for dealing with the consequences of sea level rise will emerge with more successful solutions than a community that must improvise when a crisis arises. The case studies detailed above demonstrate the values that public education, research, government commitment, and advance planning hold for any effort to enable the migration of coastal wetlands. Moreover, the case studies illustrate the advantages of institutionalizing the concept of presumed mobility. By enacting legislation and promulgating regulations that provide for an orderly retreat from the coastline over time, property owners can be psychologically and financially prepared to retreat before migrating wetlands conditions reach their doorsteps.