

Risk Allocation Policy in the Coastal Zone:

The Current Framework and Future Directions

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Contents

	<u>Page</u>
I. Coastal development trends: the nature and magnitude of coastal risks	1
II. Coastal Development Subsidies	3
A. National Flood Insurance Program	3
B. Federal Disaster Assistance	8
C. Beach Renourishment and Shoreline Protection	10
D. Federal Tax Code	11
E. Other Development Subsidies	11
F. A Lax Regulatory Framework	12
III. Existing programs and recent initiatives encouraging mitigation and less damaging development patterns	13
A. Section 1362 flooded properties purchase program	14
B. Upton-Jones relocation assistance	14
C. Community rating system	17
D. Hazard mitigation programs/requirements under federal disaster assistance act	20
E. Coastal Barrier Resources Act	22
F. Coastal Zone Management Act and State Management programs	25
G. Other existing programs and policies	33
H. Proposed congressional flood insurance reforms	34

IV.	Recommendations and Options for the Future: Readjusting the incentives structure and promoting less hazardous and damaging coastal development	36
A.	Revamping the National Flood Insurance Program	37
B.	Revamping disaster assistance	42
C.	Extending and Expanding the Coastal Barrier Resources Act	44
D.	Revamping the federal tax code	45
E.	Strengthening state and local coastal management	46
F.	Shoreline Protection and Beach Renourishment	47
G.	Expanding Wetlands Protection	49
V.	Impediments and Obstacles to Reform	50
VI.	References	54

I. Coastal development trends: the nature and magnitude of coastal risks

Americans seem ever drawn to coastal areas. Over time we have increasingly become a coastal nation, as development and growth pressures continue to reflect the desire to live and play along coastlines. Despite their inherent appeal and attractiveness, coastlines are risky environments, subject to hurricanes and severe coastal storms, flooding long term erosion, and sea level rise. It is the premise of this report that at least part of the reason that growth and development pressures have continued and heightened in recent years is that certain incentives exist--indeed a system of incentives --which serve to "collectivize" many of the risks associated with living or owning property on the coast. This paper focuses primarily on the elements of this incentive structure, especially at the federal level, describing and evaluating the National Flood Insurance Program, federal disasters assistance, funds for beach nourishment and coastal protection, and tax benefits available through the federal income tax code, among others.

Increases in population and development in coastal areas have been dramatic in recent decades, and at much faster rates than the rest of the country. Already, nearly half of the U.S. population resides in coastal counties, and projections suggest that by the year 2010 coastal populations will grow to 127 million (Culliton, et al, 1990). This represents a 60% increase over what coastal population levels were in 1960. Of the 20 states expected to grow by the greatest amount, 17 of them are coastal. Florida alone is expected to grow in population by some 226%.

Much of this growth has occurred during an unusual lull in hurricane and coastal storm activity. While there have been 39 Atlantic hurricanes with wind speeds of 100 knots or greater between 1950 and 1988, the vast majority of them (85%) occurred during the 1950s and 1960s (National Committee on Property Insurance, 1988; see also Godschalk, Brower and Beatley, 1989). Moreover, much of this development has occurred in the most vulnerable locations, including barrier islands, beachfront areas, on or near coastal wetlands and estuarine shorelines, and floodplain hazard zones, and so on. Even though loss of life from hurricanes and coastal zones has gone down since the turn of the century, levels of property damage have continued to rise. Recent storms dramatically illustrate the increasing potential impacts of these events. Hurricane Andrew, for instance is estimated to have caused over \$30 billion in property damages. While loss of life from these events has declined over time, the potential exists for greater loss of life in the future

as evacuation times continue to rise, and we reach the limits of our existing warning and prediction systems.

Sea level rise and long term shoreline erosion also represent serious threats. This is especially a problem along the low-lying barrier island system of the Gulf and Atlantic coasts, where small vertical rises in sea level translate into large horizontal movement in the shoreline. Shoreline erosion is a serious problem along the west coast of the U.S. as well. Of California's 1100 miles of coastline, for example, some 86% of it is actively eroding (Griggs, Pepper and Jordon, 1992). Coastal states and communities must increasingly face serious questions of how to confront coastal erosion, including whether to armor the shoreline and resist the forces of nature (e.g. through seawalls, groins), engage in softer approaches such as beach renourishment, or to institute a strategy of gradual retreat (e.g. through relocation, shoreline setback restrictions).

The possibilities of accelerated future sea level rises, due to global warming, threaten to exacerbate these problems. While estimates of future sea level rise vary greatly consensus appears to be developing around a range of between .5 to 2 meters by the year 2100 (Edgerton, 1991). Future sea level rises in this range suggest major expansion of areas of coastal flooding and inundation. A number of studies have sought to estimate the likely impacts of such rises on the built and natural environment, with sobering conclusions. Even under moderate scenarios future sea level rise many oceanfront communities, from Charleston (SC) to Galveston (TX), would be largely under water, with many of the areas subject to periodic flooding (e.g. Barth et al 1984; Titus, 1991; Titus et al 1991). Property changes would be great, and the intensity and cost of structural protection (if attempted) very high. Substantial damage to the natural environment could also result, including inundation of large areas of coastal wetlands (e.g. Park et al 1989; Titus, 1991) and loss of biodiversity (e.g. Reid and Trexler, 1991). Park et al (1989) estimates, for instance, that a one meter rise in sea level would result in a loss of between 46% and 52% of all coastal wetlands. Losses of wetlands will be even greater where human development (e.g. bulkheads, houses) impedes the natural landward migration of wetlands in response to sea level rise (e.g. Titus, 1989).

II. Coastal Development Subsidies

While the development pressures in coastal areas are undoubtedly driven by many larger social and economic trends, government policy can influence the pace, quality and location of this development. Historically, government has subsidized, sometimes directly other times indirectly, this coastal development through a number of programs and policies. The following sections describe several of the primary programs which have served to underwrite risky coastal growth, with particular emphasis on the federal level. Several programs receive particular attention, including: the National Flood Insurance Program (NFIP); federal disaster assistance; federal public investment programs and policies; and the federal tax code; among others. It is the premise of this report that these existing policies and programs represent levers which can be modified or adjusted to encourage safer coastal development patterns, and to reduce long term property damage and loss of life. A more rational and risk-averse policy framework can also serve to reduce pressures on an extremely sensitive and productive coastal ecosystem, and protect the resilience of this system in adapting to long term erosion, sea level rise, etc. Considerable discussion is also provided of state programs which influence the quality and location coastal development (both positively and negatively).

For each of the policy and programmatic discussions to follow, an attempt is made to discuss not only their negative features, but also those provisions which require or encourage (or could) hazard mitigation and resource protection. The National Flood Insurance program, for example, while subsidizing coastal development, also imposes certain minimum flood mitigation standards, and has evolved in recent years to incorporate positive programs which seek to promote greater attention to long term risk-reduction.

A final section of this report identifies and discusses a number of possible changes in these programs and policies, which can further reduce risks and promote coastal resource protection. These are meant to be neither exhaustive nor definitive, but rather starting points for a constructive dialogue for creating a policy framework and incentives structures more supportive of risk-reduction objectives.

A. National Flood Insurance Program (NFIP)

The availability of federal flood insurance is frequently cited as a primary example of how hazardous coastal development is subsidized and how the wrong kind of incentives are created. Federal flood insurance was

made available in 1968 through the enactment of the National Flood Insurance Act. Prior to this program affordable private flood insurance was generally not available (a similar reluctance of private insurers to provide wind insurance has led to the establishment of wind pools in states such as Florida and Texas). Under the National Flood Insurance program (NFIP) federally-subsidized flood insurance is made available to owners of flood-prone property in participating communities. Coverage is available both for the structure itself (up to \$185,000 for a single family structure) and for contents (up to \$60,000). Administered by FEMA (Federal Insurance Administration in particular), participating communities are required to adopt certain minimum floodplain management standards, including: restrictions on new development in designated floodways (development within the floodway is prohibited if it results in raising flood levels more than one foot); a requirement that new structures in the 100-year flood zone be elevated to at or above the 100-year flood level (generally known as base flood elevation or "BFE"); and a requirement that subdivisions are designed to minimize exposure to flood hazards. For high hazard coastal zones ("Velocity" zones, or "V" zones) additional standards are imposed, including: the requirement that buildings must be elevated on pilings; all new development must be landward of mean high water; that the BFE includes potential wave heights; and that new development must not damage dunes or dune vegetation.

While program participation is entirely voluntary, strong incentives currently exist in the program. Because of limited participation in the early years of the program, the 1973 Flood Disaster Protection Act mandated flood insurance for all federally-backed mortgages (e.g. VA, FHA), and mortgages and loans obtained through federally-insured and regulated financial institutions. Also, disaster assistance grants (public assistance) are not available to local governments not participating in the program (individual property owners need not have flood insurance to be eligible for individual and family grants, however). As a result, community participation has been high, with about 19,000 localities participating. While participation rates for owners of flood-prone property have been fairly low (about 25% of those eligible), this nevertheless amounts to a considerable federal financial liability (second only to social security). There are currently approximately 2.5 million flood policies in effect, representing nearly \$230 billion in insurance liability (FEMA, 1992). The NFIP is the second largest financial obligation at the federal level (social security being the largest). It is estimated that more than 70% of the NFIP policy holders are located in coastal communities, with many of

these located in the most hazardous locations (with some 64,000 located in V-zones; see Miller 1989).

Damage claims under NFIP have been substantial over the years. Since 1978 there have been 350,000 claims, with total payments of more than \$2.5 billion (FEMA, 1992). (These figures do not include claims, arising from Hurricane Andrew and Iniki). A relatively high percentage of these damage losses have occurred in coastal communities. For communities which contain Velocity zones (special coastal high hazard zones) there have been some 240,000 claims over this same period, paying out nearly \$1.7 billion. Thus, approximately 68% of the claims since 1978 have been in coastal communities, and 68% of the funds paid out have been for damages there (FEMA, 1992).

Historically, the NFIP has suffered from a number of problems and has been the subject of considerable criticism. A major point of contention between supporters and detractors of the program is whether it is in fact actuarially-sound, and thus pays for itself. In the last several years (beginning with fiscal year 1987), the NFIP has in fact been generating a surplus (i.e. premiums payments have exceeded claims). As of September 1992 the flood insurance fund contained about \$416 million (FEMA, 1992a). However, the program has generated deficits over much of its life. Between 1978 and 1987 the program ran an average annual operating deficit of about \$65 million (Miller, 1989) (i.e. generating a \$657 million deficit over that 10 year period). Between 1969 and 1986 the program was supported by Congressional appropriations of \$1.2 billion (and about \$2.5 billion from policyholders). Even in recent years while the program has been financially self-sufficient operating deficits have occurred. (In fiscal years 1989 and 1992 total program expenses have exceeded total income).

There is little dispute that the extent of the current surplus in the flood insurance fund is quite modest when compared to potential flood damage liabilities. Even FIA's own estimates suggest that the probability of exceeding in any given year the existing surplus amounts is quite great. As Table 1 indicates (generated by FEMA) the probability of total annual losses of \$800 million or greater is a high 30% to 35%, and an even higher 60-70% probability of exceeding \$300 million (FEMA 1992b; the FEMA director can borrow up to \$500 from the Treasury without notifying Congress, and an additional \$500 million if Congress is notified). FEMA has estimated that its probable maximum loss in any given year is as high as \$3.5 billion, much greater even than its present \$1 billion borrowing authority (FEMA 1992b). Some have argued, that FEMA's ability even to

borrow funds in this amount from the federal treasury without Congressional approval has reduced necessary oversight of the program. It is also important to again remember that the nation has experienced over the last thirty years an abnormally low level of hurricane and coastal storm activity.

Table 1

Estimated Probabilities of Exceeding Given Levels
of Flood Insurance Losses

<u>Total Annual Loss Costs (\$ millions)</u>	<u>Estimated Exceedence Probability</u>
300	60 - 70%
800	30 - 35%
1,400	10 - 15%
1,800	2 - 7%
3,500	.05 - .5%

Source: FEMA, 1992

In comparison to the magnitude of potential liabilities under the program, and the meager size of the current surplus (and in effect a cause) is the modest cost of these insurance benefits to property owners. The average cost of flood insurance is by all measures quite low. Average annual cost (as reported by GAO) is \$262 (for all structures), and \$469 for structures in coastal high hazard zones.

Other significant problems in the implementation of the NFIP have also been identified. While flood insurance is virtually mandatory for new construction (requiring mortgages from federally-insured banks), there is considerable evidence that many lenders are not ensuring the requirement is satisfied. It has been estimated that there are approximately 11 million properties in Special Flood Hazard Areas (100 year floodplain, but only about 1.4 million are actually covered by flood insurance policies. A 1990 GAO study of compliance in two states, Maine and Texas, found relatively high levels of non-compliance (22% and 78% respectively of properties in SFHAs in Maine and Texas requesting disaster assistance did not have

insurance). Interviews with lending institutions uncovered a variety of problems, including erroneous classification of properties and allowing insurance policies to lapse later on (see GAO, 1990). This study illustrated, as well, that many properties in flood hazard areas simply are not required by law to have flood insurance, for example either because they had no mortgage or had a mortgage from an unregulated lender (essentially institutions not federally insured). Also, enforcement and monitoring staff within FEMA are sparse, and ensuing full compliance with mandated floodplain management requirements remains a concern.

A general criticism of NFIP is that it is not run as a private insurance company would be, with loss reduction always in mind. A relatively high percentage of all flood insurance claims--about 43% (according to the GAO)--have been for repetitively-damaged properties. Yet, FEMA does not, in these cases, as perhaps a private insurance company would, cut-off or substantially restrict future coverage for such properties. Individuals are permitted to rebuild and to continue to receive insurance, and the program allows for a potentially unlimited process of damage-rebuild--damage. Many believe that the premiums charged to repetitive loss properties should at least be raised by FEMA in these instances to reflect the actual occurrence and recurrence of flood events.

Another significant concern about NFIP as it functions in coastal areas is its failure to take into account long term erosion. In fact, Congress initiated changes in 1973 to the definition of "flood" to include collapse or subsidence along shorelines, and NFIP regulations were amended to allow creation of special erosion zones ("areas of special flood-related erosion hazards" or "Zone E"), and to mandate local land management programs to take these hazards into account (see NRC, 1990). No special erosion zones have even been delineated however, and FEMA has not sought to require local land management programs (i.e. setbacks) to address erosion hazards. Moreover, long term erosion trends are generally not taken into account in current FEMA floodplain mapping. The V-zones or velocity zones are the closest flood zone to a shoreline erosion zone, yet they are often narrowly drawn, and "frequently exclude adjoining areas with virtually indistinguishable hazard characteristics." (NRC, 1990, p. 75).

Another problem is the infrequency with which flood insurance maps are revised and updated. It has been estimated that FEMA is able to remap communities on average every 9 years. Yet, many participating communities are rapidly growing, and substantial development and building in the floodplain can substantially modify local flood hazards.

B. Federal Disaster Assistance

The federal government has for many years been involved in assisting state and local governments in responding to, and recovering from, national disasters. Such financial assistance can be seen as another form of incentive for hazardous coastal development, by subsidizing the riskiness of public and private actions. The Federal disaster assistance framework was substantially revamped in 1988 when Congress passed the Robert T. Stafford Disaster Relief and Emergency Assistance Act (providing greater emphasis and financial support for mitigation activities; see below).

Several major forms of disaster assistance are available through FEMA. Such assistance generally falls in two categories: 1) individual and family assistance and 2) public assistance.

Under FEMA's Individual and Family Grants program (IFG) grants of aid up to \$10,040 can be made to individuals and families to cover disaster-related expenses (e.g. home repairs not covered through insurance, replacement of personal belongings). Under FEMA's public assistance program states and communities can receive grants, usually at a 75%-25% federal cost share, to cover the cost of damages to public facilities. Eligible projects include repair and replacement of roads, bridges, sewer and water systems, recreational facilities, and replacement of artificial public beaches, etc. Communities not participating in the National Flood Insurance program are not eligible for public assistance funds. Applicants under the IFG program need not be in a participating community, nor have purchased federal flood insurance (though they must agree to purchase it as a condition of receiving such grants).

Precisely how much of an impact federal disaster assistance has, or has had, in encouraging (or failing to discourage) hazardous and damaging coastal development is uncertain. Amounts of federal disaster assistance in recent years have been substantial. Some \$8.3 billion was spent between 1978 and 1988 on presidentially-declared disasters. FEMA reports that approximately \$885 million (or about \$88.5 million per year) was spent as a result of hurricanes and coastal storm events (Miller, 1989). These FEMA disaster assistance monies do provide a significant subsidy for coastal communities, underwriting risk to a variety of coastal public investments. Public assistance monies are generally provided on a 75-25 cost share (75% federal/25% state or local) and can be used to repair and restore such public investments as roads, sewer and water systems, public boardwalks, and even loss of beach renourishment sand. In several recent disasters, including Hurricane Andrew and Hugo, the federal government

agreed to cover 100% of the costs of these public-sector damages. Where the 25% contribution has been required, frequently the state assumes half, leaving local governments to assume only 12.5% of the cost of such damages.

There are currently no provisions in this system to consider the magnitude of the damage to an individual community or to consider the financial capability of the state or locality to cover these damages. What results is an incentive system in which high risk communities have little incentive to ensure that public facilities are placed in safe locations or designed in ways that minimize future vulnerability to hurricanes or other disasters. And, in many cases the federal reconstruction subsidy is in addition to the original federal subsidy used to construct the facility or investment. For example, the federal government heavily subsidizes beach renourishment (through the U.S. Army Corps of Engineers; see below), and once sand is lost or heavily eroded in a storm event this becomes an eligible cost under the public assistance program.

Disaster assistance has in many ways been seen by states and communities as an entitlement, and something deserved regardless the extent or cause of the damages, or the ability of these jurisdictions to assume these costs. In theory presidential disaster declarations are only to be issued where the resources of affected states and local governments are clearly exceeded. Yet, presidential declarations have been increasingly viewed as proforma and have occurred even where damage levels are relatively modest and where state and local governments could clearly have assumed the cost with little burden.

In its defense FEMA has sought to reform this system in the past, only to be harshly criticized by state and local government representatives and owners of property in high risk areas. Proposals were made, for example, in the mid-1980s to increase the required state-local share of public assistance grants to 50-50 (i.e. 50% federal, 50% state/local), and to impose a set of ability-to-pay criteria. These proposals received considerable political flack and were eventually dropped. Many commentators, however, have echoed the need for such reforms which might, among others, help to reduce this negative incentive structure (e.g. Burby, 1990).

In addition to FEMA, a number of other federal agencies provide some form of disaster assistance. These include loans, grants, and reconstruction monies from: the Small Business Administration, the Federal Highway Administration (for roads and bridges), the Department

of Education (for school buildings), Farmers Home Administration, U.S. Army Corps of Engineers, and the Economic Development Administration, among others.

One effort to coordinate the actions of these different agencies was the Interagency Hazard Mitigation agreement signed in 1980. Under this agreement an interagency hazard mitigation team is called into action immediately following a disaster declaration and is required to prepare a report within 15 days of the declaration. These reports typically identify hazard mitigation opportunities and contain recommendations, many of which have been pursued by FEMA and other federal agencies. These recommendations also typically feed into the Section 409 hazard mitigation plan prepared by the state (see below).

C Beach Renourishment and Shoreline Protection

Significant subsidies have also been provided in the form of funding and technical from federal and state agencies for flood control and oceanfront property protection. These subsidies have been provided both for the installation of "hard" devices, such as seawalls, revetments, groins, jetties, and breakwaters, and "soft" approaches, such as beach renourishment and dune building. At the federal level the U.S. Army Corps of Engineers (COE) has had primary responsibility for such programs.

Miller has estimated that the Corps spends about \$11 million annually for beach nourishment on barrier islands, and another \$22 million on flood control projects, stabilization, and dredging activities (Miller, 1989). Federal cost sharing has ranged from 55 to 90% (federal share). There is, consequently, a major collective subsidy of such projects. States have also been active in assisting and subsidizing these shore protection efforts. A number of states now provide state funding, often through the issuance of bonds, for local renourishment programs (often in combination with federal subsidies). In South Carolina for instance, the state legislature created a \$10 million Beach Renourishment Fund (most of which went to funding emergency renourishment and dune-rebuilding projects following Hurricane Hugo; see Kana, 1990). The State of Maryland has provided substantial funding (some \$60 million) under its Shore Erosion Control Program (SECP) for beach renourishment in Ocean City, Maryland. Also under the SECP the state provides interest-free loans and technical assistance for shorefront propertyowners experiencing erosion problems (including construction of bulkheads, riprap; Pito, 1992). The state also provides 50% matching funds to propertyowners who undertake nonstructural erosion control (e.g. grass planting).

Beach renourishment remains a controversial approach to the coastal erosion problem. Such projects are very expensive (e.g. \$5 million per mile in the case of Miami Beach), and have been shown to have much shorter lifespans than are typically estimated (e.g. see Pilkey and Clayton, 1987; Pilkey, 1989; Dixon and Pilkey, 1991; and various other publications of Pilkey). A single northeaster or other significant coastal storm event can virtually single-handedly wipe out millions of dollars in renourishment expenditures (which is what has happened in Ocean City, MD). A 1982 \$5.2 million renourishment project in Ocean City, N.J., lasted only 2.5 months (Pilkey and Clayton, 1987). Coastal Geologist Orrin Pilkey concluded from a major study of beach replenishment: "We have found that for the last 25 years, coastal engineers have predicted the life time (and hence the cost) of replenished beaches with unvarnished and unjustified optimism... Most replenished beaches last less than five years." (Pilkey 1989, p. 37).

D. Federal Tax Code

Coastal development subsidies are also provided in the form of tax expenditures, or deductions and other subsidies contained in federal and state tax code. Several major tax code subsidies have been provided at the federal level. The casualty loss deduction allows coastal propertyowners to deduct the cost of uninsured damages resulting from hurricanes and other natural disasters. Allowable deductions are determined by subtracting the post-storm value of property from its prestorm value, less insurance received. The deduction is only allowed where losses exceed 10% of adjusted gross income.

Other federal tax code subsidies include interest and property tax deductions for second homes (where much coastal development has been), and accelerated depreciation for seasonal rental properties. In large degree these types of subsidies are hidden, and estimates of their aggregate cost are hard to come by. There is little doubt, however, that the extent of these public costs is substantial.

E. Other Development Subsidies

Coastal growth is subsidized by a variety of other federal development programs and grants. The Farmers Home Administration, for example, provides subsidies in the form of community facility loans, business/industry loans, and rural housing loans (e.g. see GAO, 1982, appendix III). The Department of Housing and Urban Development

provides guaranteed home loans, as does the Department of Veteran Affairs. The Rural Electrification Administration provides loans for development of electrical systems. The U.S. Environmental Protection Agency has provided extensive funding for waste water treatment and water systems. The Department of Transportation has provided extensive funding for the construction of highways, roads and bridges, and other improvements which have served to make many otherwise remote coastal areas readily accessible. Most of these development-related grants and subsidies are not coastal-specific, and estimates of their magnitude and actual impacts in coastal regions are difficult to come by.

F. A Lax Regulatory Framework

While not technically a financial subsidy, hazardous coastal development has clearly resulted in significant part from an inadequate and lax regulatory framework. Many coastal states and localities have but the most primitive and minimal controls on the location and quality of development. While some coastal states, for instance, have adopted fairly stringent coastal setback requirements, many others have not and frequently permit new development to locate in close proximity to the oceanfront and in locations which will be subject to erosion threats within a short period of time. North Carolina, as a positive example, requires major coastal structures to set-back 60 times the average annual erosion rate (see later discussion). South Carolina, on the other hand in effect has no fixed shoreline setback and through a special permit procedure allows development to locate in close proximity to the ocean.

Few coastal states or localities prohibit development within floodplains, although such structures may be subject to certain design requirements such as elevating to the 100-year flood level. To the uninformed coastal resident or buyer of coastal property, the securing of a state or local permit may itself be perceived as a "certification" of the safety of a coastal site or location ("They wouldn't let me build here if it were dangerous").

The extensive wind damages from Hurricane Andrew have illustrated further the looseness with which many development codes have been implemented and enforced. The South Florida Building Code (with a 120 mph wind design standard) was generally viewed as one of the most stringent performance-based building codes in use anywhere. Yet, problems with enforcement and implementation (and with the provisions of the Code itself) have again raised questions about the stringency and effectiveness of coastal regulations. A grand jury in Dade County recently

issued a report extremely critical of the "shoddy" building practices evident in South Florida (Booth, 1992). Among the problems cited by the grand jury were inadequate and lax building inspection, inability to control untrained and unlicensed building contractors, and corruption, apathy and high turnover in the Building and Zoning Department. Strengthening the code was also recommended (including changes in the ways roof systems are constructed) and increasing federal wind standards for mobile homes (most of which were destroyed in the hurricane).

In many coastal areas building codes simply are not required. In twelve coastal states adoption of building codes is left entirely up to local officials (Manning 1988). In South Carolina, for instance, localities are under no requirement to adopt a building code at all (though if they choose to it must be the Standard Building Code). In Texas, as a further example, no state building code is mandated and counties do not even have the authority to adopt building codes if they wanted to (leaving many hazardous rural and unincorporated areas without mandatory construction standards).

III. Existing Programs and Recent Initiatives Encouraging Mitigative and Less-damaging Coastal Development Patterns

The existing policy framework does include several major programs and policies which seek to reduce coastal risks, and which could serve as the foundation for additional policy changes in the future. As mentioned earlier, the NFIP has mandated, from its beginning, the adoption of certain minimum floodplain management standards, including elevation requirements. In recent years, the program has evolved even further in giving much greater attention to risk-reduction and hazard mitigation. The flood insurance (mostly recent) reforms discussed below include: the Section 1362 flooded properties purchase program; the Upton-Jones relocation assistance program; and the Community Ratings System. Several recent bills have been introduced in Congress which have proposed even further reforms and these initiatives are described as well. Among the other programs which have positively encouraged mitigation and risk reduction (or have the potential to) discussed below include: the federal hazard mitigation grants programs (under the Stafford Act); Section 409 state hazard mitigation plans; the Coastal Barrier Resources Act (CoBRA); and the federal Coastal Zone Management Act (CZMA) and State Coastal Management programs.

A. Section 1362 Flood Properties Purchase Program

The NFIP despite the limitations cited here has evolved gradually over the years, and certain programs and provisions have been developed which move it in the direction of greater hazard mitigation and loss reduction. One of the more significant of these is the Section 1362 Flooded Properties Purchase Program. Authorized by a section of the flood insurance act, the program allows FEMA to break the damage-rebuild-damage cycle which accounts for many damage claims.

Under the program, FEMA offers to buy-out owners of damaged property, paying the difference between the fair market value of the structure and the allowable insurance claim, plus the value of the land on which the structure is/was located. The community must agree to participate, must be willing to accept the land, and must prepare a plan for its use which ensures that it will never be developed in the future. Eligible properties must have had federal flood insurance, and must meet one of several damage criteria (e.g. damaged substantially beyond repair, or damaged at least 25% three times in last five years).

While the 1362 program makes a great deal of sense, it has been used sparingly. Modest amounts of funds are set aside for 1362 purchases. Since first funded in 1980, FEMA has acquired only about 100 properties per year, and there has been a clear bias against using 1362 funds in coastal areas. The feeling is that because of the often very high cost of land in coastal communities, it is possible to get a greater "bang for the buck" when these limited funds are employed in riverine locations. Since 1980, Congress has appropriated less than \$5 million per year for 1362 (and in some cases FEMA has failed even to use all of these monies). Several recent Congressional bills intended to reform the NFIP extend and expand the 1362 concept (these are described in a later section).

B. Upton-Jones Relocation Assistance

Another major improvement in the flood insurance program was passage of the so-called Upton-Jones Amendment. An amendment to the Housing and Community Development Act of 1987, these provisions sought to make available funds to subsidize demolition or relocation of those shoreline structures subject to fairly immediate erosion hazards. The amendment was co-sponsored by Representatives Fred Upton (R-Mich) and Walter Jones (D-North Carolina) and a direct result of the erosion hazards existing in each of these states. Upton, concerned with the public safety and debris problems created by shoreline structures damaged and

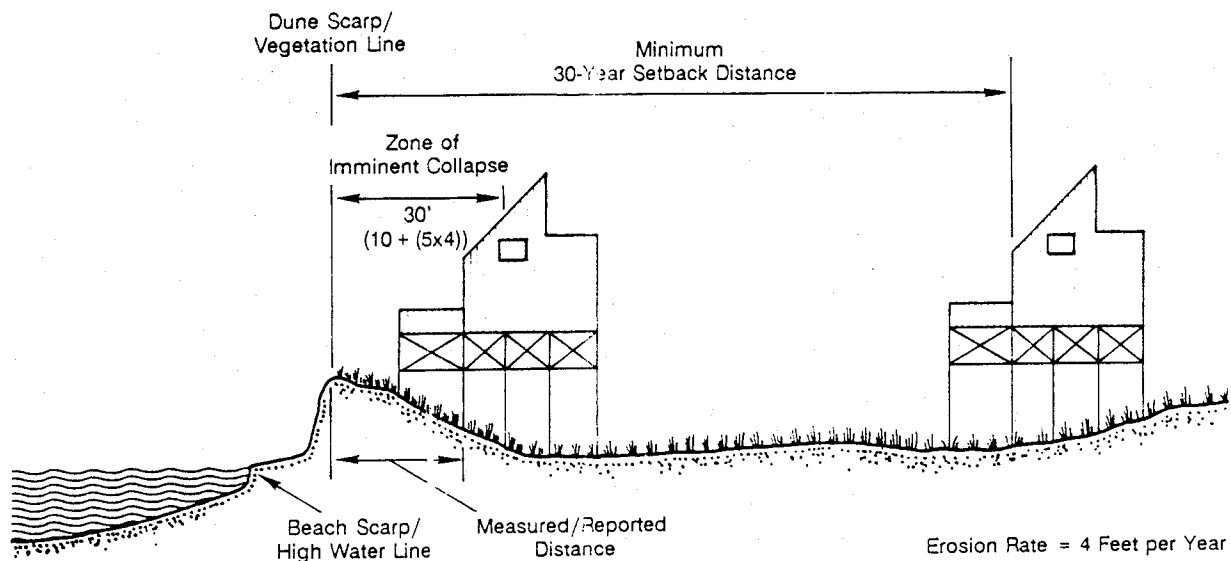
destroyed as a result of rising lake levels along the Great Lakes, sought to make funds available for demolition. Jones was responding to the high number of structures in North Carolina vulnerable to short term erosion (it was estimated that 750 oceanfront structures would be lost to erosion in the next ten years in North Carolina, and some 5000 structures located within the 60 year erosion line; see NRC, 1990). Under the NFIP prior to Upton-Jones, a property owner could not receive any flood insurance payment until the structure was actually damaged.

Under Upton-Jones, owners of shorefront property with federal flood insurance are eligible for sizeable demolition or relocation subsidies. Specifically, Upton-Jones provides up to 40% of the insured value of a building for relocation (or 40% of the cost of relocation if less), and up to 100% of the insured value of a structure for demolition plus 10% (or the cost of demolition if less than 10%). Relocation funds can be used for, among other things, new site preparation, construction of a new foundation, utility hook-ups, etc.

For structures to qualify they must be certified to be within a zone of imminent collapse. FEMA defines this area as seaward of a line 10 feet plus 5 times the average annual rate of erosion (see diagram 1). The provisions also require the state or local government to condemn structures, or certify that they are in danger of collapse, in order for them to qualify. Once FEMA declares a structure subject to imminent collapse the property the owner has a certain reasonable time to relocate or demolish, after which she/he is only entitled to 40% of covered losses in the next storm or flooding event.

Once demolition or relocation occurs certain restrictions are placed on the availability of new insurance. specifically, any future development on the property must, in order to receive flood insurance, locate landward of the 30-year erosion line (for structures of 1 to 4 dwelling units) or landward of the 60 year line in the case of larger structures. Structures moved to a different site must also meet these standards, as well as the elevation and other floodplain management restrictions which exist there.

Diagram 1



Source: NRC, 1990.

To date use of the Upton-Jones has been limited. As of August 1989, only 266 claims had been filed. According to a recent National Research Council study, there are a number of reasons which help to explain low participation, including: a general lack of awareness about the program; a reluctance to remove or interrupt income from rental properties; a lack of suitable or affordable relocation sites; a lack of eligibility for land acquisition; and problems encountered in condemnation of structures (many states do not allow condemnation unless there is actual structural damage, requiring changes to state law).

While there has been much support for Upton-Jones in concept, recommendations for improvement of the program have been made. The National Research Council report recommends the following changes: 1) encourage relocation over demolition; 2) mandate relocation behind the 30-year erosion line; 3) require an easement or some other form of legal restriction preventing use of vacated shorefront areas; terminate insurance or raise insurance premiums for those structures certified as within the zone of imminent collapse, if they are not relocated or demolished after a certain time. Some have also criticized the program for defining the eligible zone of imminent collapse too narrowly, suggesting that structures landward of the five year erosion line should also be encouraged to relocate. The program could also be criticized as providing yet an

additional underwriting by the public of private risks (i.e., will it further encourage risky coastal development if propertyowners know they will be able to receive such relocation assistance in the future?). The suggested changes mentioned above, in addition to coupling program benefits to more stringent erosion management for new construction (e.g. coastal setbacks) would serve to substantially eliminate such incentives.

C Community Rating System ← mobilization

In recent years FEMA has also initiated a new program called the community rating system (CRS), which seeks to reward communities for the additional activities and programs they undertake which serve to minimize flood damages, beyond the minimum requirements of NFIP. Specifically, the insurance premiums of propertyowners within these communities are reduced to take into account these local activities. Participation in CRS is voluntary, and local governments are responsible for submitting the documentation which shows implementation of these different creditable activities.

There are eighteen mitigation activities for which CRS gives credit, grouped in four categories. These four categories include public information; mapping and regulations; flood damage reduction, and; flood preparedness. Communities are assigned a certain number of points for these activities depending on the extent of their and their likely effectiveness at achieving CRS objectives. A maximum number of credits is established for each measure. A detailed coordinators manual lays out the methodology for assigning points for the various measures. The CRS program calls for periodic review and monitoring, and adjustments to assigned points.

The eighteen specific measures are listed in Table 2. For each particular measure a detailed point allocation methodology has been developed (see FEMA, 1992e). The points generated from each individual measure are then added up to produce the community's total points, which are then used to determine the extent of premium reduction for property owners. As Table 3 indicates, premium reductions range from 5% to 45% for property within Special Flood Hazard Areas (i.e. A zones and V-zones). A maximum 5% reduction is allowed for property outside of Special Flood Hazard Areas, largely on the grounds that premiums are already low in these areas and because the measures for which credits are given are directed at the 100-year flood zones.

Table 2

Activity	Maximum Points	Average Points	Applicants
300 Public Information Activities			
310 Elevation Certificates	137*	73	100%
320 Map Determinations	140	140	92%
330 Outreach Projects	175	59	53%
340 Hazard Disclosure	81*	39	40%
350 Flood Protection Library	25	20	77%
360 Flood Protection Assistance	66	51	45%
400 Mapping and Regulatory Activities			
410 Additional Flood Data	360*	60	20%
420 Open Space Preservation	450*	115**	42%
430 Higher Regulatory Standards	785*	101*	59%
440 Flood Data Maintenance	120*	41	41%
450 Stormwater Management	380*	121	37%
500 Flood Damage Reduction Activities			
510 Repetitive Loss Projects	441*	41	11%
520 Acquisition and Relocation	1,600	97	13%
530 Retrofitting	1,400	23	3%
540 Drainage System Maintenance	330*	226	82%
600 Flood Preparedness Activities			
610 Flood Warning Program	200*	173	5%
620 Levee Safety	900*	0	0%
630 Dam Safety	120*	64	45%

* Maximum points revised since 1990 CRS Schedule.

** 1990 credits revised to reflect 1992 CRS Schedule.

Source: Federal Emergency Management Agency, 1992e.

Table 3

<u>CT</u>	<u>Class</u>	<u>SFHA Credit</u>	<u>Non-SFHA Credit</u>
4,500 +	1	45%	5%
4,000 - 4,499	2	40%	5%
3,500 - 3,999	3	35%	5%
3,000 - 3,499	4	30%	5%
2,500 - 2,999	5	25%	5%
2,000 - 2,499	6	20%	5%
1,500 - 1,999	7	15%	5%
1,000 - 1,499	8	10%	5%
500 - 999	9	5%	5%
0 - 499	10	0	0

Source: Federal Emergency Management Agency 1992e.

Participation in the CRS program has so far been modest in terms of the number of communities. For FY 1992 there were 564 communities (or only about 3% of the 19,000 communities participating in the NFIP). However, despite this small percentage, this does represent about 45% of the flood insurance policy base. The level of mitigation effort for most participating communities has been relatively low, with the vast majority of these communities--519--(or about 92%) certified as class 9 communities, or undertaking sufficient mitigation measures to present a 5% reduction in policyholder premiums. Another 40 communities have been certified as class 8 (10% reductions), four communities as class seven (15% reduction) and one community as a class 5 (25% reduction). (FEMA 1993).

Questions nevertheless remain about the CRS strategy. It is not clear that the most active local governments would not be undertaking these kinds of mitigation actions anyway. It is also not clear that some of the measures for which local governments are given credit, such as hazard disclosure, do in fact lead to clear hazard or damage reduction. Moreover, such an approach could be criticized for further reducing the premiums paid, and in fact further subsidizing hazardous development patterns. As an alternative, a number of the measures for which localities are given (e.g. an erosion setback) could simply be made mandatory, as conditions of participation in NFIP (these issues are taken up in greater detail in Section IV).

D. Hazard Mitigation Programs/Requirements Under Federal Disaster Assistance Act

There have also been some positive changes to the federal disaster assistance framework, in recent years. The Stafford Act created a Hazard Mitigation Grants Program (Section 404), for instance, which provides federal matching funds for state and local mitigation projects (i.e., the federal government will pick up 50% of the share of these projects). These grant funds are tied to disaster declarations, and are limited to 10% of the federal share of the public assistance monies made available.

Between 1989 (since authorization) and 1992, FEMA has approved 206 applications for hazard mitigation grants, obligating approximately \$43 million. As Table 4 indicates, these funds have been used to finance a variety of different types of mitigation, including: public/private facilities (e.g. floodproofing sewage treatment systems, seismic retrofitting), drainage projects, equipment purchases, relocation of structures, planning programs, education and training and land improvements. Nearly sixty percent of the funds went for mitigation improvements to public/private facilities. It is perhaps somewhat discouraging that such a small percentage of these grants are for relocation/acquisition (about 11%) and planning programs (about 3%; includes beach management plans, developing hazard mitigation plans, zoning and building code ordinances; see Joint Task Force, 1992).

A joint task force of the National Emergency Management Association and the Association of State Floodplain Managers was formed to evaluate the HMGP. This study identified a number of implementation programs and recommendations for addressing them. Among the concerns about the program identified were its slow pace of implementation, the lack of "hazard mitigation principles and guidance," difficulties in state level coordination, and the failure of states and localities to identify mitigation opportunities before a disaster occurs. The specific recommendations of the joint task force include: creating state teams to respond to disaster declarations; developing and endorsing a federal-state hazard mitigation strategy following each disaster declaration which would identify mitigation opportunities; reinforcing preparation/update of state hazard mitigation plans through the federal-state agreement; strengthening technical assistance activities (e.g. training and handbooks), and improving guidance on project eligibility; among others (for a review of the full set of recommendations see Joint Task Force, 1992). Of special importance are

Table 4

RANK of PROJECT CATEGORIES
by
PERCENT OF ESTIMATED OBLIGATIONS
January, 1989 to August, 1992

Hazard Mitigation Grant Program

	Type of Projects	\$ Millions	Percent
1.	Public/Private Facilities	\$24.8	58%
2.	Drainage Projects	\$5.9	14%
3.	Equipment Purchases	\$5.3	12%
4.	Relocation of Structures	\$4.7	11%
5.	Planning Products	\$1.0	3%
6.	Education and Training	\$0.5	1%
7.	Land Improvements	\$0.5	1%
	Total	\$42.7	100%

Source: Joint Task Force on Hazard Mitigation Grant Program, 1992.

the task force's conclusions that FEMA should better enforce state hazard mitigation plan requirements, and seek to elevate the priority and importance given to these plans. As noted land use/relocation/nonstructural programs are underrepresented in the HMGP, and overall the level of funding is quite modest.

The Stafford Act also made mitigation an eligible expense under the FEMA Public Assistance Program (and thus allowing for 75% federal contribution for reconstruction improvements to roads, bridges, utility lines, etc., which make them less vulnerable to future damage).

The existing federal disaster assistance framework does have some significant "teeth" in which to promote and require hazard mitigation. Section 409 states that FEMA may condition the provision of disaster assistance on state and local actions to mitigate hazards ("including safe land use and construction practices"). In addition, states receiving disaster assistance are required to prepare a state hazard mitigation plan--a so-called Section 409 plan. These plans are intended to require states (and their localities) to seriously confront the natural hazards they are subject to and identify programs and policies which can be implemented to reduce them in the long run. In theory, FEMA can condition (and even withhold

entirely) disaster assistance funds according to whether or not the programs and policies contained in the plan have actually been implemented. Politically, however, this is quite difficult to do and FEMA has chosen not to adopt such a strident view towards the plans. On the positive side, most states required to prepare these plans have done so, though again after the disaster is over they are not necessarily implemented. Once the disaster is over, states are relieved of much of the pressure to undertake planning and mitigation activities and FEMA lacks a clear system for monitoring state progress and compliance with 409 plans.

E. Coastal Barrier Resource Act (CoBRA)

The Coastal Barrier Resources Act (CoBRA) enacted by Congress in 1982, represents an attempt to shift away from some of the ill-effects of federal subsidies such as flood insurance and disaster assistance. A product of conservative political times, CoBRA's stated objectives are to reduce growth pressures on undeveloped barrier islands, to reduce threats to people and property and to minimize the public expenditures that typically accompany such disasters, and to reduce damage to fish, wildlife and other sensitive environmental resources.

The Act designated a "Barrier Island Resources System," (CBRS), originally comprised of 186 undeveloped barrier island units, including 453,000 acres and 666 miles of shoreline. After a certain date, a number of federal subsidies would no longer be permitted in these designated areas, including the issuance of new flood insurance policies, the expenditure of federal monies for roads, bridges, utilities, erosion control, etc., and non-emergency forms of disaster relief. The Department of Interior has responsibility for implementing the program.

Barrier islands were defined in the Act as to include depositional geologic features (barrier islands, barrier spits...) and "associated aquatic habitats" (e.g. adjacent marshes, estuaries). (See P.C. 97-348; 16 U.S.C. 3501-10). Criteria for determining whether a barrier island unit was undeveloped, and thus should be included, were (Godschalk, 1987):

1. less than one walled and roofed building per five acres of of fastland;
2. absence of urban infrastructure (vehicle access, water supply, wastewater disposal, and electrical service to each lot); and
3. not part of a development of 100 or more lots.

A minimum land area of one-quarter mile of oceanfront was also employed designating units (extending back to the bay or soundside). Maps were initially prepared by the Department of Interior in 1981, under the Omnibus Budget Reconciliation Act of that year. Congress, in consultation with landowners and others, modified the actual boundaries of units, initially reducing the oceanfront area covered by the CoBRA provisions. The CBRS was later expanded in 1990 under the Coastal Barrier Improvement Act to include 560 units and 1.3 acres and 1200 shoreline miles (GAO, 1992). In addition, under the 1990 Act, the Department of Interior was directed to map all undeveloped coastal barriers along the Pacific Coast (to eventually be forwarded to Congress for inclusion in the CBRS).

Several studies have sought to evaluate the effectiveness of CoBRA at discouraging barrier island development. One of the first exploratory studies was conducted by Godschalk (1984; 1987). This pilot study assessed the viewpoints (through telephone interviews and mail surveys) of developers, government officials and conservationists in three states (North Carolina South Carolina and Florida), and included several case studies as well (Topsail Island, NC; Hutchinson Island, FL). The results of the Godschalk study were mixed, but raised serious questions about the effectiveness of CoBRA. These limited case studies showed that at least initially the loss of subsidies did serve to slow development. However, the cases also indicated that, especially for larger forms of development (e.g. condominiums and multi-family projects), developers would likely be able to find replacement insurance, and would also be to replace other subsidies (e.g. through state funding for bridge construction).

A 1990 study by the National Wildlife Federation examined aerial photographs to determine the extent of new development occurring after the enactment of CoBRA (Jones and Stolzenberg, 1990). Specifically, structures were analyzed for 157 barrier island units, encompassing about 95,000 acres of fastland. These results show that considerable development occurred following the enactment of CoBRA--the study counted some 594 additional (post-CoBRA) structures, or an increase of over 40%. The development activity was particularly high in certain states. Development in Florida accounted for about 52% of the total counted. Significant numbers of additional structures were also found in North Carolina, South Carolina, Alabama, Delaware and Texas.

More recently, the U.S. General Accounting Office undertook an assessment of CoBRA in 1992. Specifically, the GAO study examined 34

CBRS units (from the original 186), similarly comparing aerial photographs over time, along with field visits and building permit data (GAO, 1992). Extensive interviews with agency personnel and a random sample of property owners to determine whether restrictions on flood insurance were being complied with were also components of the study. The resulting conclusions of this study are similar. Of the 34 units analyzed, the GAO found that 9 had undergone new development since 1982. About 1200 new residential units had been constructed in these nine units, and additional development is planned for the future.

Yet, the study also concludes that the CoBRA restrictions have had some positive effect:

"CBRA's prohibitions of new federal expenditures and financial assistance have slowed, delayed, or stopped development in some CBRS units. For example, the principal owner of the CBRS unit at Deer Island, Mississippi, told us that he could not proceed with his development plans without federal flood insurance and other forms of federal assistance. In an effort to proceed with plans to build about 160 condominium vacation cabins, a swimming pool, tennis courts, roads, and a marina, he has been trying to get the unit removed from the CBRS. He wants to develop the unit despite a history of hurricane damage that devastated previous structures on the island." (GAO, 1992, p. 17).

Despite the Act's ability to slow down and discourage development in some units the study does conclude that further development is likely unless stronger controls are pursued. In the study's words:

"Additional future development in 9 of the 34 CBRS units included in our review is planned and likely to occur with or without federal financial assistance. Other CBRS units that are accessible and/or suitable for development and investment may undergo similar development. While the availability of accessible coastal land is limited, populations of coastal areas are expected to increase by tens of millions by the year 2010. This population increase will further spur market demand, providing an incentive for developers, owners and investors to assume the risks associated with owning and building in these storm-prone areas. Stronger protective measures may be needed if further development is to be discouraged." (GAO, 1982, p. 24).

The GAO study also uncovered other problems with CoBRA implementation. The study's random sample of propertyowners found that about 9% of them were able to obtain flood insurance even though they were ineligible under CoBRA. (These problems appear largely associated with write-your-own companies; see GAO, 1992, p. 26). Also, the study identified problems with the certification process established to ensure that federal agencies comply with the Act, though it concludes that federal agencies generally are adhering to the restrictions.

These studies suggest that CoBRA has not stopped development pressures on undeveloped coastal barriers, though the withdrawal of federal subsidies has had some effect in discouraging new development there. These results might suggest several policy directions. Possible additional actions identified by GAO include the fee-simple or less than fee-simple (easements) acquisition of undeveloped barrier lands, although the study acknowledges the high cost of such a strategy. (Fee-simple acquisition involves purchasing full ownership, or the entire "bundle of rights"; less-than-fee-simple acquisition involves purchasing less than full ownership, or a partial interest in the land, typically the right to build or develop on all or a portion of the land.) Some studies in the past have argued that despite the high cost of acquisition, the public savings in the long term still justify such purchases (e.g. see Miller, 1989).

Jones and Stolzenburg (1990) recommend: removal of the remaining forms of federal subsidy allowable under the current federal income tax code (casualty loss deductions...); prohibition of all loans made by federally-insured banks and lending institutions (originally waived under Section 11 of CoBRA); prohibition of federal block grants; and prohibition of federally-funded projects occurring outside designated units, yet affecting them.

F. Coastal Zone Management Act and State Management Programs

Passage by Congress in 1972 of the federal Coastal Zone Management Act (CZMA) has served as a major catalyst for increased coastal planning and management. Under Section 305 of the Act, the federal government (through the Office of Ocean and Coastal Resource Management within NOAA) provides grants for the development of state coastal management programs. These plans must contain certain things, and once approved Section 306 of the Act provides funding for state implementation of these programs. These funds are provided on a federal-state cost-share basis. (Initially as high as 80% federal, now at an even 50-50 cost share). In

addition to the financials incentive for participation, states were also encouraged to participate as a way of exercising some degree of control over federal actions and projects in their coastal zones. Under Section 307 once a state's plan is approved subsequent federal actions must be consistent, to the extent practicable, with it.

While the program is voluntary, participation has been very high. Of the 35 coastal states and territories eligible for funding, 29 now have federally-approved plans (notable holdouts have been Texas and Georgia, with each now working towards developing a program...). Moreover, the CZMA has clearly served as a major catalyst for the development of more extensive and more effective coastal management programs. Compared with the state management framework existing prior to CZMA, there is little doubt that coastal development patterns and practices are much more respectful of protecting sensitive coastal resources and reducing exposure of people and property to coastal risks. (Godschalk and Cousins 1985; Brower et al, 1991).

States have considerable freedom under CZMA to craft a coastal program to fit their individual state needs and circumstances. It must include certain basic components, however, including: identification of the boundaries of the coastal zone, definition of permissible land and water uses with it, an inventory and designation of areas of particular concern, and identification of the means by which the state will exert control over activities in the coastal zone. Some states have taken a networking approach, pulling together into a coastal program a number of already-existing management provisions (e.g. Florida, New Jersey...). Other states (e.g. NC's Coastal Area Management Act) have created entirely new management and regulatory frameworks, and new state decisionmaking bodies to implement the program (e.g. state coastal councils, commissions). (See Brower, et al 1991).

There is considerable variation in the specific provisions and management tools employed, and in their stringency and coverage. Some state programs clearly have made major strides to reduce the riskiness of coastal development. Some 13 states now impose some form of coastal setback, requiring new development to locate a certain distance landward of the ocean (as measured from mean high water, first line of vegetation ...; see Table 5; Platt et al 1992; NRC 1990; Houlahan 1990; NOAA, 1991). Increasingly these setback requirements are calculated according to local erosion rates. North Carolina, for example, employs one of the toughest erosion-based set-backs. Specifically, for small scale development in beachfront areas, new development must be set-back a distance of at least

30-times the average annual rate of erosion for that particular stretch of coastline, measured from the first stable line of vegetation (e.g. see N.C. Division of Coastal Management, 1988; Godschalk, Brower and Beatley, 1989; Platt, et al, 1992). Development must also be landward of the crest of the "primary dune" and the landward toe of the "frontal dune." For larger structures, the setback is doubled to 60-times the rate of erosion.

Other types of restrictions are also imposed. Under New York's Coastal Erosion Hazard Areas Act, for example, in certain erosion zones (in so-called "structural hazard zones") only "moveable" structures are permitted (see Platt, Miller, Beatley, Melville, Mathenia, 1992). Specific density limitations are imposed by some states in certain high risk locations. Under NC's CAMA, for instance, development in inlet hazard zones is restricted to structures of less than 5000 sq. feet in size, and generally must not exceed a density of more than one unit per 15,000 square feet of developable land (N.C. Division of Coastal Management, 1988).

Some coastal states have also imposed significant restrictions on the building of erosion control structures (seawalls, revetments, groins, etc.). Some states, including North Carolina, South Carolina and Maine, have banned the construction of new permanent shore-hardening structures altogether. Such actions serve in the long run to reduce destruction of beaches, and put propertyowners on notice that should a beachfront structure end up subject to erosion hazards, it will not be permissible to allow the construction of such protective (yet damaging) structures. States like North Carolina have managed to resist recent political challenges to such controls.

Most coastal states have also imposed restrictions on development in tidal or saltwater wetlands, and a smaller number apply restrictions to non-tidal or freshwater wetlands. States typically require a permit before certain activities can take place in wetland areas, and usually include a more expansive list of such potentially damaging activities than those regulated under the federal Section 404 program (see below). Regulated activities typically include: discharge of dredge and fill, draining of wetlands, and cutting of trees and destruction of vegetation, among others. Frequently these regulations extend to adjacent buffer areas as well. State wetland standards frequently incorporate many of the key concepts contained in the EPA 404(b)(i) guidelines, including restricting wetland alternatives to water-dependent uses, and forbidding such activities where practicable alternatives exist.

Table 5
Status of State Setback Authorities

State	Setback Legislation	State	Setback Legislation
Maine	yes ^a	Louisiana	no
New Hampshire	no	Texas	no
Massachusetts	no	California	no
Rhode Island	yes	Oregon	no
Connecticut	no	Washington	no
New York	yes	Alaska	no
New Jersey	yes ^b	Ohio	no
Delaware	yes	Illinois	no
Pennsylvania	yes	Michigan	yes
Maryland	no	Wisconsin	no
Virginia	no	Minnesota	no
North Carolina	yes	Hawaii	yes
South Carolina	yes	American Samoa	no
Georgia	no	Northern Marianas	yes ^a
Florida	yes	Guam	no
Alabama	yes	Virginia Islands	yes ^a
Mississippi	no	Puerto Rico	yes ^a

^aState has a construction setback, but it is not primarily for coastal erosion hazard purposes; see text for discussion.

^bNew Jersey setback line--The state setback only applies to projects requiring a state CAFRA permit (projects of greater than 24 residential units). Local municipalities have authority for "sub-CAFRA" projects through dune/beach protection ordinances.

Source: Houlahan, 1989

Most state wetlands programs also require mitigation when natural wetlands are destroyed or damaged. Mitigation ratios imposed can be quite high, ranging from 2-to-1 to 7-to-1 (i.e. amount of created, restored, or enhanced acreage required for each acre of natural wetland destroyed or damaged) (for a review of state wetland programs see Salveson, 1990).

Many state coastal programs also seek to manage rebuilding and reconstruction following hurricanes or other major flooding events. Most state programs require development permits for rebuilding substantially damaged structures. Hurricanes and coastal storm events, while exacting substantial human and economic cost, do often represent opportunities to rebuild and reconstruct in ways which minimize exposure to future risks

(e.g. through relocation, setback requirements elevation of buildings...). The South Carolina Beachfront Management Act (BMA), originally created in 1988, contained some of the most stringent reconstruction provisions in the country when Hurricane Hugo hit the coast a year later. In enacting the BMA the State sought to explicitly implement a long-term shoreline retreat policy (flowing from the recommendation of a special blue ribbon committee on beachfront management). Under the original BMA habitable structures which were found to be "damaged beyond repair" (damaged 66 2/3 or greater) would only be allowed to rebuild landward of a no construction zone (the so-called "dead zone"). All structures rebuilt within a larger 40-year erosion zone were also required to move as far landward as possible (see diagram 2). Some 159 beachfront structures located in the no construction zone were found to be damaged beyond repair (many of which would not have been able to rebuild at all under the Act). Pools and recreational amenities damaged 50% or greater were also prevented from rebuilding. Restrictions were also placed on rebuilding erosion control structures if damaged greater than 50%. Vertical seawalls could be replaced with sloping revetments, but only under certain conditions (for a discussion of the South Carolina Act, see Platt, Beatley and Miller, 1991; Beatley 1992). Opposition to the rebuilding restrictions following Hugo was intense, especially by beachfront propertyowners. Several takings decisions (e.g. Lucas v. South Carolina Coastal Council), moreover, suggested that the State's financial liability in cases where the deadzone restrictions prevented all reasonable use of a parcel, could exceed \$100 million. These political dynamics lead to a substantial softening of the law, completely eliminating the deadzone, and creating a special variance procedure allowing development to occur even further seaward under certain conditions (seaward of the "baseline" or the crest of the ideal dune). Despite creating somewhat stronger rebuilding restrictions for erosion control devices, the 1990 revisions in many ways represent a political "retreat from retreat" (for a discussion of these dynamics see Beatley, 1992).

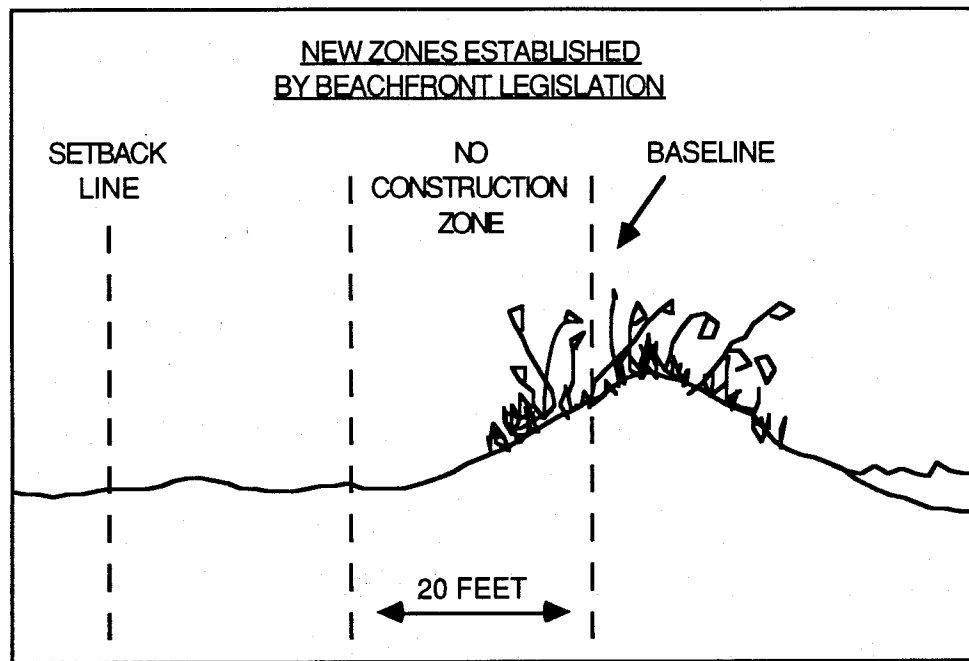
It is worth noting that increasingly state coastal programs are requiring that local governments prepare hurricane and coastal storm recovery and reconstruction plans. North Carolina was the first state to impose such requirements, but other states have followed suit (e.g. Florida, South Carolina ...; see Godschalk, Brower and Beatley, 1989).

Other states have begun to explicitly incorporate consideration of sea level rise into their programs. Klarin and Hershman (1990) report that 17 coastal states have officially recognized the problem of sea level rise and have undertaken assessments of the problem/issue (e.g. proclamations,

legislative findings, research and impact assessments). Eleven coastal states have initiated new public and intergovernmental processes (e.g. forming a sea level rise task force, policy setting process), and 13 states already have existing regulations adaptable (or partially adaptable) to future sea level rise (e.g., coastal setbacks, such as those discussed above). Klarin and Hershmann report, however, that only three states have adopted new policies specifically to respond to sea level rise. Under Maine's Coastal Wetlands Act wetland buffer zones are established to anticipate migration in response to sea level rise. As this zone moves in the future, development within it must also move (specifically, development must be relocated or abandoned if it encroaches for more than a 6-month period or if damaged 50% or more). Also, in certain frontal dune areas (where some development is permitted), developers are required to build structures (those exceeding a certain minimum size) to take into account a 3-foot rise in sea levels over the next 100 years (see Klarin and Hershman, 1990).

Some state programs have sought to facilitate and promote landward relocation of structures. In response to rising Great Lake levels, the state of Michigan created the Emergency Home Moving Program (EHMP). Under this program the state provides loan interest subsidies for propertyowners wishing to relocate lakefront structures subject to erosion (see Platt et al, 1992; St. Amand, 1991). Two options were provided to propertyowners: either a 3% interest subsidy on the first \$25,000 of relocation costs or a one-time grant of \$3500. As a condition of this assistance, propertyowners must move their structures at least 45 feet landward. The state has also implemented an Emergency Home Flood Protection Program which provided similar subsidies for the elevation of threatened structures (see also Platt et al 1992).

Diagram 2



Another strategy, which some states are using is acquisition of coastal hazard areas and sensitive lands. State programs such as Florida's Conservation and Recreation Lands ("CARL") and California's Coastal Conservancy have been very effective at protecting wetlands, beaches and other sensitive coastal lands. Acquisition can be in the form of fee-simple or less than fee-simple (e.g. easements, acquisition of development rights...).

Many state coastal programs also impose some form of real estate disclosure requirement which may be somewhat useful in discouraging hazardous development. Under North Carolina's CAMA permit program, for example, an applicant must sign an AEC Hazard Notice to acknowledge that "he or she is aware of the risks associated with development in the ocean hazard area and of the area's limited suitability for permanent structures" (N.C. Division of Coastal Management, 1988). Under South Carolina's modified beachfront management program similar disclosure provisions are required when a special beachfront variance is issued (see Beatley, 1992).

Building codes and construction standards represent another important component of many state and local risk-reduction strategies (though not necessarily an explicit component of a state's coastal program). Coastal structures can be designed to better withstand hurricane winds, wave and surge. Building codes may be state-mandated (as in North

Carolina) or local-option (as in South Carolina) and can vary substantially in their stringency. The federal CZMA does not mandate that states impose building codes, and in some 12 coastal states adoption of building codes is left as a local option. It is not uncommon for rural areas especially to be without construction standards (see Manning, 1988). The stringency of the wind design standard to which coastal structures must be built is a variable. Under the N.C. Building Code, for instance, construction on the Outer Banks must be designed to withstand windspeeds of 120 mph. Building there must also adhere to fairly stringent piling and foundation standards (Godschalk, Brower and Godschalk, 1989). The benefits of North Carolina's standards have been illustrated well by a study by Rogers, Sparks and Sparks (1988), comparing damages from Hurricanes Alicia and Diana in Texas and North Carolina respectively. Though the storms were comparable in strength and wind speeds, resulting damages were much less in North Carolina. The authors attribute the lower damages to North Carolina's mandatory construction standards (and the lack of any major control over building in the unincorporated areas of Texas; see National Committee on Property Insurance, 1988). While the South Florida Building Code (SFBC) is considered one of the strongest prescriptive codes anywhere, (and similarly mandates a 120 mph wind speed standard) post-storm damage inspections following Hurricane Andrew have identified a number of potential deficiencies in this code (e.g., poor performance of roof coverings, poor connection of roof systems, use of staples to attach plywood sheathing, problems with windows and wall siding; see Perry et al 1992). Local enforcement and builder compliance problems have also been implicated. Even though a relatively strong code, some have argued for even tougher standards given the location, and frequency and potential magnitude of future storm events (e.g. higher wind load standards).

The federal coastal zone management act, then, has served to stimulate considerable coastal planning and management that would probably not otherwise have happened (or would have emerged at a slower pace). Participation has been high and even the two notable holdout oceanfront states, Texas and Georgia, have been developing programs (Section 305 funds are now available again under the 1990 reauthorization of CZMA).

The CZMA has, however, suffered from certain implementation problems. First, funding levels have been modest, with annual implementation monies (Section 306) staying at about \$33 million. (See NOAA, 1990). Given the immensity of the management tasks, individual state allocations are quite modest. Provision of additional CZMA monies to states, targeted especially on the development, strengthening, and

enforcement of strong shorefront and hazard area management provisions would likely return benefits many-fold. The federal coastal program has also historically suffered from a lack of clear performance standards. Some states have aggressively managed and controlled coastal development while others have done little. Moreover, NOAA has been timid in applying sanctions to states that do not implement their adopted and approved programs. While programs can be "disapproved" this is an action which has been rarely, if ever taken.

G. Other existing programs and policies

There are a number of other federal programs and policies which have influenced, or have the potential to influence, coastal development. One of the more significant is Section 404 of the Clean Water Act, which represents the cornerstone of federal efforts to protect wetlands. This program restricts the discharge of dredge and fill materials into the waters of the U.S., requiring permit approval from the U.S. Army Corps of Engineers. The Corps must approve, deny or modify such permit requests consistent with its own public interest review and the Section 404(b)(i) guidelines, promulgated by EPA. (EPA also has final veto authority over the issuance of 404 permits). Under the 404(b)(i) guidelines the Corps can issue a permit only where it concludes there are no practicable alternative sites for the proposed use (non-water dependent uses are assumed to have practicable alternatives), and where impacts are mitigated to the maximum extent. Mitigation requirements can include the creation of new wetlands or the enhancement or restoration of degraded wetlands.

The 404 program has suffered from a number of problems and limitations, including: a limited set of activities over which it has control (i.e., only pertains to discharges); problems with conflicting definitions of wetlands; the perceived ease with which the Corps has issued permits (statistically, few permit requests are denied); the inconsistency with which wetlands mitigation and compensation are required, and the failure to designate in advance wetlands where discharges would and would not be appropriate (for a discussion of these and other problems with the program see Conservation Foundation, 1988). Much conflict in recent months has surrounded the regulatory definition of wetlands under the 404 program (e.g., 1989 delineation manual versus 1991 manual...) and Congress has commissioned a study by the National Academy of Sciences to help resolve this issue (though, the resulting definition will likely address what is a wetland at this point and time and not necessarily consider wetlands mitigation or movement in response to sea level rise). The 404 program, then, does exercise considerable control over development in

coastal areas, with substantial implication for risk management. Clearly, however, the program could be strengthened in a number of ways which would permit it to more effectively reduce coastal risks, and take into account future sea level rise. The land acquisition initiatives of the U.S. Fish and Wildlife Service, the National Park Service, and other agencies (e.g. through the federal Land and Water Conservation Fund...) represent another potentially-effective federal handle on coastal development. Agencies such as USFWS have, however, consistently fallen short of acquisition objectives, and the resources available for federal acquisition generally have been quite limited.

Other existing federal programs and policies, which may influence coastal risk allocation include, among others: Executive Orders 11990 and 11988 (wetlands protection and floodplain management respectively); the Endangered Species Act (ESA); and the Clean Water Act (National Pollutant Discharge Elimination System, and the enforcement of effluent and water quality standards).

H. Proposed Congressional Flood Insurance Reforms

Since around 1990 major legislative reforms to the current federal flood insurance system have been under consideration by Congress, with special focus on coastal zone. Two proposals are of particular note and will be reviewed here: HR 1236 and S. 2907.

House Resolution 1236, the National Flood Insurance, Mitigation, and Erosion Management Act represents the most far reaching of these proposals, and passed the House in May 1991. This proposed legislation was quite ambitious and contained a number of major reforms to the existing system, including: expanded flood insurance purchase requirements; an expanded mitigation assistance program; the creation of an Office of Mitigation Assistance within FEMA; the establishment of a national Flood Insurance Mitigation Fund and a mitigation surcharge on issuance premiums to fund it (\$5 per policy); and an extensive erosion management program; and a mandatory review (and updating where necessary) of floodplain maps at least every five years; among other provisions. Many of these provisions would represent significant improvements to the existing flood insurance system and are incorporated into the recommendations section to follow.

The erosion management provisions would represent some of the most improvement reforms under HR 1236. The Act would direct FEMA to designate erosion-prone communities, within which erosion-prone areas

are located and designated. These initial designations are to be made within 60 months of the Act's enactment. More specifically, FEMA would be required to identify and designate a 10-year, 30-year and 60-year erosion setback line (see diagram 3), and use standards which would apply in these zones. In particular, under the Act these standards would restrict the location and intensity of coastal development within these different erosion zones. No new construction, or relocation of structures would be permitted seaward of the 30-year erosion setback line, and only structures of 1 to 4 dwelling units would be allowed seaward of the 60-year line. These structures would also have to be of a type which are "readily movable."

Adoption of these erosion management standards would remain optional for erosion-prone localities, though mitigation and relocation assistance (e.g. equivalent of Upton Jones relocation assistance, mitigation grants program), would not be available to communities that did not adopt them. Also, for existing structures located seaward of the 10-year setback line in communities not adopting the erosion standards, additional limitations are placed on future flood insurance claims. Specifically, payment for future claims would be limited to 40% of the value of the structure, the policy would be cancelled upon such payment, and future flood insurance would not be allowed. The Act would also require FEMA to "increase the chargeable premium rate" for existing structures located seaward of the erosion setback lines.

HR 1362 would also place overall restrictions on the issuance of new flood insurance in high risk erosion areas. No new insurance would be available for structures seaward of the 30-year erosion line, and available only for structures of 1 to 4 dwelling units seaward of the 60-year erosion line (as of the date of notification to the erosion-prone community).

Other important reforms to the flood insurance system would also be imposed under the HR 1236. It would expand flood insurance purchase requirements, and would impose minimum compliance review procedure for lending institutions. Specifically, each federally-regulated lending institution would be required to conduct a review of all loans at least every five years to insure compliance. The Act would also mandate the escrowing of flood insurance payments in the same way that taxes, and other insurance payments are handled, and would create new hazard notification requirements. Furthermore lending institutions would be subject to new fine for failure to adhere to these provisions.

HR 1236 passed the House of Representatives on May 1, 1991 (by a vote of 388 to 18). However, the Senate version (S 1650) ran into considerable political opposition, principally from propertyowners groups and local governments. The major point of contention was the erosion management component (even Bud Schauerte, then-head of the FIA condemned it as "backdoor federal land-use control" and "despicable"; for a good review of the political opposition see Dean, 1992). In response to these concerns, a modified version--S 2907-- was introduced. While the bill was not passed in the 101st Congress, a similar version will likely be reintroduced, and because it weakens certain provisions that were in HR 1236, will likely gain passage (see below).

The "National Flood Insurance Reform Act of 1992" (S. 2907), sponsored by Senator Kerry, represents, then, a somewhat more moderate proposal and does respond to some of the expressed opposition of coastal propertyowners and local governments. While it contained many of the same flood insurance reforms (e.g. expanded purchase and compliance requirements) and mitigation assistance provisions, it essentially eliminates the specific erosion management standards found in 1236. FEMA would be required to develop erosion management criteria which could then be used in the community rating system. Incentives for adoption of erosion management programs are to be provided in the form of premium rate adjustments. The Act would require FEMA to designate erosion-prone communities and erosion-prone areas, and the latter are defined in bill as areas subject to erosion within 60 years. Policyholders within communities not participating in the community rating system and containing coastal erosion risks would be subject to a 20% premium increase. Also, two years after the enactment of the bill no new flood insurance would be issued for structures within erosion hazard areas--in this sense S. 2907 is stronger than 1236. Relocation demolition assistance would also not be available unless communities qualify for erosion management credit under the CRS (within 5 years). S. 2907 would also create a national Flood Mitigation Fund, and a mitigation surcharge.

IV. Recommendations and Options for the Future: Readjusting the Incentive Structure and Promoting Less Hazardous and Damaging Coastal Development

What follows are a series of alternative policy and programmatic changes for readjusting the existing incentive structure in coastal areas. This list is meant to be neither exhaustive nor definitive, but rather should

Table 6

Federal Programs and Laws Influencing Coastal Development: Status and Recommended Changes

FEDERAL PROGRAM	KEY PROVISIONS	LEGISLATIVE BASIS	EXISTING MITIGATION PROVISIONS	RECOMMENDED CHANGES/POLICY OPTIONS
National Flood Insurance Program (NFIP)	<ul style="list-style-type: none"> provides federal flood insurance to propertyowners in participating communities communities must adopt minimum floodplain management provisions (e.g. elevation to 100-flood level, restrictions to building in floodway...) 	<ul style="list-style-type: none"> National Flood Insurance Act Flood Disaster Protection Act 	<ul style="list-style-type: none"> Minimum floodplain management standards Upton/Jones Relocation Assistance Community rating system 362 flood properties purchase program 	<ul style="list-style-type: none"> adjust premium rates mandate erosion management standards curtail insurance for high-risk repetitive loss properties restrict coverage to existing properties require wetlands protection incorporate sea level rise in mapping and rate structure expand relocation assistance
Disaster Assistance	<ul style="list-style-type: none"> Individual and family grants program public assistance grants on 75-25 cost share 	<ul style="list-style-type: none"> Stafford Disaster Relief and Emergency Assistance Act 	<ul style="list-style-type: none"> mitigation grants program 409 state mitigation plan required 	<ul style="list-style-type: none"> reduce federal share for public assistance more stringent mitigation requirements impose ability-to-pay standard elimination of public assistance funds altogether
Coastal Zone Management	<ul style="list-style-type: none"> federal funds and technical assistance for development and implementation of state coastal management plans (cost-share basis) 	<ul style="list-style-type: none"> Coastal Zone Management Act (CZMA) 	<ul style="list-style-type: none"> state coastal management plans (e.g., oceanfront setbacks, land acquisition, construction standards, post-storm reconstruction standards, etc.) 	<ul style="list-style-type: none"> stronger program mandates expanded resources available to coastal states

Coastal Barrier Management	<ul style="list-style-type: none"> withdraws federal subsidies for new development in designated Coastal Barrier Resources System (CBRS); Prohibits issuance of new flood insurance, post-disaster assistance, and other development funds 	<ul style="list-style-type: none"> Coastal Barrier Resources Act (CoBRA) 	<ul style="list-style-type: none"> further limit subsidies expand coverage to other sensitive lands Promote state CoBRAs acquire undeveloped area
Beach renourishment and shore protection	<ul style="list-style-type: none"> Provision of funding and technical assistance for beach renourishment and shore protection projects, cost share from 55-90% (federal) 	<ul style="list-style-type: none"> Federal Flood Control Acts (of 1917, 1936, 1945, 1955, 1968... for a detailed review of these see Platt, et al, 1992) 	<ul style="list-style-type: none"> discourage permanent shoreline stabilization increase state and local contribution phase-out federal funding of beach renourishment condition funding on minimum state and local coastal management
Federal Tax Benefits	<ul style="list-style-type: none"> casualty-loss deduction interest and property tax deductions for second homes accelerated depreciation for season rental properties 	<ul style="list-style-type: none"> Federal Tax Code 	<ul style="list-style-type: none"> eliminating or curtailing casualty loss deduction mitigation tax incentives
Federal Wetlands Protection	<ul style="list-style-type: none"> Section 404 restricts discharge of dredge and fill materials into U.S. waters 	<ul style="list-style-type: none"> Section 404 of the Clean Water Act 	<ul style="list-style-type: none"> tighten regulatory control in Section 404 permit review incorporate sea level rise into wetlands management decisions expand wetlands acquisition

be viewed as a starting point for additional discussion about appropriate changes. These possible changes are summarized in Table 6.

A. Revamping the National Flood Insurance Program

The NFIP represents a significant federal subsidy of high-risk development, and further helps to reduce the perceived riskiness of coastal development. There are a number of program and policy changes which could be made to the NFIP which would reduce these effects. They include, among others, the following:

- adjusting premium rates.

Despite the gradual increase in rates over the years, the average yearly premium paid by coastal propertyowners remains quite modest. The NFIP has only in recent years been running a small surplus, and in light of the catastrophic potential of future storms, and the likely future impacts of sea level rise, the rate structure remains a subsidized one. If the availability of flood insurance is to be maintained, rates should be much higher to reflect these factors and the tremendous risk to the federal treasury. At a minimum FIA should charge premium rates sufficient to generate and operate a surplus in the flood insurance fund large enough to cover the maximum probable annual loss (i.e. \$3.5 billion according to FEMA). On a related point, it could be argued that a significant reason why FIA is able to run deficits, is its line of credit with the U.S. Treasury. Another policy option, then, would be curtail or take away these borrowing powers.

- Mandating Erosion Management Standards.

The failure of the current NFIP's to adequately address long term erosion trends must be rectified. In particular, long term erosion trends must be factored into premium rate structures for existing and future policy holders, and minimum erosion management standards should be required.

Especially important is the need to mandate at least a minimum state or local erosion setback requirement as a condition of participation in the NFIP. Erosion based setbacks, such as exist in states like North Carolina represent models, although the timeframes used in such systems should be substantially expanded (e.g. a minimum 100-year setback should be imposed for larger multi-family structures; only movable structures should

be allowed seaward of the 50-year erosion line; this 50/100-year system is what is suggested by the recent National Research Council study on coastal erosion. See NRC, 1990). Similarly, legislative proposals such as HR 1236 represent positive directions but again the setback standards should be more extensive. Whatever setbacks are mandated, should be considered minimums, and where lot depth or project design allows more extensive setbacks, these should be encouraged or required. (For a discussion of this issue see Platt et al, 1992.)

Because federal flood insurance should be viewed as a privilege and not a right, it is not unreasonable that coastal states and localities be called upon to impose certain sensible erosion mitigation requirements, as they already are in the case of building elevation, dune protection; etc. Alternatively, communities could be penalized for failure to adopt minimum setbacks (e.g. making communities ineligible for mitigation and relocation assistance; raising insurance premiums, reductions and future claims in 10-year erosion zones, etc.).

Interestingly, strong erosion management standards will in the long run tend to reduce the need for other types of federal subsidies. For instance, federal beach renourishment expenditures may be less important in the future if natural beaches are allowed to migrate and maintain themselves, as they would under natural conditions. Public expenditures for repairing and rebuilding seawalls, roads, and other public investments in the coastal zones would also be reduced over time. Furthermore, what would be imposed is a system which is already in use in a number of states and localities, and thus is certainly possible technically and economically. However, it should be remembered that much of the coastline is already heavily built-up (places like Ocean City, MD and Virginia Beach, VA) and that political and economic pressures will likely dictate that these areas be protected through some means (renourishment, structural measures, etc.).

- curtailing insurance for high-risk repetitive loss properties.

NFIP should take a number of actions to reduce its long term insurance liability and to pull it more in line with the risk-averse philosophy of private sector insurers. At a minimum, it should acknowledge that certain locations are extremely risky and it should prohibit all new insurance policies in these locations. In particular, no new insurance should be issued in V-zones, or velocity zones, and in high risk erosion zones (e.g. within a 10-year erosion zone). Proposals such as HR 1236 are positive in this regard, prohibiting all new flood insurance

policies for development seaward of the 30-year erosion line. Writing new insurance in V-zones would be a conservative first step, and eventually eliminating new insurance within even the fifty year erosion zone would be a sensible move. Generally, premiums for existing policies should be raised to reflect the greater risks inherent in these locations.

In addition, a much stronger approach should be taken towards repetitive loss properties, or properties subject to periodic and multiple flooding claims. FEMA should establish a limit on the number of claims permissible before insurance is terminated (i.e. just as an automobile insurance company might terminate a policy in the event of multiple accidents). Furthermore, FEMA should (in addition to or in lieu of) incorporate repetitive losses into determination of premium levels. The greater the number of flood insurance claims, the higher the required premiums should be.

- Providing coverage only to existing floodprone properties.

Much of the original intention of the NFIP was to make available affordable insurance to those communities and propertyowners already located in floodplain areas, and in turn to reduce federal expenditure for disaster assistance and recovery. There was little intention or desire to encourage new development in floodplan areas, nor a feeling that new development is entitled to insurance. One approach, then, would be to limit flood insurance only to existing homes and businesses, and, after a certain date, suspend issuance to new development (i.e. future development). Such an option would protect insurance benefits to existing flood-prone property, but in turn eliminate insurance incentives for new development.

- Wetland protection requirements.

Coastal wetlands provide important flood protection benefits, serving as natural sponges retaining large amounts of flood waters, and anchoring shorelines against erosion. The NFIP should be modified to give explicit consideration to protection of natural wetlands and their immediate surroundings. Specifically, federal flood insurance should not be made available to any development project which fills-in or otherwise adversely modifies existing natural wetlands (in a sense "CoBRA-cizing" wetlands). For purposes of implementation wetlands should be defined consistent with the definition used by the USEPA and USCOE in implementing Section 404 of the Clean Water Act. Such a charge has the benefit of reducing federal incentives for converting or damaging natural wetlands. Indeed,

the 404 program could serve as one possible trigger for denying new flood insurance (i.e. issuance of a 404 permit could be deemed to automatically deny flood insurance).

As a second prong, minimum wetlands protection and management should be required as an additional condition for local participation within NFIP. Participating local governments should be required to control future development in a way which prohibits development in wetland areas, and which protects a minimum buffer zones around such wetlands. Among other purposes, such a buffer would retain some degree of migration ability for wetlands responding to future sea level rise.

- Incorporation of sea level rise into NFIP mapping and rate structure.

As discussed in earlier sections, future sea level rise may serve to dramatically increase the size of the coastal zone subject to inundation and flooding in the future. The current NFIP mapping and rate structure does not take this into account but could. Incorporation of even conservative sea level estimates into FEMA maps might serve to discourage future development in these areas and serve to put coastal communities and propertyowners on notice about such future risks. That development which does occur in these areas will at least be subject to certain minimum flood management standards (e.g. elevation).

- Expanded relocation assistance.

FEMA and the NFIP must substantially expand the emphasis given to relocation assistance. The existing 1362 and Upton-Jones programs represent good strategies but are underutilized and underfunded. Section 1362, or something like it, should be expanded and funding substantially increased. Efforts could be made to expand the use of Upton-Jones, as well, and to promote its relocation alternative over demolition. Among the possible improvements to Upton-Jones, that should be considered include: requiring relocation outside of high-risk locations (e.g. landward of the 30-year erosion line, not simply making future insurance conditional on it), and expanding eligibility beyond the currently narrow definition of imminent collapse.

Incentives to relocate could be made even stronger by modifying the ways in which the flood insurance program treats structures at risk to erosion. Requiring higher premiums for structure seaward of certain erosion zones (e.g. the 30-year erosion line) would create financial

incentives to relocate. Cutting-off insurance to structures within a zone of imminent collapse (e.g. within 10- year or 5-year erosion line), after a certain period of time (e.g. two years after a chosen date) would have a similar effect.

The federal government may also wish to help states develop their own more extensive relocation assistance programs. Just as the federal government has helped states establish revolving funds to finance local sewage treatment plant improvements so also could the federal government help states establish coastal relocation revolving funds.

Under the Clean Water Act, the federal government has encouraged creation of state waste water revolving funds through the provision of startup capitalization grants. Once established states then provide local governments with the ability to borrow funds for the construction of new wastewater treatment facilities, or the improvement and upgrading of existing facilities. Loans are provided at interest rates at or below fair market (depending on factors such as a community's financial circumstances and the severity of the water quality problem). In the case of Virginia's "Water Facilities Loan Fund," annual payments back to the fund are required, and full repayment of loans must occur within twenty years (e.g., see Virginia Water Quality Board, 1991). Thus, annual repayment by borrowers ensures a steady pool of funds available for new loans.

Such revolving funds could be similarly useful in providing grants to assist private propertyowners in locating and purchasing alternative coastal sites. State revolving funds might be used to purchase relocation sites in advance, later making them available to beachfront propertyowners needing to relocate. Propertyowners could then be asked to repay the fund for these acquisition costs, perhaps at below market rates.

Such a fund could also be useful in purchasing damaged properties following a hurricane or major storm event, and in turn selling or relinquishing these lands to local governments for needed beach access points and public recreational areas. In rare cases land swaps may be possible, allowing a beachfront propertyowner to trade his/her lot for a state-acquired relocation lot further landward.

States should also be required to consider and incorporate relocation strategies and programs in their Section 409 mitigation plans, as suggested

by Platt et al (1992). Relocation programs (of the sort described) could be a minimum required component of State 409 plans.

B. Revamping Disaster Assistance

There are a number of ways in which the existing disaster assistance framework could be modified to reduce incentives for hazardous and costly coastal development patterns. These include, at a minimum, the following:

- Reducing the federal share for public assistance

One possible way to ensure that state and local governments are made responsible in the public investment decisions they make is to require them to assume a greater share of their costs. Efforts have been made in the past to raise the state/local share of public assistance to at least 50%, and this seems a reasonable minimum. The recent practice of covering 100% of the cost of public assistance should stop. Even this level of funding should be contingent upon a needs-based and ability-to-pay formula, and contingent upon satisfying minimum mitigation standards following a storm or flooding event (see below). Requiring that a greater share of these costs be assumed by affected states and localities, irrespective of whether or not this would have much effect on public investment decisions would also be supported from an equity point of view--that those states and localities engaging in risky investment practices ought to be made to bear a substantial portion of their cost.

- More stringent mitigation requirements

The mitigation provisions and requirements currently existing under the Stafford Act are already quite strong. The main problem appears to be the failure of FEMA to force states and localities to adopt mitigation as condition of disaster assistance. FEMA rarely (if ever) withholds disaster assistance funds from states who fail to adopt or implement mitigation measures. Most states dutifully prepare Section 409 mitigation plans, but those plans largely end up setting on a shelf in the state capitol and there is generally no mechanism for requiring or ensuring that states implement what is contained in these plans. FEMA, then, would adopt a more stringent view of mitigation, more clearly and aggressively tying disaster assistance funds to tangible long-term hazard reduction policies, programs and actions.

It is probably also advisable to establish some clearer system for judging state accountability for 409 progress. States could be required to more clearly indicate those mitigation actions they agree to adopt and implement within a specified timeframe (e.g. adopting a shoreline setback requirement, developing a relocation program, etc.). It should be made clear that subsequent federal disaster assistance will not be provided (or provided at a reduced level, say no more than 50% of otherwise eligible funding) where the plan has not been implemented. It may also be sensible for FEMA to establish a system for certifying that state 409 plans meet a minimum mitigation threshold (i.e. that they contain actions and policies sufficient to bring about a substantial degree of long term risk reduction).

At a minimum coastal states should be required to adopt a building code (or mandate local adoption) and to ensure that an adequate system of implementation and enforcement will exist. Such minimum construction standards (perhaps one of several standard codes) could be made a condition of participation in the NFIP, or of receiving funding under the CZMA. The federal government should also consider raising national wind standards for mobile homes, which performed very poorly in Hurricane Andrew.

- consideration of ability-to-pay and extent of damages

As noted earlier, the existing disaster assistance framework fails to explicitly consider the ability of impacted localities and states to assume disaster losses, and the extent of damage actually incurred. Once a disaster area is designated, all localities are eligible for disaster assistance regardless of the extent or size of damage incurred. Much federal disaster assistance is provided in small amounts to numerous localities--damage levels which could clearly be covered by local governments. As well, certain localities (and states) are wealthier and have a greater capacity to pay for and assume the costs of hurricanes and other disasters. Some form of per capita threshold should be utilized by FEMA to determine when local resources are adequate and when federal funds are not necessary or appropriate. In short, these types of provisions would act as a kind of disaster "deductible," and federal resources would kick in only after certain thresholds are reached. Such a system would further contribute to greater local and state accountability for their decisions, and greater equity in the overall disaster assistance system.

- elimination of public-assistance funds

One option, though not very politically feasible, would be the elimination entirely of certain categories of disaster assistance, especially public assistance. While the public generally supports the role of the federal government in assisting individuals and families in recovery and rebuilding, this "helping" sentiment may not be as strong when it comes to helping states and localities rebuilt boardwalks or local streets. Alternatives to outright grants of aid could be developed, including creating a federal public assistance loan program. If local governments need to borrow funds to rebuild sewer systems, roads, and recreational amenities, such a program would make such funds available, but subject to repayment with interest. Such an arrangement, again, adds an element of equity, and may result in more cautious local and state investment policies. Such loans could be offered at below market interest rates.

C Extending and Expanding the Coastal Barrier Resources Act

While withdrawal of federal subsidies from barrier island development clearly will not stop such development, it has been shown to slow it. Moreover, such an approach is sensible from the perspective of taxpayer equity. (If developers and coastal propertyowners choose to build in high risk locations at least the general public should not have to pay for it.) The CoBRA experience is positive enough, then, that efforts should be made to expand its coverage and strengthen its provisions.

- further limitations on subsidies

As noted earlier, CoBRA does not eliminate all federal subsidies. Important remaining subsidies include: the casualty loss deduction under the federal income tax code, federal block grants, and grants and loans from federally-insured banks. CoBRA could be strengthened, and coastal development on designated units further discouraged, by eliminating these remaining subsidies. As well, CoBRA should be modified to prohibit federal subsidy of projects and expenditures which, while technically outside of the CBRs, serve to directly encourage or facilitate development (e.g. construction of a bridge).

- expand coverage to other sensitive lands

Consideration should also be given to expanding the kinds of lands to which federal subsidies are limited, including other sensitive coastal areas besides barrier islands. These could include, for example, coastal wetlands

(and wetland buffer zones), estuarine shorelines, critical wildlife habitat, and other areas. Substantial resource management benefits could result from the "CoBRA-cizing" of other sensitive lands. Efforts to expand the CBRs to the Pacific coast, while currently meeting some resistance, should be continued.

- Promote state CoBRAs

While Florida has imposed certain limitations on future state investments in high-risk coastal areas, few other states have such restrictions. Coastal states could impose CoBRA-like restrictions (e.g. limitations on state road and bridge expenditures, disaster assistances, ...) which could further reinforce the effects of the federal limitations.

- Acquisition of undeveloped areas

While CoBRA has been able to slow development of barrier islands, studies by the U.S. GAO and others illustrate that development will likely still continue in many places despite withdrawal of federal subsidies. Consequently, consideration should be given, as suggested by GAO and others, to acquiring (through fee simple or less than fee-simple means) many of the remaining undeveloped barrier island units.

There is considerable merit to the argument that acquisition now, though costly, could in the long-run be cost-effective. Acquisition is especially warranted for those barrier islands units of special ecological importance (e.g. which contain endangered species habitat, maritime forests ...) and in areas which will provide critical public recreational benefits. Acquisition could be encouraged at federal, state, and local levels, and in concert with private conservation groups and land trusts. At the federal level the U.S. Fish and Wildlife Service is the logical agency to spearhead such acquisition efforts. Acquisition of remaining undeveloped wetland and estuarine shoreline areas should also be given a high priority.

D. Revamping the Federal Tax Code

As discussed in earlier sections, the U.S. Tax Code offers several major subsidies for coastal development, including: casualty loss deductions for damage from hurricanes and storms; depreciation tax shelters for seasonal rental properties; and deductibility of mortgage interest and property taxes for second homes.

The actual effect of these tax benefits is difficult to determine, as is the magnitude of tax expenditures involved. They do represent another major category of public subsidy of coastal development, and hazardous coastal development at that. Options here include eliminating these tax benefits entirely, or curtailing them in important ways. The casualty loss deduction could be eliminated altogether, or restricted only to damages that occur to a principal residence (e.g. as proposed by Platt et al, 1992).

In addition to eliminating these types of negative incentives, the tax code could also be modified to support and encourage mitigation. This could occur, for instance, by providing a tax deduction for home improvements intended to mitigate storm damages, or for expenses associated with relocation (including purchase of a relocation lot).

E. Strengthening State and Local Coastal Management

In many respects, coastal states and localities are in the best position to manage and control coastal development. Efforts at imposing land use planning or land use controls at the federal level have met with great skepticism and political opposition. Moreover, nearly two decades of positive experience with the federal Coastal Zone Management Act (CZMA) suggests that such an approach has considerable merit. At the federal level, the CZMA approach could be further modified and reinforced to promote greater risk-reduction and more sensible land development patterns.

- stronger program mandates

The federal CZMA provides considerable flexibility to states in crafting their specific implementation strategies and techniques. One possibility is to mandate certain specific (and stronger) minimum development controls. These could include, for instance, an erosion-setback program (already adopted by a number of states), restrictions on construction of immovable buildings, a relocation assistance program and restrictions on rebuilding damaged or destroyed structures in high-risk locations, and adoption of minimum coastal construction standards, among others. It is not unreasonable that major federal financial subsidies be accompanied by the adoption of certain minimum risk reduction measures. These minimum measures could also include wetlands protection (including protection of buffer and migration areas) and minimum considerations of sea level rise in coastal programs.

The CZMA program could also be further adjusted to create financial incentives to undertake additional risk reduction measures. The current enhancement grants program (Section 309) represents a movement in this direction and does include as eligible funding areas coastal wetlands management and protection, and natural hazards management (including sea level rise). States could be further rewarded (e.g., through additional earmarked funding) for actions and programs which reduce coastal risks.

- expand resources available

The current level of funding provided to coastal states is meagre at best. Annual appropriations for state program implementation (306 funds) have remained at around \$30 million, making the program tremendously underfunded in comparison with the (growing) seriousness and magnitude of coastal management problems. Adequate funding is especially needed to implement state regulatory and development management provisions (e.g. setback requirements) and to facilitate local coastal planning (i.e. planning grants to local governments). Additional funding for these types of coastal planning activities represents cost-effective expenditure of funds, which can serve to effectively reduce long term coastal risks as well as better protect coastal environmental resources.

The federal government should also, to the extent possible, help to facilitate the development and implementation of state land acquisition programs. Programs such as Florida's Conservation and Recreation Lands (CARL) program and California's coastal conservancy represent some of the most effective and sensible strategies both for protecting wetlands, barriers and other sensitive coastal lands, and for preventing future exposure of people and property to coastal risks. The federal government could facilitate such programs in a number of possible ways, including through the provision of technical assistance and perhaps by providing seed monies for the establishment of state land banks or acquisition funds.

F. Shoreline Protection and Beach Renourishment Programs

Significant subsidies to coastal development have also occurred through the programs and activities of the U.S. Army Corps of Engineers, including construction of shoreline stabilization projects and funding of beach renourishment. These projects can also result in major destruction of the coastal natural environment and can work at cross-purposes to encouraging long term shoreline retreat.

- discourage permanent shoreline stabilization

Several states have taken the lead in banning permanent shorehardening structures such as seawalls and groins. Experience suggests that such projects are costly, lead to greater erosion and loss of natural beaches, and may actually increase development pressures. The Corps (or Congress) ought to develop a long term coastal management strategy which explicitly discourages the use of such hard shoreline techniques, except where absolutely necessary. Priority should be given to beach renourishment and less environmentally damaging approaches.

- increase state and local contributions; phase-out federal funding of beach renourishment projects

The extent of federal subsidy of beach renourishment projects to many seems inappropriately high. The state and local matching share could be increased significantly, and states could be encouraged to ensure that a substantial portion of these costs filter-down to beachfront communities and propertyowners. Ideally, those propertyowners and businesses directly benefitting from these investments ought to be asked to bear the lions share of their costs. Ear-marked local revenue sources such as special taxing (renourishment) districts or a dedicated sales tax could be encouraged.

As an alternative, federal funding could be eliminated entirely (or phased-out over time), and perhaps replaced with federal seed-monies for states to establish revolving fund renourishment programs. An approach could be taken similar to that taken towards federal funding of sewage treatment plants (construction grants programs) under the federal Clean Water Act.

- condition funding upon adoption of state and local coastal management

Provision of federal funding for renourishment projects could also be conditioned on the adoption of certain minimum coastal management programs, including the adoption of setback requirements, post-disaster restrictions, and relocation assistance, among others (including many of the provisions mentioned above).

G. Strengthening Wetlands Protection

The federal government currently exercises substantial regulatory and management control over coastal wetlands. These existing programs, principally Section 404 of the Clean Water Act, jointly implemented by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency, could be further strengthened to take into account future sea level rise, and to better guard against destruction by coastal development pressures.

- tighten regulatory control in Section 404 permit review

Under the existing Section 404 permit process there are numerous problems and limitations which result in continued alteration and destruction of wetlands. The Section 404 permit process could be strengthened, though undoubtedly unpopular, by expanding the activities over which control is exercised (e.g., beyond simply discharge of materials, greater control over agricultural activities...), strongly discouraging destruction of natural wetlands, even where mitigation and compensation are provided, and more stringently interpreting and applying the Section 404(b)(i) guidelines.

- incorporate sea level rise into wetlands management decision

Another option is to modify the existing 404 permit program to explicitly take into account sea level rise. This could occur by modifying permit decisions to take into account future movement and migration of coastal wetlands in response to sea level rise. Efforts could be made in permit decisions to protect buffer areas, landward of the existing boundaries of coastal wetlands, in which development would be prohibited or limited (e.g. revetments, habitable structures). Concern about sea level rise also has substantial bearing on the current debate over the regulatory definition of what constitutes a wetland and argues for maintaining a broader, more inclusive definition.

Federal (and state and local) restrictions on the use of wetlands have raised serious claims by propertyowners that unconstitutional "takings" occur (see Section V for a more extensive discussion of this). Efforts should, consequently, be made to explore the use of such techniques as transferable development rights (TDR) to address this issue.

- expand federal wetland acquisition

While the federal government has in the past expended considerable resources in purchasing wetlands, it has in recent years failed to meet acquisition goals. The federal government (e.g. the U. S. Fish and Wildlife Service) should consider accelerated acquisition of coastal wetlands, as well as surrounding transition and wetland migration areas.

V. Impediments and Obstacles to Reform

Many of the policy and programmatic alternatives identified in Section IV, while representing positive improvements in the existing incentive and regulatory framework, would confront certain obstacles. Several of the more prominent of these are identified below.

Coastal Subsidies as Social Entitlements

Reform proposals such as HR 1236 are instructive in the firestorm of political opposition they often create. Taking away or curtailing programs such as federal flood insurance is vehemently opposed by coastal propertyowners and localities who fear a reduction in property values, salability, and economic attractiveness of coastal areas. These types of coastal subsidies, then, have over time acquired a constituency and set of beneficiaries who tend to view them as social entitlements, in much the same way that social security is viewed. Similar views exist about disaster assistance. Almost regardless of the magnitude of the damages, or the ability of states, localities and propertyowners to assume the damages, there is the perception that a disaster declaration and disaster assistance are deserved. These are difficult political obstacles to overcome but may suggest the necessity of proposals which gradually phase-out subsidies over time.

Private Property and the Takings Issue

A major impediment to more effective and sensible coastal management are concerns about impacts on private property. Specifically, very frequently propertyowners who are restricted as a result of a coastal management programs (e.g. oceanfront setbacks, restrictions on filling wetlands) are quick to claim that these restrictions represent unconstitutional "takings" of private property, under the 5th amendment of the U.S. Constitution (as well as similar provisions in state constitutions). If land use regulations are so onerous and restrictive as to deny a coastal

property all reasonable economic use of their property the courts may well conclude that a takings has occurred (for a history of the taking's issue see Bosselman, Callies and Banta, 1976).

A recent case in South Carolina, Lucas v. S.C. Coastal Council illustrates the potential dimensions of this obstacle. David Lucas, a South Carolina propertyowner who had acquired two small lots on Isle of Palms (a barrier island community east of Charleston), was prevented from building on them as a result of the 1988 South Carolina Beachfront Management Act (both lots were seaward of the so-called "baseline"). Arguing that the setback restrictions deprived him of all reasonable economic use of his property he challenged the restrictions as an unconstitutional taking. The lower court found in his favor and awarded him \$1.2 million. The S.C. Supreme Court overruled this decision upholding the coastal council's actions as merely preventing a public harm and thus not requiring compensation. Lucas appealed to the U.S. Supreme Court, which reversed and remanded. In the process, the court reiterated the position that when such land use regulations preclude all economic use of property a taking occurs (unless the regulation serves only to enforce a preexisting common law doctrine, such as nuisance). The full implications of the Lucas decision remain to be seen, but it will undoubtedly be cited by opponents of more stringent coastal land use regulations.

Takings law remains unsettled, and considerable disagreement exists about when a regulatory taking actually occurs. What constitutes a reasonable economic use, for example, remains a debatable question. The S.C. law did not prevent the erection of a temporary structure on the Lucas property, for example, or the sale of the lots to adjoining propertyowners. (A recent similar case in Maine concluded a taking had not occurred, in significant part because the propertyowner was able to park his recreational vehicle on the site; see St. Amand, 1991 for a discussion of this case).

Irrespective of the specific constitutional challenge of a takings, additional restrictions on the use of land have in recent years met with serious political opposition. A number of property rights protection groups have been established and have been very vocal in opposing additional government restrictions (e.g. the wise use movement in the west).

Cost: Perceived and Actual

Potential cost represents a serious obstacle to many of the proposed program changes discussed here. Some of these costs are actual, while

others are more perceived. Major coastal land acquisition, for example, will clearly entail major public expenditures, given the high price of coastal property (e.g. the high cost of the Lucas Isle of Palms property). Similarly, public relocation subsidies could also involve a substantial public expenditure. The history of the Section 1362 flooded properties purchase program in coastal areas is that few properties can be purchased given the high land prices. On the other hand, some of the alternatives discussed here are relatively inexpensive and their perceived costs may be much higher than their actual costs. Adoption of coastal building standards, for instance, actually involves a relatively small increase in the cost of home construction.

As well, attention is frequently focused on the initial costs of programs without considering the resulting long-term cost-reductions. While relocation subsidies may involve substantial upfront costs they serve to curtail future loss expenditures, sometimes on a repetitive basis. Similarly, public acquisition of wetlands, floodplains, and other sensitive coastal lands while expensive initially can serve to prevent many-fold future public costs (disaster damages, ecological damages).

The attraction of Coastal Areas

The economic and personal attraction Americans have for the coast could also be seen as an obstacle to many of the reforms suggested. Recent surveys of coastal propertyowners suggest that many of them do have a solid appreciation for the danger and riskiness of building and living in coastal areas, but see hurricanes and coastal storms as simply a necessary part of the tradeoff for the benefits of coastal living (Beatley, 1992). Table 6 represents the results of a mail questionnaire administered to owners of beachfront property in South Carolina heavily damaged by Hurricane Hugo. As the results indicate even those who have been devastated by such events do not generally have regrets, or plan to move to safer locations. A related obstacle is the economic advantage of beachfront locations. A major reason why beachfront propertyowners are reluctant to relocate their structures (and are willing to wait until the structure has nearly collapsed in the surf) is that many rent their units, and rental incomes are substantially higher on the first row beachfront than on more inland sites.

Table 6

"Now that you have experienced the effects of a hurricane, has this had any influence on your feelings about owning beachfront property?"
(circle all that apply)

	<u>Freq.</u>	<u>Percent</u>
1. Yes, would not buy beachfront property again	8	6.1%
2. Yes, would like to sell my property and buy property in a safer location	9	6.8
3. No, hurricanes are just a normal risk in beachfront areas	52	39.3
4. No, the benefits and enjoyments of beachfront living outweigh the potential risks	55	41.7
5. Other	8	6.1

N = 132

Source: Beatley 1992

Organizational fragmentation

Another obstacle, especially at the federal level, is organizational fragmentation. No one federal agency or department has responsibility for coastal management and coastal risk reduction. For example, the Coastal Zone Management program is administered within NOAA, responsibility for wetlands management is shared by USEPA and the Corps, FEMA has responsibility for flood insurance, and a number of agencies and offices are involved in disaster assistance. These different federal programs and initiatives are not well-coordinated and do not result in a unified, comprehensive strategy for reducing coastal risks, or addressing long term sea level rise. Moreover, the perceived missions of these different agencies vary considerably, and can result in actions and programs that work at cross-purposes. FEMA has historically not seen its mission in terms of coastal management, but rather more as an agency seeking to help families and communities respond to, and cope with, natural disasters. A comprehensive coastal management and risk-reduction program linking together these different missions and initiatives would be helpful, as would some degree of reorganization (e.g. moving NOAA into EPA, as recently suggested by outgoing EPA Administrator William Reilly).

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