PROTECTION AND PRESERVATION OF COASTAL SALTMARSH ON THE NORTHEAST ATLANTIC COAST

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Milton H. Steinmueller
Major professor

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ABSTRACT

PROTECTION AND PRESERVATION OF
COASTAL SALTMARSH ON THE
NORTHEAST ATLANTIC COAST

By

John Edward Carroll

Coastal wetlands are unique environments at the land-sea interface. They are protected coastal areas where there is a mixing of salt and fresh water, generally treeless, and are covered with grass or sedge vegetation and marine algae. They are high in biological productivity, and support a great diversity of life. They directly support the life cycles of all commercially valauable shellfish, and a large proportion of commercially valuable finfish, marine sportsfish, waterfowl, shorebirds, and furbearers of the United States. They also play a valuable protective role as natural buffers to storm tides, and help alleviate air and water contamination.

Coastal wetlands have been lost in northeastern states at rates varying from 4% to 28% during the past twenty years, entirely due to man's activities. It is the purpose of this dissertation to document the value of these coastal wetland areas and the threat seen for some, explore strengths and weaknesses of the efforts made to

protect the values of these areas, and recommend approaches for obtaining more desirable patterns of use of these areas.

The method of analysis was to structure information obtained from the sources in terms of the questions posed by these three purposes. Most of this information was non-quantitative; some was subjective. In situations when preciseness was required, exact quotations from relevant sources were provided. In other instances, the judgment of the writer concerning relevance was the basis for the analytical interpretation.

Major difficulties were noted in attempts to define, biologically, geologically, and legally, the nature and boundaries of a coastal wetland. Problems were also encountered in attempts to evaluate the true economic worth of wetlands and their resources. There is yet no broad consensus on either of these matters.

A number of wetlands protective statutes from Maine to Mississippi were analyzed, as were legal challenges to these statutes. The only substantial questions raised in these cases are:

1. What constitutes an illegal taking of private property and violation of individual rights on the part of the state?

2. What share of the social burden of wetlands protection should be borne by the individual wetlands owner who must sacrifice potential profits from the use of

the land for the sake of protecting the public values accruing from it?

It was found that, because of the variability of state constitutions and statutes, practices of jurisprudence from one place to another, differences in regional attitudes, and differences in the technical details of the cases themselves, broad use of the state police powers and reliance on the courts to uphold those powers cannot be depended upon to save coastal wetlands from destruction. Use of regulatory authority may only be considered a temporary measure. The alternatives were found to be more effective. These include acquisition in fee simple, acquisition of easements, preferential tax assessment, zoning, regional planning, and philanthropy. Of these techniques, philanthropy can be encouraged but not controlled; zoning is subject to legal challenges similar to those involved in other uses of the police power; regional planning is necessary, but is more a supplemental tool than a solution itself; preferential tax assessment is only at an experimental stage, and is a weak technique where it is practiced; and easements are not well understood and can be just as expensive as acquisition in fee simple. Acquisition in fee simple, though expensive, is the only effective reliable tool to preserve wetlands. Without acquisition of this resource, or at least its ecological value, many of the coastal wetland ecosystems of the United States will be permanently lost.

PROTECTION AND PRESERVATION OF COASTAL SALTMARSH ON THE NORTHEAST ATLANTIC COAST

By

John Edward Carroll

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CHAPTER I

INTRODUCTION

Coastal wetlands are especially unique environments between sea and land, and occur on the interface between the two. It has been said that such interface zones, in that they exhibit characteristics from and exist on the margins of totally separate and very different environments, are themselves the most dynamic environments in the short run, the most quickly changing environments in the long run, in the world. Because such interface zones (and especially the intertidal zone) receive nutrients from at least two different environments instead of one, they are, therefore, nutrient-rich, and thus able to maintain exceptionally high rates of biomass productivity.

Coastal saltmarshes are extremely productive, and exhibit a greater biomass productivity than any other environment in the world, with the exception of the coral reef of tropical seas.[1] These environments directly support virtually the entire shellfish (hard clam, scallop, oyster, mussel) production of the United States, are responsible

[1] Connecticut Conservation Association, "Connecticut Coastal Wetlands Crises," Connecticut Conservation Reporter, 2:4 (1968), p. 1.

for most of the commercial production of crustaceans (blue crab, shrimp, crawfish), and serve as a necessary spawning ground for over two-thirds of the commercially valuable fin fisheries of this country.[2] Coastal saltmarsh also serves as primary habitat for most waterfowl of sport hunting and recreational importance, and of many shorebird species of major aesthetic importance. Such wetlands, with their great water absorption capacities, serve as important natural buffers to storm tides, and thus physically protect the shoreline by curbing erosion. Finally, coastal wetlands play a major role in alleviating air and water contamination problems, in that they effectively filter the water which passes through them, relieving it of most contaminants, and absorb excess nitrogen oxide and other gases and pollutants from the atmosphere.[3]

Coastal wetlands are in danger of permanent alteration and destruction, and wetland acreage has declined rapidly in recent years. Tangible threat exists from the draining and filling of these lands for the purpose of building waterfront residential housing and other construction. Threat also exists from the dredging of channels for navigation or to obtain landfill material, and from the

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[2]Eugene P. Odum, "The Role of Tidal Marshes in Estaurine Production," New York State Conservationist, 15:16 (June-July, 1961), p. 12.

[3]Personal correspondence, Norton Nickerson, Associate Professor of Biology, Tufts University, Boston Massachusetts, December 22, 1970.

building of bulkheads, canals, and piers, all of which alter the physical movement of the water and create sediment problems. Wetlands are often destroyed through their use as solid waste disposal areas, and are destroyed by sewage and other pollutants deposited in them. Sand and gravel, phosphate, and other forms of mining are often the cause of wetland destruction. In many areas import portions of the original wetland acreage has been significantly altered or even destroyed and lost.

Purpose

The purposes of this dissertation are:

1. Document the value of these coastal wetland areas and the threat seen for some;

2. Explore strengths and weaknesses of the efforts made to protect the values of these coastal wetland areas;

3. Recommend approaches for obtaining more desirable patterns of use of these coastal wetland areas.

Importance

Economic Values

Economic values of the wetlands include:

1. Provision of the food and total habitat of practically all the commercially valuable shellfish and crustacean species (hard and soft clams, bay scallops, oysters, blue crabs, mussels, shrimp);

2. Provision of nursery and breeding areas for over two-thirds of the commercially valuable oceanic fin fisheries;

3. Provision of extensive sport fishing and shellfishing recreational opportunity;

4. Provision of extensive sport and commercial hunting and trapping opportunity (waterfowl, muskrat, nutria, mink);

5. Provision of a wide variety of other forms of outdoor recreation (boating, swimming, etc.);

6. Protection of valuable coastal property from damage from storm tides, due to the absorption capacity of the wetland;

7. Control of sediment from adjacent uplands, which would otherwise create economic problems elsewhere.

Non-Economic Values

Non-economic values of the wetlands include:

1. Alleviation of water pollution by filtering and cleaning water which passes through it;

2. Alleviation of air pollution by absorbing gases and pollutants from the atmosphere into the vegetation;

3. Provision of the recreational opportunity to view shorebirds and other wildlife;

4. Provision of habitat for many interesting species of plant and animal life, both aquatic and terrestrial, in complex diversity.

Nature of the Problem

Coastal wetlands are being drained and filled, primarily to make them more attractice for sale as valuable waterfront and nearshore homesites, and also to enable these sites to be used for industrial development which is water-dependent. Shallow water wetland bottoms are also being dredged, both to provide material to fill in the

wetlands and to enhance navigational potential for recreational boating and commercial shipping. Furthermore, with open space for solid waste disposal often at a premium near population concentrations, valuable wetlands are often used for this purpose, thereby being destroyed or seriously altered. Numerous forms of water contamination, including oil spillage and human sewage, also damage or destroy wetlands.

Lack of Protective Devices

While a variety of approaches may be taken to protect wetlands, none has thus far proven to be an effective solution to the problem. Cooperative agreements between government levels have proven weak and are virtually ignored in those few areas where they exist. Floodplain and wetland zoning has not achieved wide acceptance among zoning boards. Regulation of wetland use through the police power of the state, generally requiring some type of permit application and hearings procedure, has been ineffectively administered in some areas, while under attack in the courts as an unconstitutional taking of private property in other areas.

Condemnation of land by eminent domain for the broad purpose of recreation or preservation is legal in most areas. Most political leaders are, however, exceedingly reluctant to use eminent domain for this purpose, for fear of continuing lawsuits and political repercussions.

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Purchase of easements or development rights to maintain wetlands in their natural conditon has been suggested but the concept is not widely understood, and such a purchase would in the coastal zone often be as expensive as direct acquisition in fee simple. There is no doubt that acquisition of wetlands in fee simple for the purpose of preservation is effective, but sufficient funds are often unavailable to achieve this end. This situation is further compounded by the fact that waterfront real estate, such as coastal wetlands, is often much more expensive than adjacent upland sites. Devices, therefore, exist, but have not to date been effective.

Scope

The scope of this dissertation is limited primarily by physical, institutional, and geographical parameters. However, since an acceptable definition of a coastal wetland or saltmarsh is difficult to develop and varies from place to place, it is therefore difficult to delimit precise dimensions of the study area.

Physically, the coastal wetlands include all of that area in the intertidal zone which supports certain kinds of plant and animal associations, most notably the Spartina alterniflora-Spartina patens association. The intertidal zone is defined as the area between mean (average) high tide and mean (average) low tide. However, the adjacent dry upland the adjacent submerged bay bottoms

must also be included to a greater or lesser degree, due to their immediate effect on the ecology of the intertidal zone.

Institutional dimensions involve all levels of government: federal, state, and local. Federal powers of acquisition for migratory bird conservation, outdoor recreation, preservation of endangered species, and other ecological purposes have resulted in protection of wetland acreage. State statutes to acquire wetlands and state police power to regulate its uses have also resulted in protection, as have numerous local ordinances, especially in the area of zoning. The breadth of institutional dimensions also includes the work of the federal, state, and local judiciary, insofar as this work has affected and effected protection of the coastal wetlands and, likewise, the work and influence of organized private conservation groups in this effort.

The overall geographical limit of this dissertation extends from Maine to Texas and, for the sake of clarity, the treatment generally proceeds in that north-south progression. However, particular emphasis is placed on the southern New England-mid-Atlantic wetlands from Massachusetts to New Jersey. The ecological descriptions of the early chapters, and the values mentioned, most ideally approximate these saltmarsh environments more than any others, and there is a decided emphasis, too, on the

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statutes and court cases of this area. The rationale for such an emphasis is threefold:

1. This area has extensive saltmarsh acreage of the most valuable kind;

2. It has suffered greater percentage losses of its coastal wetlands and is under greater threat for further loss than any other wetlands region;

3. It is the area of greatest and longest personal familiarity to the writer.

This dissertation does not treat the estuaries and wetlands of the Pacific Coast, in that wetland acreage is spatially very limited on that coastline and the environment and problems are rather different. Likewise, the vast wetlands of the Gulf Coast are not treated in as great a detail as those of the Atlantic, since the natural environment and the human threats to the integrity of that environment are somewhat removed from the Atlantic Coast situation. The dissertation study period ends in the Fall of 1972.

Method of Analysis

The method was to structure information obtained from the sources in terms of the questions posed by the three hypotheses. Most of this information was non-quantitative, while some was subjective. In situations when extreme preciseness was required, exact quotations from relevant sources were provided. In other instances, the judgment of the writer concerning relevance was the

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basis for the analytical interpretation. Interviews were conducted in an early stage of the research, but were random and did not follow a formal research style.

Hypotheses

This dissertation will utilize the following hypotheses as guides to the explorations in the areas discussed above.

Hypothesis One: Coastal wetlands are sufficiently valuable to justify preservation. In this context, valuable refers to both economic and non-economic values. Preservation, in this context, is interpreted to mean protection from deliberate human alteration.

Hypothesis Two: Coastal wetlands may be temporarily protected by a variety of legal tools. By temporarily protected in this context is meant a "holding action" until more permanent action leading to a more permanent solution is accomplished. By legal tools is meant the techniques, such as easements, zoning and permit requirements, which may be used to prevent the wetland from being altered or destroyed.

Hypothesis Three: Coastal wetlands will only be effectively preserved through public or private acquisition for this purpose. By "effectively preserved" in this context is meant legally protected from any man-induced alteration or destruction.

Organization

The approach of this disseration is to:

1. define and delimit tidal saltmarsh, and describe its botanical, zoological, geological, and ecological characteristics, and illustrate the difficulty of clearly defining the study area;

2. present some of the economic problems associated with wetlands protection, including the various man-caused threats to its natural integrity and the methods of economically evaluating the worth of wetlands and their associated resources;

3. describe the legal foundation for federal, state, and local jurisprudence in the protection of wetlands, problems of jurisdiction and ownership, and rights to usage, and analyze a selected number of state wetlands statutes;

4. discuss and analyze selected examples of litigation and judicial decisions in the wetlands area, and provide insight into the basis of decisions rendered; and

5. denote methods of accomplishing the toal of wetlands preservation and protection, through the use of zoning, easements, philanthropy, regional planning, regulatory authority, preferential tax assessment, and especially through acquisition in fee simple.

CHAPTER II

THE SALTMARSH IN PERSPECTIVE

The late Professor Paul Errington, a man whose whole philosophy of life and career was formed in, on, and of the fresh marshes of South Dakota and Iowa, once remarked

> . . . while exploitative forms of marsh use such as hunting and trapping are justifiable as long as they are decently done and limited to reasonable use of renewable natural resources, they should not be overemphasized. Non exploitative enjoyments of the marsh itself are those deserving of being called the 'higher use.' They are among those best adapted to year-round use and even to mass use, if it comes to that, in settled communities.[1]

He goes on to say how exploitative uses often have a way of leading to public pressure for the clearing, filling, channeling, or other destruction of the marsh.

Errington of the Midwest was to the fresh marsh what Teal of New England is to the saltmarsh--both men good scientists and ecologists as well as potent philosophical and romantic writers who have done much to promote their mutual though separate and distinct cause of marsh preservation. It is from these two men that much of the attitude and philosophy toward the world of the saltmarsh

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[1]Paul L. Errington, Of Men and Marshes (New York: Macmillan, 1957), p. 135.

and its protection, as evidenced in this dissertation, has been nurtured and advanced.

The Nature of the Tidal Saltmarsh

The nature of, and the natural, economic, and social values of tidal saltmarsh present an interesting paradox. The former, the exact nature of the environment, though well documented, is a subject of great disputation and disagreement, being at the root of many of the problems concerning preservation and protection of this environment. The values of the environment, on the other hand, are so obvious, so well known, so well documented, as to make this section of the work indeed the easiest to both present and defend. Hence, it can be shown to almost anyone that the saltmarsh ecosystem is well worth the effort to preserve and is even of national significance, thus justifying federal interest and efforts. However, it is a much more difficult task to adequately (and especially legally) define what it is that constitutes the saltmarsh, and just what is to be included in its boundaries. There is obvious danger in too narrow a definition, for such would leave much valuable saltmarsh unprotected, while the courts have already shown the danger of too broad a definition, continually declaring that such overly broad definitions

lead to an unjustified taking, and thus are unconstitutional.[2]

In this dissertation, the intention is to treat only tidal saltmarsh, also known as coastal saltmarsh, saltgrass, coastal wetlands, estuarine marsh, etc., and avoid inland freshwater marshes and wetlands, the nation's most notable being the prairie wetlands of the pothole region in Minnesota, Iowa, and the Dakotas. (Based on personal knowledge and visits to the area, the St. Clair Flats and Harsen's Islands in the estuary at the mouth of the St. Clair River, St. Clair County, Michigan, can be in this coastal wetland category. It is Michigan's only true coastal embayed estuary, though not saltmarsh in the most technical sense.) It is a further purpose to deal essentially with the coastal saltmarsh estuaries of the Atlantic and Gulf coasts, placing emphasis on the southern New England shoreline from Cape Cod, Massachusetts, to New Jersey. This immediate area was chosen for special emphasis because:

--it had quite extensive natural saltmarsh prior to settlement;

--much of this natural saltmarsh has been lost to settlement and, as these wetlands have diminished, their value, and the challenge, have

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[2]This point is obvious in Maine v. Johnson, 265 A.2d 711 (1968), and in other cases cited in this dissertation.

become greater both to those who would preserve them and to those who would alter or destroy them (vulnerability is thus related to value, although the values to different interests are often not comparable since wetlands are not suitable for many human uses and efforts to make them suitable frequently represent losses rather than gains of human and natural resources); and

--finally, because the author is more familiar with this geographical subdivision of the nation's coastline than any other, having spent the better part of his life in the area.

Legal Definition

Definitions of coastal wetlands or tidal saltmarsh are about as variable as there are different kinds of wetlands and saltmarsh, and legal definitions are as variable as men's philosophy of government, ranging from the society-favored laws of the Commonwealth of Massachusetts to the more private landowner-oriented statutes of Georgia. Some common legal definitions might be expressed as follows:[3]

Maryland:

> . . . areas on which standing water, seasonal or permanent, has a depth of six feet or less, and where the soil retains sufficient moisture to support aquatic or semi-aquatic plant life.

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[3]Marvin L. Wass and Thomas D. Wright, Coastal Wetlands of Virginia (Gloucester Point: Virginia Institute of Marine Science, 1969), p. 4.

Massachusetts:

> . . . the term 'coastal wetlands' shall mean any bank, marsh, swamp, meadow, flat or other lowland subject to tidal action or coastal storm flowage and the such contiguous land as the Commissioner of Natural Resources reasonably deems necessary to affect by any such order in carrying out the purposes of this section.

Rhode Island:

> A coastal wetland shall mean any saltmarsh bordering on the tidal waters of this state whether or not the tidewaters reach the littoral areas through natural or artificial watercourses, and such uplands contiguous thereto, but extending no more than fifty yards inland therefrom, as the Director of Natural Resources shall deem reasonable necessary to protect such saltmarshes . . . . Saltmarshes shall include those areas upon which grow some, but not necessarily all, of the following: [with nineteen species named].

Connecticut:

> . . . those areas which border on or lie beneath tidal waters, such as, but not limited to, banks, bogs, saltmarsh, swamps, meadows, flats, or other lowlands subject to tidal actions, including those areas now or formerly connected to tidal waters and whose surface is at or below an elevation of one foot above local extreme high water and upon which may grow or be capable of growing specific species of plants: [with nineteen species named].

The Maryland definition is a very unsatisfactory definition which fails to recognize all-important vegetative parameters, and also fails to differentiate between fresh and saline wetlands, a most necessary legal division. The Massachusetts definition is also weak in that it lacks vegetative parameters, but it shows strength in recognizing the value of contiguous upland and submerged lands to maintaining the marsh ecosystem. In fact, it has served

as a model for Connecticut, New Jersey, and other states. In the Rhode Island definition, vegetation is recognized as a parameter, but there is a specific deterrent to coverage greater than fifty yards from the wetland margin, regardless of value. This is illogical, since the salt-marsh vegetation may extend beyond fifty yards. The choice of fifty yards is arbitrary and without scientific validity. The Connecticut definition is patterned after those of her neighbors to the east and north, and includes their best points, while deleting their faulty ones, such as arbitrary measurements and lack of vegetative paramters.

Many ecologists have advised lawmakers to draw up a definition which includes all the area between mean higher high water and mean lower low water so as to include the mudflats and beaches as well as the typical saltmarsh. Such a law would be more inclusive in the South Atlantic coastal marshes such as those of Georgia where mudflats prevail, and does have the advantage of being a legally easy way to deal with numerical tideline definitions. However, while not totally discounting the value of such a precise definition, the writer feels very strongly that emphasis must be placed on species identification as the most important single aspect of the law, since there is sufficient consistency in species occurrence to accent this definition.

Wass and Wright[4] maintain that precise marsh border limits would require surveying to determine the extreme tidal range but that the upper limit (assuming it is undisturbed, which it often is not) can be determined on the basis of vegetation, denoting the presence of acceptable marsh genera and species (which does change over broad areas and regions, though not so drastically as to make such a law unworkable). They also recommend that contiguous areas are ". . . necessary to the stability of the wetlands and the security of their biota," a point with which the author agrees. Otherwise, wooded "islands" or hummocks in the midst of marshes could not be protected, and the development or encroachment on these often leads to the destruction of the whole marsh. Thus, a more complete definition would be: all the area within the extreme tidal range and those contiguous areas, both highland and subaqueous, which are deemed necessary to the stability of the wetland or saltmarsh community. Such contiguous areas would have to, of course, be determined on the basis of vegetation.

The states of Maine, New Hampshire, Massachusetts, Delaware, Maryland, Virginia, and Georgia claim title to submerged lands only up to the mean low tide line. Other eastern coastal states claim full title to such lands up to the mean high tide line.

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[4] Ibid., p. 5.

The writer would like to return in a later chapter to a much more complete discussion of this question of ownership and rights in the tidelands, but has delved lightly into the subject at this point to show the reader the necessarily close theoretical relationship between the nature of the environment and the nature of the laws needed to protect it. There are at present numerous definitions of coastal saltmarsh wetlands, most of them quite vague and general, many of them totally useless and often unenforceable, sometimes unacceptable to the courts. The recent bill in the Mississippi Legislature, though good in theory, is a prime example of these weak bills and laws. It defines coastal wetlands or tidal wetlands as

> . . . those state-owned areas under tidewater, including spaces between ordinary high and low water marks, such as but not limited to banks, bogs, saltmarsh, swamps, meadows, flats, or other lowlands subject to tidal action.[5]

On the surface this is not a bad definition even though it does not include vegetative parameters, for it is all-encompassing in the intertidal zone. However, what it does not tell the reader is that most such areas have been transferred by the state to recognized private ownership down through the years, and that the state today lays claim to little tidal wetlands, while the bill protects only such public tidal wetland.

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[5]Mississippi, House of Representatives, Committee Substitute for House Bill No. 467--Wetlands Bill (Jackson: Mississippi Legislature, 1972), p. 2.

On the other hand, one of the most comprehensive legal wetlands definitions is that of New Jersey, which begins:

> The estuarine zone is composed of bays, harbors, lagoons, channels, inlets, barrier beachers, sounds, estuaries, wetlands, tidal marsh, submerged lands, riparian, tidal portions of many freshwater streams and tributaries, and coastal and intertidal areas. . . .[6]

These phrases are followed by a very clearly presented total biological, physical, and geological description of the zone covered in the act, encompassing not less than 5,900 words of text on definition alone. This is easily the most complete and enforceable (from a legal viewpoint) wetlands law in the United States, and it is being followed by highly detailed maps of the state's estuaries and wetlands which fit within the broad yet quite specific definition put forth in this law.

Natural Definition

Coastal wetlands might be thought of as "treacherous bogs infested with mosquitos," an "evil-smelling eyesore,"[7] or perhaps a piece of real estate of great potential value if developed, or as a haven for waterfowl and other

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[6]New Jersey, Department of Environmental Protection, New Jersey Wetlands Order: Basis and Background (Trenton: Department of Environmental Protection, 1972), pp. 1-6.

[7]George C. Matthiessen, Tidemarshes: A Vanishing Resource (Mystic: Connecticut Conservation Association, 1969), p. 2.

wildlife, or perhaps as an obstacle to boating and access to the sea. Perhaps one of the better broad definitions, however, is

> . . . any of the protected coastal areas where there is a mixing of salt and fresh waters, including all of the tidal rivers, marshes, tideflats, lagoons, bays and shallow sounds . . .

as expressed by the Connecticut Conservation Association.[8] To this should be added: generally treeless, and covered with grass or grass-like and sedge-like vegetation and/or marine algae; areas of very high biological productivity, and great diversity of life. Estuaries are interface zones between fresh and saline waters, and thus act as an effective nutrient trap, receiving nutrient input from both terrestrial run-off and from the highly productive shallow ocean waters. A unique feature of the tidemarsh ecosystem is that most nutrient material is not lost, but is retained within the system, and is continually distributed by tidal ebb and flow (or tidal flush). Like most environmental interfaces or transition zones, wetlands are thus in themselves highly productive. Diverse, productive, dynamic are perhaps the best three words used to describe this environment: all three may be used in the superlative, and all three contribute to the problem of both developing and preserving the environment. Shaw and Fredine in their now outdated but still useful work classify wetlands as

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[8] Connecticut Conservation Association, "Connecticut Coastal Wetlands Crises," Connecticut Conservation Reporter, Vol. 2, No. 4 (1968), p. 1.

"ecologically the most densely populated biotic community on the face of this planet,"[9] and Allee and Schmidt claim they are so biologically rich because ". . . in topographic succession they represent a transitional stage between open water and dry land."[10]

Unfortunately for the cause of wetlands preservation, many people believe these environments to be at the least foul-smelling undesirable places with a negative value and, much worse, a source of physical harm to man by supporting populations of malaria-carrying mosquitos and growths of poisonous fungi and bacteria. However, since saltmarsh is by definition covered with intermittent and free-flowing water and since such waters cannot support these menaces, such saltmarsh more than likely presents no harm to man in any real form.

Thomas L. Linton in his article describing South Atlantic and Gulf Coast marshes and estuaries characterizes the salt marsh and barrier island complex of this coastline by the following natural parameters:[11]

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[9] Samuel P. Shaw and C. Gordon Fredine, Wetlands of the United States (Washington: U.S. Government Printing Office, 1956), p. 3.

[10] W. C. Allee and Karl C. Schmidt, Ecological Animal Geography (New York: John Wiley and Sons, Inc., 1937), p. 570.

[11] T. L. Linton, "A Description of the South Atlantic and Gulf Coast Marshes and Estuaries," in Proceedings of the Marsh and Estuary Management Symposium (Baton Rouge: Louisiana State University, 1967), p. 3.

saltmarshes:

--wide expanses of shallow open water

--large sounds

--fairly straight channels in marshes

--low tidal amplitude (approximately three feet)

--low turbidity

--aquatic vegetation present

--marsh cord grass (Spartina species) dominant.

barrier islands:

--long narrow barrier islands

--washing over can occur, with subsequent breaks through the barrier island

--long straight ocean-fronted islands

--high coastal energy

--very little indentation on the ocean side

--coarse-grained beach sand.

Although this delineation specifically refers to that coastal area from Cape Hatteras to the Rio Grande, it can be largely expanded to include much of the region to the north up to and including the New Hampshire coastline. However, the tidal range increases somewhat the farther north one proceeds.

Pritchard defines an estuary as

> . . . a semi-enclosed coastal body of water which has a free connection with the open ocean and within which sea water is measurably diluted with fresh-water derived from land drainage.[12]

Butman of the Massachusetts Institute of Technology further refines this to

> . . . mixing zones where fresh water containing one part per thousand or less of dissolved salts gradually mixes with sea water containing 35 parts per thousand dissolved salts . . . [13]

and recognizes three characteristic parameters of an estuary: the shape of the estuary, the water of the estuary, and the circulation in the estuary.

Geologically, marsh is a transitory feature, and will eventually transform into upland; it is kind of an intertidal plateau of silt and sand, covered with vegetation and regularly flooded by the tides. Its landscape appearance is that of a meadow. Two species of Spartina grasses predominate: Spartina alterniflora (cordgrass) and Spartina patens (marsh hay). Zonation between these two species is caused by dryness, and hence elevation above sea level. Tall cordgrass grows in the wetter low

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[12] D. W. Pritchard, "What Is an Estuary: Physical Viewpoint," in Estuaries, ed. by George Lauff, American Association for the Advancement of Science, Publication No. 83 (Baltimore: Horn-Schafer Co., 1967), p. 3.

[13] Bradford Butman, "Land Use--Estuarine Interactions: Some Considerations," in Papers on National Land Use Policy Issues (Washington: U.S. Senate, 1971), p. 163.

marsh, while the shorter marsh hay grows in the upper part of the marsh that is less often innundated by the sea.

Productivity and Natural Characteristics of Tidal Saltmarshes

Primary production of a marsh is mainly accomplished by the marsh grasses, with secondary importance given to algae and phytoplankton. Salt marsh production is utilized in two ways:[14]

1. direct consumption of fresh plant material by herbivores and plant parasites--5% of total crop;
2. detritus feeders (crabs, snails, mollusks, worms) who utilize the material after it has been broken down by bacteria and fungi --95% of total crop.

In terms of overall environmental productivity in grams of organic material produced per square meter per year,[15] marshes produce 2,000, while other production rates are considerably lower:

ocean over continental shelf	300
open ocean	100
wheat (world average)	340
wheat (maximum yield)	1,400

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[14] B. W. Tripp, "The Ecological Importance of a Saltmarsh," in Papers on National Land Use Policy Issues (Washington: U.S. Senate, 1971), p. 170.

[15] Ibid., p. 171.

Regarding detritus, Tripp says it is

> . . . critical to the estuarine ecosystem because it is the main pathway by which energy flows from plant producers to animal consumers. It serves to store the energy for later use, to transport it to less rich areas of the system and as a buffer mechanism against lean periods. The marsh exports 45% of its net production, and most of this is transported in the form of detritus.[16]

Tripp summarizes the causes of this high marsh productivity as:

1. the ebb and flow of tidal action which serves to transport nutrients;
2. an abundant supply of nutrients;
3. rapid regeneration and conservation of nutrients due to the activities of micro-organisms and filter feeders;
4. three types of primary producers (marsh grass, mud algae, phytoplankton) that insure maximum utilization of sunlight in all seasons;
5. constant year-round production of plant material (with mud algae and phytoplankton producing all year, and grass producing in the growing season).

Tripp contends that virtually all human use and influence of and over the saltmarsh, except deliberate protection in the natural state, reduces energy production in the marsh in one or more ways:[17]

1. modification of river influx, resulting in salinity changes;
2. organic enrichment;
3. addition of heated waters from power plants;

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[16] Ibid., p. 172.

[17] Ibid., p. 173.

4. alteration of the drainage system; and

5. addition of noxious compounds (industrial wastes, pesticides, oil).

In the Long Island, New York, natural saltmarsh, Spartina alterniflora or saltmarsh grass constitutes a largely pure stand below mean high tide, while the area immediately above this line is generally dominated by Spartina patens (saltmeadow grass), Distichlis spicata (spike grass), or a mixture of the two. Other species, such as Salicornia species (saltwort), Phragmites species (reed), Typha species (cattails), and Iva species (marsh elder) are secondary and appear at higher topographic levels. The common reed, Phragmites communis, dominates artificial spoil banks above mean high tide, and areas having a limited influx of salt water.[18]

The terrestrial animal scene is dominated by a number of common invertebrates, notably fiddler crabs (Uca pugilator and Uca pugnax), mud snails (Nassarius obsoletus), salt grass snails (Melampus bidentatus), and ribbed mussels (Modiolus modiolus and Modiolus demissus).[19]

Since Spartina alterniflora is restricted to areas below mean high tide, its areal cover is a good measure of which marsh areas are submerged in an average high

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[18]Joel S. O'Connor and Orville Terry, The Marine Wetlands of Nassau and Suffolk Counties, New York (Stony Brook, N.Y.: Marine Sciences Research Center, 1972), p. 4.

[19]Ibid., p. 4.

tide, and O'Connor and Terry corroborate the writer's experience that

> Coverage by Phragmites communis is presumptive evidence that the area has either been built up above mean high tide level with dredged bottom sediments or the area has very limited sources of salt water.[20]

O'Connor and Terry credit tide levels, water table, drainage, degree of soil aeration, and salinity of the soil water as being the main determinative factors of saltmarsh vegetation type, and bring together the relationship between ecology and jurisprudence in citing the recent case of Dolphin Lane Associates, Ltd. v. Town of Southampton, Trustees of the Freeholders and Commonalty of the Town of Southampton (before the Suffolk County Supreme Court, December 29, 1971), in which

> . . . the boundary between Spartina alterniflora and Spartina patens has recently been accepted as a legal definition of the mean high tide line for purposes of demarcating wetland ownership boundaries in the Town of Southampton.[21]

Hence, a knowledge of Spartina alterniflora presence and areal coverage of particular marshes may be of great value in managing and protecting saltmarsh. This case has resulted in a probable landmark decision, and will thus be treated in some detail in later chapters.

O'Connor and Terry have developed an important table depicting coverage by dominant vegetative types in

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[20] Ibid., p. 7.

[21] Ibid., p. 18.

the marshes, and their associated estimates of net annual production as indicated in Table 1.

A discussion of the nature of the saltmarsh would not be complete without reference to the very recent and popular work by John and Mildred Teal entitled Life and Death of a Saltmarsh and, while much is to be found in this work which further supports and adds to many aspects of this dissertation, one of the most important is Teal's chapter on "The Dominant Spartinas." These two marsh grasses, Spartina alterniflora or cord grass in the lower wetter marsh, and frequently wind-swirled Spartina patens or salt hay in the upper drier marsh are not only the dominant vegetation form in the marsh ecosystem and a key to

TABLE 1.--Long Island, New York, Saltmarsh Vegetative Coverage and Net Annual Production.

Species	% Area	Acres	Tons/Acre (Dry Matter)	Est. Net Annual Production (Tons)
Spartina alterniflora (tall form)	14	3,100	3.7	11,000
Spartina alterniflora (short form)	45	10,000	2.3	23,000
Spartina patens	16	3,600	2.2	7,900
Distichlis spicata	7	1,600	2.9	4,600
Phragmites communis	9	2,100	5.1	11,000
Baccharis halmifolia	2	360	--	--
Salicornia species	0.3	74	--	--
Typha species	0.3	57	--	--
Juncus gerardii	0.1	23	--	--

Source: J. S. O'Connor and Orville Terry, The Marine Wetlands of Nassau and Suffolk Counties, New York (Stony Brook, N.Y.: Marine Sciences Research Center, 1972), p. 15.

the understanding of the biological nature of this habitat but are becoming more and more a part of the legal definition of what is or is not a saltmarsh, and what is or is not worth ecologically and/or legally setting aside. On Long Island, for example, the courts are now readily accepting the presence of either one of these species as justification for preservation as valuable wetland, whereas the presence of the common reed (Phragmites communis), being indicative in some places of an already altered or ecologically destroyed marsh community, almost insures that no preservation effort will stand in court, all other things being equal.[22] Indeed, the terms "Spartina" and "Phragmites" are coming into such common parlance among lawyers, planners, newspaper writers, and laymen as well as biologists on Long Island and in southern New England and New Jersey that they are rapidly becoming the common as well as Latin or scientific names of the species. Teal comments:

> Out of the thousands of species of land plants in North America, only two species of grass, Spartina alterniflora and Spartina patens, thrive on this rigorous salty regime and dominate the marshes of the East Coast. They rule the marsh through sheer tonnage produced and space occupied. The rest of

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[22]The decision rendered by Judge Geiler in the case of Dolphin Lane Associates, Ltd., v. Town of Southampton (Suffolk County Supreme Ct. No. 73873/68, 1972) illustrates this acceptance.

> marsh plants are like so many relatives attached to a strong household, of some importance in the social setup but of none in the chain of command.[23]

Cronin provided a definition of salt marshlands from a biological perspective when he characterized them as

> . . . organic factories, traps for sediments, reservoirs for nutrients and other chemicals, and the productive and essential habitat for a large number of invertebrates, fish, reptiles, birds and mammals.[24]

In summary, tidal marshes are landforms resulting from the invasion of shallow water by land vegetation, and there is a change in the kind, abundance, and size of vegetation, depending on a combination of a few critical environmental factors, such as air and water temperatures, salinity of the water, duration of inundation (exceedingly important), salinity of the ground water, level of the water table, and the tidal range. It is possible to differentiate between "low marsh" and "high marsh" in terms of elevation.

Low marsh may be characterized by:

--cordgrass, saltmeadow hay, spikegrass, black rush

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[23]John Teal and Mildred Teal, Life and Death of the Salt Marsh (New York: Audubon-Ballantine Books, 1969), p. 84.

[24]L. Eugene Cronin and A. J. Mansueti, "The Biology of the Estuary," in A Symposium on the Biological Significance of Estuaries (Washington: Sport Fishing Institute, 1971), p. 105.

[25]Carl N. Schuster, "The Nature of a Tidal Marsh," New York State Conservationist, 21(1): 22-29, 36, 1966, p. 24.

--Spartina alterniflora (cordgrass) borders all salt watercourses and covers the low marsh

--depressions or saltpans are devoid of vegetation, except for glasswort (Salicornia europaea).

High marsh may be characterized by:

--Spartina patens (saltmeadow hay) dominant

--spikegrass, sea lavender, black rush

--upland fringe of sea myrtle, seaside goldenrod, bulrushes, marsh elder

--freshwater margin of cattails and, in disturbed areas, tall reeds (Phragmites communis).

Phytoplankton and red and green algae are found in both low and high marsh.

The marsh ecosystem has all the physical and geological cycles which most other environments have, plus the tidal cycle four times daily. The tides redistribute nutrients and sediments throughout the tidal marsh complex, and affect primary productivity by decreasing or increasing exposure of the mud algae and marsh plants. Another environmental aspect to be considered is that the large ratio of surface area to water area not only favors primary (vegetative) productivity, but it also provides a large, greatly divided, sheltered, food-rich habitat which is a nursery area for many species of crustaceans and fish. Noting this nursery factor as one value among many, the following sections will treat some of the many values

associated with naturally-occurring marine saltmarsh, values which make this kind of environment worth the effort of expense and preservation.

Natural Values of Saltmarsh

The values of temperate zone coastal wetlands are great and varied, and also well documented. They may be considered to have major biological, physical, and direct human values.

Biological Values

The inherently great biological productivity of these wetlands has already been alluded to. It is an accepted fact that, while terrestrial deserts and ocean depths (both low productivity zones) produce hundreds of pounds of organic matter (dry equivalent) per acre per year, and while grasslands, forests, and typical farmlands (medium productivity zones) produce thousands of pounds per acre per year, estuaries and deltas (high productivity zones) produce tens of thousands of pounds per acre per year, with the richest coastal marshes producing many tons more per acre per year.[26] Estuarine lands provide both the food and the total habitat of practically all of our commercially valuable shellfish species (hard and soft clams, bay scallops, oysters, blue crabs, mussels, etc.), and fully support the spawning and immature populations of

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[26]Connecticut Conservation Association, loc. cit.

probably three-fourths of our commercially valuable oceanic finfish species (which, in the Northeast, totals about 75 species).[27] Perhaps a little over half of all fish eggs hatch at sea, with the young quickly swimming into the estuaries for shelter and protection during growth, while the remainder hatch in the estuaries themselves. Without the protection of estuaries, these species would be rapidly devoured by predatory species at sea (including predatory pelagic birds). It is estimated by the Sport Fishing Institute that Atlantic Coast commercial fleets net over one billion pounds of estuarine dependent fish worth over $75 million annually. Annual shellfish harvests are sometimes worth as much as $26,850/acre on the market.[28] (It should be borne in mind, however, that even the professional biologist cannot state exactly how valuable a specific marsh area is in terms of its contribution to the fisheries in adjacent waters, due to the newness of tidelands ecology as a science, and due to the number of variables involved. We seem to learn of the losses more from hindsight after a given marsh is destroyed.) It is likely that the future contribution of tidal marshes to world food production will be substantial and likely to increase steadily in coming years.

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[27]Eugene P. Odum, "The Role of Tidal Marshes in Estuarine Production," New York State Conservationist, 15 (6) (June-July, 1961), p. 12.

[28]Connecticut Conservation Association, loc. cit.

The late Rachel Carson once wrote that the total value of the oyster, clam, scallop, and other mollusk resources is so great it has not yet been estimated and when the value of the shrimp, crab, and crawfish industries, even of the Gulf Coast of the United States alone, is added, an enormous figure is arrived at. The shrimp industry of Louisiana and Florida, and the crawfish industry of Louisiana, alone supply the world population, she reports, with a "tremendous amount of food."[29] All of these species are directly dependent on the maintenance of coastal wetlands in good ecological condition for their survival.

In testimony before the House Subcommittee on Fisheries and Wildlife Conservation in 1966, Dr. Stanley Cain, former Dean of the School of Natural Resources at the University of Michigan, and at that time Assistant Secretary of the Interior for Fish and Wildlife and Parks, remarked at length on the values of estuaries, and mentioned in particular the Sapelo marshes of Georgia which

> . . . produce nearly seven times as much organic matter per acre as the water of the Continental Shelf, twenty times as much as that of the deep sea, six times as much as that of the average wheat-producing lands. . . .[30]

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[29]Rachel L. Carson, Fishery Resources of Our Atlantic and Gulf Coasts (Washington: U.S. Government Printing Office, 1950), p. 2.

[30]U.S., Congress, House, Committee on Merchant Marine and Fisheries, Estuarine and Wetlands Legislation, Hearings, before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, 89th Congress, 2nd sess., 1966, p. 90.

The submitted statement of the Atlantic States Marine Fisheries Commission to these same hearings asserts that from 1900 to 1965, inclusive, there were no less than 5,470 technical papers, articles, and reports prepared dealing with the ecology of estuaries and coastal waters in the eastern United States alone, many of which assert the various values previously mentioned.

It was mentioned above that in the area of estuaries, as in so many other things, the true biological value of the resource is often learned after the resource has been destroyed. For this reason, included here from Dr. Cain's testimony in the 1967 estuarine hearings is an official U.S. Department of the Interior table indicating the state-by-state rate of loss of important fish and wildlife estuarine habitat, as determined by Interior Department biologists, and as reflected in loss of finfish, shellfish, waterfowl, and other wildlife production. While the problems of loss will not be treated until a later chapter, this table (Table 2) is presented at this point to show again that these estuaries do have an established biological production value and that biologists are able to determine relative proportions of values. Dr. Cain later provides a list of the main species affected by this habitat loss, and interestingly notes that the affected species are those of the very highest dollar value.

TABLE 2.--Loss of Important Fish and Wildlife Estuarine Habitat, by State, 1967 (in acres).

State	Total Area	Basic Area of Important Habitat	Area of Basic Habitat Lost by Dredging and Filling	% Loss of Habitat
Alabama	530,000	132,800	2,000	1.5
Alaska	11,022,800	573,800	1,100	.2
California	552,100	381,900	255,800	67.0
Connecticut	31,600	20,300	2,100	10.3
Delaware	395,500	152,400	8,500	5.6
Florida	1,051,200	796,200	59,700	7.5
Georgia	170,800	125,000	800	.6
Louisiana	3,545,100	2,076,900	65,400	3.1
Maine	39,400	15,300	1,000	6.5
Maryland	1,406,100	376,300	1,000	.3
Massachusetts	207,000	31,000	2,000	6.5
Michigan	151,700	151,700	3,500	2.3
Mississippi	251,200	76,300	1,700	2.2
New Hampshire	12,400	10,000	1,000	10.0
New Jersey	778,400	411,300	53,900	13.1
New York	376,600	132,500	19,800	15.0
New York-Great Lakes	48,900	48,900	6,000	1.2
North Carolina	2,206,600	793,700	8,000	1.0
Ohio	37,200	37,200	100	.3
Oregon	57,600	20,200	700	3.5
Pennsylvania	5,000	5,000	100	2.0
Rhode Island	94,700	14,700	900	6.1
South Carolina	427,900	269,400	4,300	1.6
Texas	1,344,000	828,100	68,100	8.2
Virginia	1,670,000	428,100	2,400	.6
Washington	193,800	95,500	4,300	4.5
Wisconsin	10,600	10,600	0	0
Total	26,618,200	7,988,100	568,800	7.1

Source: U.S., Congress, House, Committee on Merchant Marine and Fisheries, Estuarine and Wetlands Legislation, Hearings, before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, 89th Congress, 2nd sess., 1966, p. 90.

In the summer of 1967, evidence of Gulf Coast interest in wetlands problems emerged with the Marsh and Estuary Management Symposium at Lousiana State University, a symposium which saw speaker after speaker present and very adequately demonstrate the values of Atlantic and Gulf Coast estuaries to the fisheries, to waterfowl, to the fur industry, and to aquaculture. At this symposium, special emphasis was placed on the value of these environments to waterfowl of all types, and the revenue that the sport hunting of these birds brings to the region. John Lynch in his speech on values of the marshes to waterfowl stresses the difference between marsh habitats which have utility for waterfowl and those with real value, providing the example of the "head-of-tide" marsh of the South Atlantic Coast which winters 50,000 greater snow geese, while the corresponding marsh type along the Gulf Coast winters almost 500,000 blue geese. He says,

> If these two marshes were to be appraised solely on the basis of the number of waterfowl served, quite obviously the Gulf marsh would be said to have the greater waterfowl utility. But the South Atlantic marsh habors the entire North American population each winter, of a nonabundant goose that has failed thusfar to demonstrate great adaptability, whereas the blue goose has a large vigorous population that exhibits a remarkable ambivalence towards the Gulf marsh and a growing capability for exploiting new winter habitats. In the light of these circumstances, a tangible and perhaps critical value is apparent in the former case. In summary, the capability of an environment to attract waterfowl may reflect its actual,

> or at least potential, utility for waterfowl. But the capabilities of ducks and geese for getting along without that environment might well be a better index of its true value to waterfowl.[31]

Numerous other writers have taken care not to neglect the values of such environments to aesthetically pleasing and interesting varieties of non-game marsh bird species like the numerous wading egrets and herons, cranes, rails, and shore birds like gulls and terns. A number of these species are among the most beautiful members of the bird family, and are of especially great interest to ornithologists.

A recent report on waterfowl has described the bays and salt marshes of Long Island's south shore as ". . . the most important coastal waterfowl area in the North Atlantic states."[32] These marshes provide both resting and breeding opportunity to most of the important species in the Atlantic Flyway.

James Sykes, prominent marine biologist and Director of the Bureau of Commercial Fisheries Biological Laboratory in St. Petersburg Beach, Florida, remarked at the same

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[31]John J. Lynch, "Values of the South Atlantic and Gulf Coast Marshes and Estuaries to Waterfowl," in Proceedings of the Marsh and Estuary Management Symposium (Baton Rouge: Louisiana State University, 1967), p. 61.

[32]U.S., Department of the Interior, Progress Report on Waterfowl Resources of the Great South Bay Region, Progress Report of the Bureau of Sport Fisheries and Wildlife, Division of River Basin Studies, Boston, Massachusetts, to District Engineer, New York District, Army Corps of Engineers, 1969, p. 2.

Louisiana symposium that the great source of protein in the future will not be from the land or the deep sea but from the seaward side of the land-sea interface, and that the estuary is ". . . more controllable or 'farmable' than the deeper environment,"[33] and that technical capability for oceanic food production can best be achieved by shifting effort progressively from the coastal to the deeper zones. It thus goes without saying, then, that with physical and/or ecological destruction of estuaries and wetlands this option is lost. Dr. Sykes hints at the actual and potential values of estuaries for mariculture, a topic which will be discussed at greater length later in this dissertation.

Finally, as one might expect at a Louisiana estuary symposium, the very obvious values of such habitats to the extremely lucrative shrimp, oyster, and fur (muskrat and nutria) industries were detailed at length. These habitats provide all the necessary life needs of oysters and commercially important fur bearers, and the food and certain other needs of both pink and white shrimp.

Taormina reports that the value of Spartina marshes as basic food-producing areas is greater than the value of the finest wheat or rice producing areas in the

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[33]James E. Sykes, "Commercial Values of Estuarine-Generated Fisheries on the South Atlantic and Gulf of Mexico Coasts," in Proceedings of the Marsh and Estuary Management Symposium (Baton Rouge: Louisiana State University, 1967), p. 75.

world--at least one thousand dollars per acre. The value of bay bottom for the production of shellfish alone is phenomenal. He says,

> . . . vast areas of shallow bay bottom (2' to 12' in depth) produce at least 30 bushels of clams per acre per year. This amounts to one bushel from an area 48' by 30'. Considering an average price of clams to the digger of seven dollars per bushel, the value of such flats in annual yield is $210 an acre. However, this is a naturally renewable resource--a perpetual source of food as well as some recreation which costs nothing to produce. Therefore, the actual worth of such a resource is its capitalized value. At an acceptable net return of 5 per cent, an acre of bay bottom is worth $4,200 just for shellfish production alone.

He continues,

> . . . we may have shellfish-producing tidal flats worth at least $4,200 an acre being sold as 'cheap fill' to be dumped on marshes worth at least $1,000 per acre in order to develop housing sites or other 'improvements.' The wisdom of such use becomes even more questionable when it is recognized that such housing projects invariably require additional expenditure of public funds.[34]

In addition, he estimates waterfowl value to be $500 per acre or more on Long Island.

In a letter to the writer, Dr. Norton Nickerson, wetlands ecologist and Associate Professor of Biology at Tufts University in Boston, as well as Vice-President of the Massachusetts Association of Conservation Commissions, put forth a premise which has much bearing on the biological value of saltmarsh. Professor Nickerson is studying the role of marshes as dams to the movement of

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[34]Anthony Taormina, "The Natural Values of Marine Wetlands," New York State Conservationist, 21(6):7 (1967).

fresh groundwater seaward, and reports to the writer he has assembled evidence suggesting that ". . . all these anaerobic areas (marshes) are very important in denitrification, and hence they almost alone keep our ground water free of nitrates."[35] Man's polluting activities are adding significantly to and more than doubling the quantity of nitrogen oxides added to the earth's ecosystem each year, thus dangerously overloading the environment with nitrate pollutant, and he contends that the anaerobic bacteria living chiefly in wet anaerobic organic situations like wetlands convert dangerous nitrate and nitrite concentrations to harmless nitrogen gas. However, since the acreage of wetlands in his home state of Massachusetts has been halved in the last quarter century, the detoxifying bacterial populations in the remaining wetlands are being required to do four times as much nitrogen oxide conversion than would have occurred under prior conditions. Thus, wetlands are a vital link in clearing up water pollution caused by excess quantities of nitrogen oxides which have been released by man, and Professor Nickerson warns,

> If we persist in overloading one point of the nitrogen cycle while restricting the rate of conversion at another point, we simply put ourselves on a collision course, with forecastable and

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[35]Personal correspondence, Norton Nickerson, Associate Professor of Biology, Tufts University, Boston, Massachusetts, December 22, 1970.

> disastrous results, in which our water supplies will gradually become toxic through accumulation of oxides of nitrogen. Wetlands are thus not wastelands, but are instead essential ecosystems which perform unique chemical conversions upon which our very lives depend. . . .[36]

George Spinner recently reported that even the extensive mudflats associated with saltmarsh on the South Atlantic coast have high ecological value, and says that the marshes, flats, creeks, and bays must be viewed as one ecosystem or production unit, and management emphasis must be placed on utilization rather than on production (that is, on how the total environment is utilized by its resident and visiting species, and not on how much it produces in organic matter).[37]

Arthur Cooley, Chairman of the Brookhaven Town Natural Resources Committee on Long Island and a personal acquaintance of the writer, testified at the 1967 Congressional Committee hearings on Estuarine Areas and reminded the Committee that many more species of fish are now acquiring commercial status as a result of fish protein concentrate (FPC) technology and recent Food and Drug Administration rulings making FPC available for human consumption, and that a majority of these species are estuarine dependent. He states,

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[36] Ibid.

[37] George P. Spinner and Helen Bird, "Salt Marsh Values, Duval-Nassau Counties, Florida, Area," Jacksonville, Florida, n.d., p. 3. (Mimeographed.)

> Since this recent ruling, it is important to reevaluate what fishes now are important as a source of fish protein. It would certainly be unwise to destroy breeding grounds or nurseries of what may very well become a valuable fish protein source.[38]

In Professor Garrett Power's lengthy report, Chesapeake Bay in Legal Perspective, some attention is given to the very important and totally estuarine-dependent blue crab resource in the bay, one of the most economically valuable natural resources of Maryland and Virginia, and also on oyster, clam, and a number of finfish species, all important in the Maryland-Virginia economy and all dependent on the ecological health of the estuary and the marine littoral.[39]

Relating somewhat to Professor Nickerson's ideas, Professor Richard Hull of the University of Rhode Island predicated in a recent article that one biological function of a salt marsh might be the filtering of fresh water, removing land-derived nutrients and some organic materials. The grasses absorb nutrients from water, binding them into organic structures, and in this way undesirable algal blooms associated with nutrient-rich waters are avoided or

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[38]U.S., Congress, House, Committee on Merchant Marine and Fisheries, Estuarine Areas, Hearings, before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, 90th Congress, 1st sess., 1967, p. 468.

[39]Garrett Power, Chesapeake Bay in Legal Perspective (Washington: U.S. Department of the Interior, Federal Water Pollution Control Administration, 1970), pp. 214-17.

reduced. The trapping and slow release of nutrients may be one of the essential roles played by salt marshes, and thus any practice interfering with this process would result in increased pollution of surrounding waters. Hull contends that

> Ditching for mosquito control, filling and dredging all reduce the efficiency of the saltmarsh as a biological filtering system of fresh-water and a year-round source of nutrients for marine life . . .[40]

and he further suggests that coastal saltmarshes might be playing a major role in ameliorating air pollution, due to the ability of marsh grasses to trap unused carbon dioxide, and to some extent nitrogen and sulfur oxides, in the atmosphere. When one realizes that such wetlands constitute the largest tracts of terrestrial open space in the great metropolitan areas of the Northeast and elsewhere, it is easy to see that this may very well be a significant natural value indeed, even if the conversion efficiency of the grasses in question should be found to be low. Dr. Hull did find in his studies that a mixed stand of saltwater cordgrass (Spartina alterniflora) and saltwort (Salicornia europaea) at Jerusalem, Rhode Island, ". . . was more efficient at fixing atmospheric carbon dioxide than a field of most agricultural crops." If the grasses are proven highly efficient in the conversion process, the saltmarsh could be regarded among the most

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[40]Richard J. Hull, "A Biologist's View on Salt Marshes," Rhode Island Resources (November, 1970), p. 5.

efficient solar energy converting systems on earth, and, Hull says, "Whether this is viewed as an air cleaning process or as an energy source for marine animals becomes irrelevant" since "We would know it cannot be replaced by a more efficient natural system."

Dr. John Clark of the Sandy Hook Marine Laboratory in New Jersey in one of his many statements on the biological value of estuaries has stated the case of the spotted weakfish as an example of a valuable sportfish loss resulting from estuarine disruption. He related,

> . . . a fish such as the spotted weakfish that uses grass beds for protection could not survive if all the grass beds in its range were smothered by siltation or filled over for real estate. The spotted weakfish, with its mottled pattern of coloring is perfectly camouflaged to inhabit the bottom vegetation abundant in estuaries. Without the grass beds, its camouflage pattern would be useless as protection from predators and, besides, the small fish and grass shrimp that the weakfish feeds on would be gone with the grass."[41]

Thus, with only minor siltation causing disruption, a major sport fishery could be lost.

In discussing similar threats to the delicate balance of biological productivity in estuaries, D. W. Bennett of the American Littoral Society has summed up three major threats to coastal zone life and habitat as:

1. destruction of bay bottom;

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[41]John R. Clark, Fish and Man: Conflict in the Atlantic Estuaries (Sandy Hook, New Jersey: American Littoral Society, 1967), p. 5.

2. destruction of tidal marshes and edges;

3. water pollution.[42]

And, Bennett expanded on the subject of why estuaries are especially vulnerable to pollution:

1. their natural populations are in delicate balance, easily upset by pollutants (and there is evidence to indicate that these ecologically diverse and dynamic environments are indeed ecologically delicate); and

2. they become the repository for most of a river's pollution load as the river meets the estuary, slows down and, in responding to the forces of gravity, simply dumps a large part of its material.

A survey of naturally induced economic values of Atlantic coastal marshes would not be complete without mention of George Spinner's work for the Marine Resources Committee of the American Geographical Society, a work which presents meticulously researched and often quoted data on economic values of the estuaries to the known fishery and other resources. For example, Spinner relates two Gulf Coast examples in Alabama (1959) and Texas (1960). In the first case, 500,000 acres of an Alabama

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[42]D. W. Bennett, ed., 202 Questions for the Endangered Coastal Zone (Sandy Hook, New Jersey: American Littoral Society, 1970), pp. 2 and 16.

estuary was credited with an average annual value of $12,916,000, divided as follows:[43]

sport fishery	--	$6,000,000
commercial fishery	--	3,850,000
oyster shells	--	2,560,000
wildlife	--	185,000
minerals, sand, gravel, oil and gas	--	321,000

In the other case, a value of $370.18 per surface acre was recorded in the bays of Corpus Christi, Texas, and was itemized as follows:

commercial fishery	--	$ 14.64 per acre
recreational use (including sport and shell fishing)	--	151.61 per acre
minerals	--	129.49 per acre
transportation	--	63.71 per acre
cooling water	--	9.64 per acre
effluent disposal	--	1.09 per acre

Spinner states "The average annual value of all commercial fishery products landed at Atlantic coastal sports in the period 1953-1966 is $146,000,000"[44] and, while the percentage attributable directly to the estuarine zone varies, the best estimate by government and university biologists is 65% to 75%.

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[43]George P. Spinner, A Plan for the Marine Resources of the Atlantic Coastal Zone (New York: American Geographical Society, 1969), p. 22.

[44]Ibid., p. 29.

The subject of natural biological values of estuaries and wetlands will continue to arise and even permeate every chapter of this dissertation, for it is impossible to divorce the existence of these values from questions of ownership, jurisdiction, management policy, or protection of this resource. It is intended that the foregoing survey be simply a foundation for understanding the importance, then, of questions and issues arising on later pages.

Non-Biological Values

Wetlands have numerous other functions, not the least of which is the physical function of serving as a natural buffer between the land and the sea. Peter L. Johnson in his monograph, Wetlands Preservation, refers to this as the hydrologic or hydraulic-hydrographic function of wetlands, due to the sponge-like and naturally absorbent nature of the root, stem, and leaf vegetative matter comprising the surface of wetlands. He estimates one acre of marsh to be capable of absorbing and holding 300,000 gallons of water. Many waterfront homes, coastal highways, railway tracks, and even whole communities have been saved from the ravages of storm-flooding as a result of this natural absorption of the wetlands. Johnson raises the point that "A ten acre marsh will accommodate three million gallons of water in a one foot rise. Take away the

marsh, and the water still has to be accommodated somewhere."[45] Indeed, the natural value of a wetland for flood protection and as a buffer zone should not be minimized, for these are very real values.

Taormina has said

> Salt-water marshes are in effect natural breakwaters, with the resiliency of the millions of stalks of cordgrass serving to mitigate the shock of pounding waves. The nearly indestructable peaty salt meadows absorb the charging waters where much of its violence is spent before it can be expended on man-made structures or vulnerable shorelines.[46]

He goes on to say that such natural barriers are worth more in protection than the most expensive bulkheading at a minimum of $100 per foot of edge. It's accepted that tidal saltmarshes reduce coastal flooding in moderating wave action and eliminating hurricane erosion.[47]

Ironically, the value of wetlands or saltmarsh as a supplier or source of sand and gravel deposits is a negative one, for once the given wetland is harvested of this resource, all other values are immediately lost. Stripmining, the only economically feasible method, destroys all other values by removing the surface and

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[45]Peter L. Johnson, Wetlands Preservation (New York: Open Space Institute, 1969), p. 7.

[46]Taormina, op. cit., p. 8.

[47]U.S., Department of the Interior, Fish and Wildlife Service, National Estuary Study, Volume 4, Appendix C (Washington: U.S. Government Printing Office, 1970), p. 16.

substrate material. Hence, sand and gravel, phosphate and other minerals, are a natural value, but only with qualification: some would say they are a negative value for their existence causes the destruction of so many other values. The fish nursery and shellfish values are immediately destroyed, and the turbidity and sedimentation resulting from the stripmining destroys aesthetic and recreational values. Saltmarsh also plays a major role as a subsurface buffer, keeping saltwater from flowing into the fresh ground water aquifer. This situation is noticeably true on Long Island.

The educational value of wetlands is especially great because of the diversity of life and the dynamic nature of the environment; just as importantly, they're adjacent to millions of people in the Northeast. And again, because of proximity to so many people, there is the psychological value of open space.

Other major use values or functions of wetlands or marsh would include:

1. moderation of surrounding water and air temperatures (because of rapid warming and ability to hold the heat of the sun);

2. provision of many types of outdoor recreation (fishing, hunting, hinking, and especially birdwatching);

3. open space and aesthetic values (including badly needed open space in and near large urban areas, such as Boston, Providence, New Haven, and New York).

The presence of untapped oil reserves underneath coastal saltmarsh and the adjacent continental shelf waters, while nominally a natural resource of value associated with this environment, ironically poses another two-pronged threat to the coastal marsh environment, because it does occur in small areas immediately under the marsh and thus provides a temptation to drill and, more importantly, because great quantities have been found below the surface of the shorelines and continental shelf, thus increasing drilling prospects which might well lead to spillage at sea, man is faced with a further challenge. Any maritime oil spillage, whether from drilling or from vessel discharge and dumpage, invariably finds its way first to the beaches and marshes before touching any other environment and, needless to say, wreaks havoc on the wetlands ecology. The most obvious results are the thousands of dead and dying sea ducks and fish; the less obvious, the injury (sometimes permanent) to the productive capacity of the marsh grasses, muds, and benthic or bottom-dwelling organisms. There is no question that the marine littoral in general and the saltmarsh in particular has the most to lose from this type of contamination, so once again natural resources of distinctly negative value to the marsh environment have been uncovered.

There are, then, many values and resources of estuaries which might be considered negative, in that they

ultimately lead man to destroy wetlands. For example, each of the major resources now mined in the estuarine zone--oil, natural gas, phosphates, sand, shell, gravel--through their retrieval have done incalculable harm to the ecology and well-being of these environments, even totally destroying many. Navigation is sometimes considered to be a positive estuarine value, yet it should be grouped with the aforementioned mining activities as being of distinctly negative value, because it demands initial and maintenance dredging for its existence. Bennett points out that phosphate mining, an especially grave threat to the estuarine ecosystem in the Carolinas, Georgia, and Florida, also holds a two-pronged danger, for not only is there the usual terrestrial and stripmining for the mineral, but there is also the distinct danger of highly toxic byproducts--silts and chemicals--to harm all life.

In a recent report on the value and protection of marine wetlands on Long Island, O'Connor and Terry[48] note some of these other non-biological values in referring to the work of Kuenzler and Chestnut to evaluate the capacity of tidal marshes to process sewage wastes, and to Deevy's work on the role of marsh sediments in removing sulfurous pollutants from air.

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[48]O'Connor and Terry, op. cit., p. 23.

In summing up the subject of values, the writer would like to present a list put forth by George Spinner and his Marine Resources Committee:[49]

1. Hurricane and flood plain protection;
2. Water and air pollution dissipation;
3. Protection of ground water table levels;
4. Coastal aquaculture and agriculture (these have some negative potential, depending on the species in question, but in general more positive potential);
5. Nature observation and human relaxation;
6. Real estate value of an unobstructed view of a living marsh for those building on the uplands;
7. Recreational value of an estuary for boating of all types;
8. Recreational value of swimming and underwater observation;
9. Commercial and recreational harvesting of shellfish, crustaceans, and sea worms (any of which can be negative, but is far more often positive);
10. Commercial and recreational finfishing;
11. Commercial and recreational values of shipping and water transportation;
12. Values of coastal wetlands as breeding and nursery grounds for all types of fauna, from waterfowl to shrimp;
13. Furbearing animal trapping values (which have some negative potential, but are basically positive).

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[49]Spinner, op. cit., p. 34.

Points seven and eleven on this list do, however, have as much negative value as positive, since they have been known to destroy, in certain instances, other values listed.

The values of wetlands have led to great conflict over their use by man. A survey of the variety of these values naturally leads one, then, into the nature of the conflict in these estuarine saltmarsh zones.

CHAPTER III

SOME ECONOMIC DIMENSIONS OF WETLANDS AND WETLANDS PROTECTION

In the preceding chapter, it was not possible to avoid alluding to the conflict between preservation of the saltmarsh and man's practices which destroy it, or indeed avoid giving a number of examples, for these conflicts are inherently a part of and caused by the nature and values of the marsh. However, the writer would like to emphasize and clarify a number of the more serious conflicts preceding a legal study of ownership, jurisdiction, statutes, management policies, and judicial decisions pertaining to wetlands.

The Problem Setting and the Negative Result

There is much documentation available to indicate that, in spite of the inherently great ecological and other values already discussed, coastal wetlands are disappearing rapidly from the American scene. This is just as true in the less populated Gulf Coast and South Atlantic areas as it is in the longer-settled, more densely occupied and more industrialized Middle Atlantic and New England states. The Pacific Coast has very little tidemarsh, with the one

major exception of the San Francisco Bay area of California, a region experiencing pressures and problems similar to those of the Northeast. The Great Lakes states also have limited coastal marshland, all of which is non-saline and hence somewhat outside the scope of this dissertation. The best example of a Great Lakes estaurine marsh is the St. Clair Flats and Harsen's Island, a deltaic lowland at the mouth of the St. Clair River and the head of Lake St. Clair in southeastern Michigan.

In many areas, the rate of disappearance is alarming. According to Dr. Stanley Cain, former Assistant Secretary of the Interior for Fish and Wildlife and Parks,

> Between 10 and 15 percent of true estuary has been lost by New Hampshire (10 percent), Connecticut (10 percent), New York (15 percent), and New Jersey (13 percent), and Maine, Massachusetts and Rhode Island have lost over 6 percent each.[1]

Between 1954 and 1964, Long Island, New York, lost 30 percent of its marshland, with an accelerating rate loss evident in the latter years of the period. The following table from Johnson provides a breakdown.

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[1]U.S., Congress, House, Committee on Merchant Marine and Fisheries, Estuarine Areas, Hearings, before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, 90th Congress, 1st sess., 1967, p. 31.

TABLE 3.--Long Island, New York, Wetland Acreage 1954-1964, and Percent Loss.

County	1954 Acreage[a]	1964 Acreage[a]	Percent Loss
Bronx	1,860	50	96
Queens	4,235	2,887	60
Kings	2,400	1,140	50
Nassau	14,130	9,495	30
Suffolk	20,590	17,008	15

Source: Peter L. Johnson, Wetlands Preservation (New York: Open Space Institute, 1969), p. 10.

[a]It should be noted that Suffolk County lies at the greatest distance from New York City, while Bronx, Queens, and Kings lie in New York City itself--hence, the difference in figures.

TABLE 4.--Extent of Coastal Wetlands in Middle Atlantic and Adjacent States and Losses Since 1954.

State	Total Acreage 1954	Estimated Acres Destroyed 1954-1964	Percent Loss
Connecticut	14,744	3,200	21.7
New York	45,395	13,000	28.6
New Jersey	241,060	25,300	10.5
Delaware	114,048	4,600	4.0
Maryland	204,060	20,200	9.9

Source: David H. Wallace, "The Biological Effects of Estuaries on Shellfish of the Middle Atlantic," in A Symposium on the Biological Significance of Estuaries (Washington: Sport Fishing Institute), p. 83.

From 1954 to 1964 Connecticut lost 2,179 acres of tidal marsh. Of 23,360 acres reported in an inventory of 1914, only 14,839 acres remained in 1964.[2]

About half of all waters designated as shellfish areas have been closed to the taking of oysters, clams, and mussels, either commercially or for sport. This official closure is due to health dangers engendered by pollution.

In a very real way, the presence and condition of the finfish, shellfish, and terrestrial wildlife serve as a litmus paper to indicate the ecological health of a given marsh, as D. W. Bennett testified at House Subcommittee hearings to establish a Gateway National Seashore (including extensive saltmarsh) in the New York Metropolitan area.[3]

Rationale of the Loss

It is not the writer's purpose in this dissertation to deal in depth with man-nature conflict over the use and disposition of saltmarsh wetlands. However, given the already well-documented if not universally recognized

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[2]John R. Clark, Fish and Man: Conflict in the Atlantic Estuaries (Highlands, New Jersey: American Littoral Society, 1967), p. 40.

[3]U.S., Congress, House, Committee on Interior and Insular Affairs, Hearings on Gateway Area Proposals, before the Subcommittee on National Parks, Committee on Interior and Insular Affairs, House of Representatives, 92nd Congress, 1st sess., 1971, p. 122.

values of these wetlands, it does seem illogical that so much wetland acreage has been altered and destroyed without attention being paid or consideration given to the loss of any of the aforementioned values. The economic, and hence political and social, pressures to dredge and fill for navigation and construction, to mine, to control mosquitos, to construct highways, and to pollute, are indeed very great, and have until quite recently superseded consideration of protecting wetlands values and foregoing the benefits of these other activities.

The problems heretofore mentioned have been the essential cause of the disappearance of East Coast marine wetlands, and the reasons for the rapid loss of Atlantic Coast wetlands are almost as varied in nature as are the values justifying their preservation. The summary breakdown of the reasons for the loss of wetlands on Long Island, New York, for the decade 1954 to 1964 is typical of the situation in the Northeast and lower New England region as a whole.

Hence, there is no doubt that, in these and in many other ways, man's activity is in sharp conflict with the highest aims of preserving wetland ecology, and with increasing pressure on our last remaining unspoiled shorelines and waterfront, that conflict is bound to become sharper. As a result, we are now witnessing an increasing amount of protective legislation coming out of legislatures

TABLE 5.--Causes of Wetland Acreage Loss in Nassau and Suffolk Counties, New York, 1954-1964.

Cause	Nassau County, N.Y.		Suffolk County, N.Y.	
	Acres	Percent of Loss	Acres	Percent of Loss
Housing	1,885	41	1,226	34
Miscellaneous fill	984	21	905	25
Recreation	487	10	336	9
Industry	729	16	316	9
Marinas, docks, channels	330	7	402	11
Airports	0	--	4	--
Bridges, roads, parking	85	2	209	6
Waste disposal	60	1	16	1
Schools	75	2	33	1
Agriculture	0	--	96	3
Drainage	0	--	39	1
Total	4,635	100	3,582	100

Source: Modified from U.S., Congress, House, Committee on Merchant Marine and Fisheries, Estuarine and Wetlands Legislation, before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, 89th Congress, 2nd sess., 1966, p. 115.

at all levels of government and, unfortunately, most of these new laws are too weak to perform the task of protection. A greatly increased number of legal conflicts and court cases resulting from intensified competition for use of the wetlands is also occurring. The following two chapters are thus devoted to a survey of the more pertinent laws and the cases which have arisen in challenge to them.

In the estimation of many writers on the subject, most wetland destruction may be attributed to any one of five major causes which are given below.

1. Dredging for navigation and filling for landfill: Dredging and filling operations are the most serious single threat to the existence of wetlands, and are related in some way to each of the other threats. Most of these projects are carried out to make residential lands, parking lots, or industrial sites, or to convert the natural wetlands to solid waste disposal sites. Occasionally, they are designed to permit or enhance navigational opportunity, more often than not for recreational boats. Bulkheads are then installed to both contain the fill and prevent it from seeping back into the dredged channels, and in addition, these bulkheads prevent tidal exchange on the wetlands. Massman reports in discussing the Chesapeake Bay estuary:

> Reduction of the freshwater flow into the Chesapeake (through dredging and filling) will increase bay salinities and reduce the rate of both outflow of surface waters and inflow of bottom waters at the mouth of the bay. While the damaging effects on shellfish will be greater than those on finfish, a reduction of inflowing ocean water into the bay will probably result in fewer of the larvae of ocean-spawned fish reaching productive estuarine nursery grounds. . . . If freshwater flows were severely reduced, the productive low salinity nursery areas would be displaced up the estuary beyond the cordgrass marshes toward the head of the tide. The fish would lose much of the benefit from high productivity and the low salinity zones would occupy a far smaller volume of water and far less productive stretch of river. If freshwater inflow were reduced to the extent that saltwater penetrated to the fall line, the spawning and nursery area of anadromous shad and striped bass would be eliminated.[4]

The environmental effects of filling depend to a great extent on the location of the fill and the type of habitat covered and thus lost. Since the marshes are valuable to aquatic production, filling obviously destroys or reduces this production, but it can work in the other direction to reduce extreme wave action and even to create new marshland.

However, there is no question that filling in general has been and is very harmful to the estuarine environment. Richard Stroud of the Sport Fishing Institute has stated that

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[4]William H. Massman, "The Significance of an Estuary on the Biology of Aquatic Organisms of the Middle Atlantic Region," in A Symposium on the Biological Significance of Estuaries (Washington: Sport Fishing Institute, 1971), p. 7.

> . . . for each acre of estuary obliterated through filling, or otherwise destroyed, there could be a corresponding annual yield of about 535 pounds of fisheries products on the Continental Shelf.[5]

A number of writers dealing with effects of filling in Florida and the Gulf Coast report that it is easy to give scientific evidence to the courts detailing reasons why grass-covered saltmarsh should not be filled, but a much more difficult task to argue on behalf of sand or mud bottoms, so there is, therefore, a situation here where the nature of the specific environment to be filled plays a role in whether it can be legally protected.

Authority John Clark feels, too, that no project is more damaging to estuarine life than dredging and filling, and points out that 45,000 acres of marshland were destroyed from 1955 to 1964 along the North Atlantic coast from Maine to Delaware. He lists the causes as:[6]

Percent Lost	Cause
34	deposition areas for dredge spoil
27	housing development
15	recreational development
10	bridges, roads, parking lots, airports
7	industrial sites
6	garbage and trash dumps
1	miscellaneous

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[5]Richard H. Stroud, "Introduction to the Symposium," *in* A Symposium on the Biological Significance of Estuaries (Washington: Sport Fishing Institute, 1971), p. 7.

[6]John R. Clark, Fish and Man: Conflict in the Atlantic Estuaries (Sandy Hook, New Jersey: American Littoral Society, 1967), p. 12.

Clark and others recommend that dredged spoil be deposited in deep parts of bays to build spoil islands, a practice which is much less ecologically harmful than filling wetlands with the spoil. He further points out with respect to navigation projects that alteration of currents and tidal flows through new channels can cause loss of plant and animal life and other ecological damage through turbidity, increased siltation, and loss of salinity balance.

Most baymen and shellfishermen are strongly opposed to dredging for almost any reason, since the disturbed bottom sediment increases turbidity, cuts off sunlight and thus energy for production, and ultimately smothers the bottom-dwelling shellfish. Testimony on estuarine legislation contains many statements of such men calling for tighter controls on such activities, and to avoid destroying this important industry as well as protect the wetlands and baybottoms.[7]

2. Gravel, sand, and in some areas, phosphate mining: This mining is essentially a subaqueous form of stripmining and is equally as disruptive as dredging for other purposes. It does not take one long after working in the estuaries to realize that this highly profitable mining and private sale of publicly owned fill is often disguised as a navigation improvement project in order to

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[7] Ibid.

win a permit for the job.[8] The circumstances and the results are largely the same as those under dredging and filling, and might easily be included in that category. Both result in major disruption of the whole ecosystem.

3. Mosquito control and marsh impoundment: Draining or impounding the wetlands by ditching to destroy mosquito larvae has been a serious threat to the ecology of these environments for many years, while the spreading of DDT and other pesticides for the same purpose is a much more recent problem. Mosquito control practices were one of the very earliest real dangers to the marsh ecosystem, with some areas experiencing major destruction as early as the nineteenth century, and the presence of the mosquitos, midges, and greenhead flies has brought much negative reaction to the marsh environment, and probably contributed to much marsh destruction. Teal, in devoting a full chapter to this subject, reports that insect control measures fall into two groups: those that attack the pest population directly, such as spraying, and those that change the habitat and make it unsuitable for these populations, such as ditching.[9] The results of insecticide spraying are obvious, in that it contaminates the

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[8]This is clear from the testimony delivered by baymen and others at Congressional hearings on estuarine bills cited in the preceding chapter.

[9]John Teal and Mildred Teal, Life and Death of the Salt Marsh (New York: Audubon-Ballantine Books, 1969), p. 226.

environment. Ditching, at least as practiced in the Northeast, drains the entire marsh, empties open pools valuable to wildlife, and can change the composition of the marsh, accelerating changes toward high and dry marsh development. The opposite of draining is controlled flooding through the building of dikes to create impoundments, in which water remains at a stable level rather than naturally fluctuating. Without fluctuation, most of the problem mosquitos cannot survive, but then neither can Spartina grasses, so the marsh is destroyed.

Teal suggests a carefully modified ditching program which does not ultimately reduce water level in the area in combination with the use of non-persistent insecticide "fogs" on windless days but admits it is expensive and requires some ecological sophistication among those who carry out the task.[10]

Some writers have noted that anti-mosquito practices do play into the hands of other interests. For example, diking to create artificial impoundments is fine for waterfowl production and thus duck hunters, while it is disastrous to commercial fishing interests and certain aesthetic interests. Chapman notes that mosquito ditching has led to the more rapid invasion of the marsh by marsh

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[10] Ibid., p. 230.

elder (Iva frutescens), which represents the beginning of a basic botanical change in the marsh community.[11]

Thus, many of these conflicts are not clearcut. Benefits to one must be weighed against benefits to others, as well as to society in general. These various benefits are often highly interrelated and difficult to observe in true perspective.

4. Highway construction: There is frequently less than adequate water passage under new coastal highways, thus submerging one part of the wetland and drying up the other. In a sense, this represents an inadvertent form of both draining and impounding. It is less expensive to make a solid causeway across a marsh than it is to permit the water to flow under it. Thus, too often, such a highway is also a dam, and is equally as negative a force on the ecological health of the marsh as are canals, diversion projects, and other water control structures and schemes.

5. Pollution: Obviously, domestic and industrial effluent alter the ecosystem greatly in numerous ways, most of which are apparent:

a. causing the bloom, growth, and dissemination of diverse undesirable aquatic algae and flowering plants which compete with and usually

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[11] V. J. Chapman, Salt Marshes and Salt Deserts of the World (London: Leonard Hill Books, Ltd., 1960), p. 245.

drive out the more desirable naturally-occurring forms;

b. biochemically contaminating and destroying numerous shellfish and other aquatic animals (e.g., the effect of DDT on blue crabs, or the effect of a number of pesticides on scallops, most of which destroy life, or the effect of human waste on clams, which spurs productivity but which makes the clam both unfit and dangerous for human consumption);

c. outright destruction of all or most life through oxygen removal, acidic burning (e.g., sulfuric acid), and in other obvious and less obvious ways.

It is well known that estuaries are of great value to anadromous and catadromous fish species (forms which divide their lives between fresh water and salt), some of which species are of high commercial value (herrings, salmon, shad, eels). It is also well known that "homing instincts" of these fish are guided by extremely small quantities of chemical substances in the water, and thus it is very possible that some of the exotic chemicals now entering estuaries might interfere with the delicate sensory systems or confuse the fish on their life-depending migration to the spawning grounds. It is an interesting sidelight on the contamination issue, then, to see that

a whole population could be destroyed by this confusion without the cause being detected.

Not all pollution, of course, consists of human and industrial effluent or insecticides; the threat of heat or thermal pollution and oil spills is just as real and sometimes deadlier in many estuaries. In the case of heat, it is, again, not a clear-cut situation. Some species (e.g., oysters, up to a point) are benefited and others are harmed, but the point is the natural ecosystem is severely altered and disrupted with many consequences, both known and unknown. Oil spills are, of course, almost universally considered to be negative, but even here there is dispute.

The Problem of Hazard

On the subject of conflict over the use of salt-marsh wetlands and their vulnerability to destruction and alteration, Wass and Wright state,

> Just as they differ in productivity, value, and biotic composition, so do wetlands vary in vulnerability, that is, the degree to which they are susceptible to alteration and the probability that it will occur. . . ,[12]

and argue that the subject of vulnerability cannot be separated from value, as the two parameters interact. They continue,

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[12]Marvin L. Wass and Thomas D. Wright, Coastal Wetlands of Virginia (Gloucester Point, Virginia: Virginia Institute of Marine Science, 1969), p. 93.

> The wetlands most vulnerable to alteration by man-made disturbance are those currently proposed for such alteration and those which, because of their geographic location, seem likely to be altered in the near future.[13]

Although man-made alteration is being referred to here, wetlands are commonly altered by a wide variety of "natural" forces, ranging from major hurricanes occurring once in several decades to tidal fluctuations which occur daily. Wass and Wright point out the paradox that high value wetlands and saltmarsh are often as vulnerable or more vulnerable to alteration than are those of lower value, simply because location and other circumstances are often more important determinants of change than are biological productivity or ecological uniqueness. Of course, it could also be stated that a low productivity marsh within an urban area might be far more valuable as a source of scarce open space, regardless of its productivity or uniqueness level, than a marsh of considerably greater productivity or uniqueness located elsewhere. And, certainly, the small low productivity marsh in the urban area is worth far more to the developer to develop than is the more productive marsh outside the urban area.

One very basic issue too often ignored in studies of this area of conflict is not relevant to biological productivity, ecological uniqueness, or any of these other previously discussed marsh values, but is nevertheless

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[13] Ibid., p. 96.

very real. This is the inevitable problem which arises when man settles on or develops land which is very vulnerable to natural disaster, such as hurricanes or river floods. Indeed, many coastal saltmarshes are within this category of vulnerability, being very much exposed to the vagaries of the elements. Many writers are now dealing with the subject of annual flood losses in the United States, and on how much of this loss could be avoided if policies were adopted which prevent (e.g., zoning) or discourage (through taxes or insurance) people from settling and/or building on highly vulnerable flood plains or rivers, or, indeed, on the subject of why the federal government should entice people into such settlement and development by numerous flood control practices which in fact increase the threat of flood danger. The very same situation exists, however, with the conflict over settlement in saltmarshes and, even more so, over settlement on the barrier beaches which protect the marshes and adjacent upland from complete innundation. As Wass and Wright remark,

> Barrier islands are best utilized as just that . . . Like flood plains, they must first be made 'safe' before being diverted to alternate use, and, similarly, cries for more protection become increasingly vociferous after each disaster.[14]

Then, government provides more protection, often ultimately worsening and aggravating the original problem,

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[14] Ibid.

and when storms come, the resulting damage is even greater, and an endless vicious cycle has begun. The answer is clear, though politically and economically (at least in the short run) difficult: entice people away from instead of to such environments, and then either publicly acquire the "problem" environments, or at least make it very difficult for people to settle or develop on them. Wass and Wright sum up this aspect adequately:

> The premise that one may live where one desires is no longer entirely valid since we must all bear the consequences of the unwise decisions of a few. Not only is the destruction of a unique natural habitat involved, but also property, the marshes protected by the barrier island, and perhaps people as well. Out of public monies must come funds to protect against future damage and attempt to repair present damage, all of which is needless.[15]

The Schema of Decision-Making

Although the difficulty of decision-making in the management and protection task will be well illustrated in succeeding chapters, where many of the numerous variables will be discussed, it is well at this point to introduce to the reader selected flow diagrams which illustrate some of the interrelationships of these various decisions and decision-makers in saltmarsh and estuarine preservation. The following diagrams (flow charts) demonstrate the estuarine resource management sequence, the interrelationship and interaction of chemical and

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[15] Ibid.

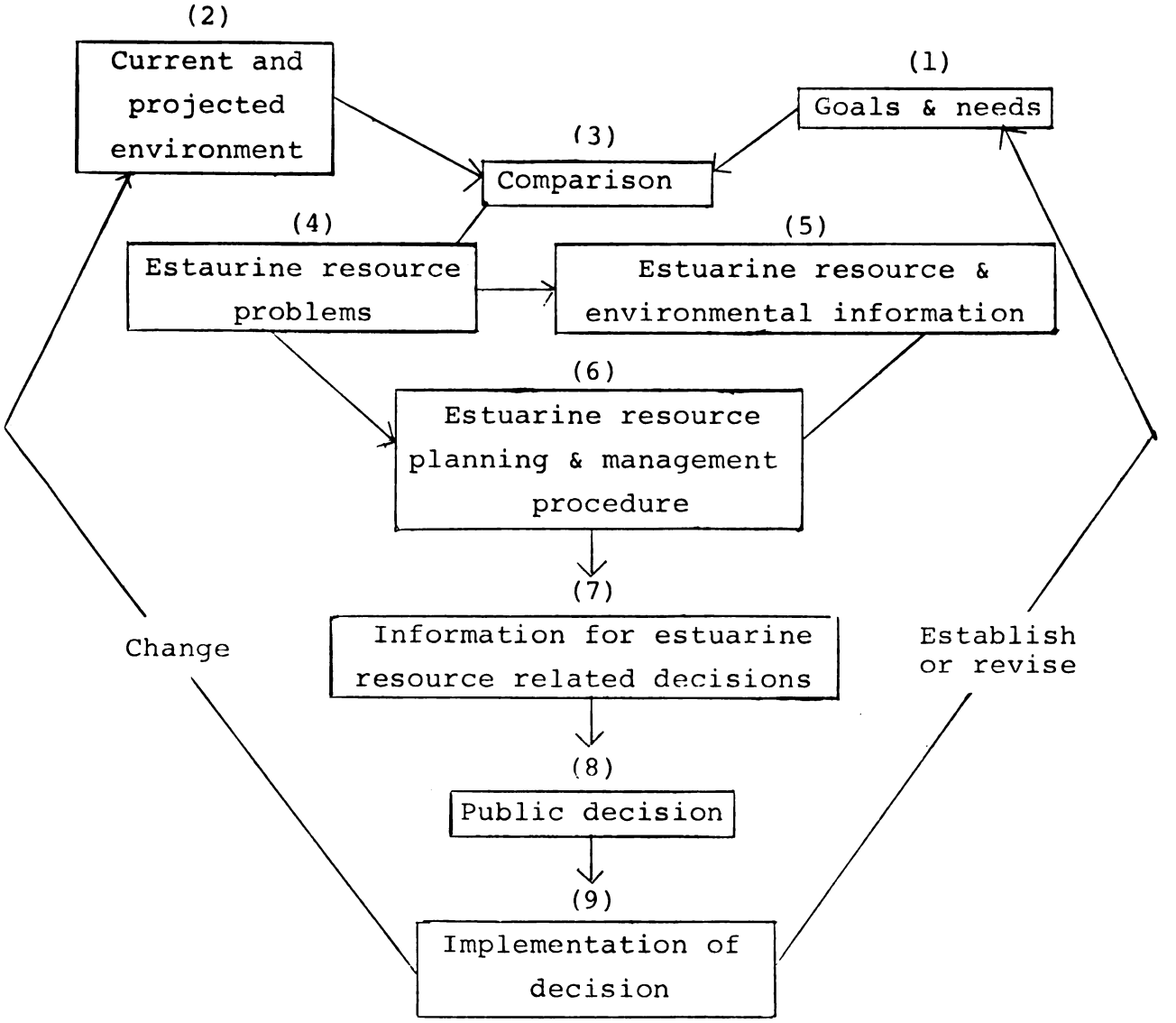

Figure 1.--Estuarine resource management sequence. (Modified from material prepared by the Travelers Research Corporation, Hartford, Connecticut.)

Source: Travelers Research Corporation, The Development of a Procedure and Knowledge Requirements for Marine Resource Planning (Hartford, Connecticut: The Travelers Research Corporation, 1969), pp. 25-63.

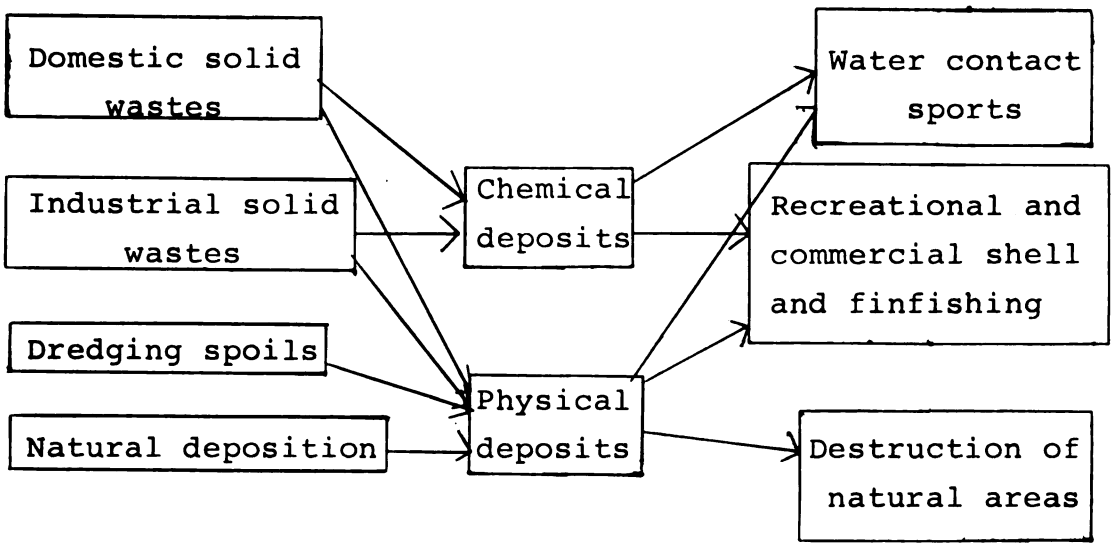

Figure 2.--Interrelationship and interaction of deposited material and use value of an estuary. (Modified from material prepared by the Travelers Research Corporation, Hartford, Connecticut.)

Source: Travelers Research Corporation, The Development of a Procedure and Knowledge Requirements for Marine Resource Planning (Hartford, Connecticut: The Travelers Research Corporation, 1969), pp. 25-63.

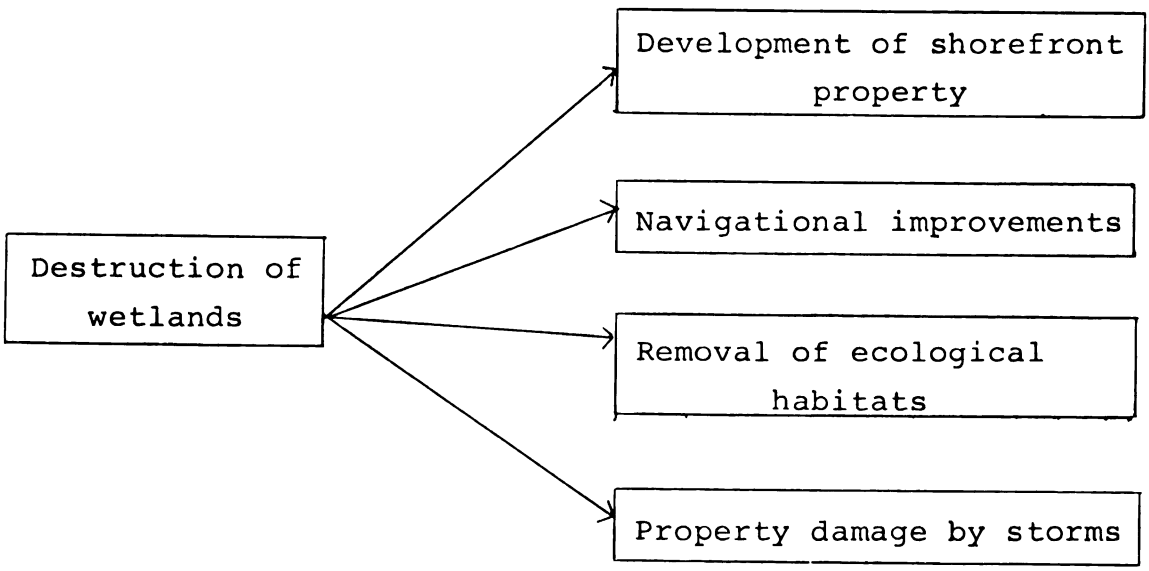

Figure 3.--Results of wetland destruction. (From material prepared by the Travelers Research Corporation, Hartford, Connecticut.)

Source: Travelers Research Corporation, The Development of a Procedure and Knowledge Requirements for Marine Resource Planning (Hartford, Connecticut: The Travelers Research Corporation, 1969), pp. 25-63.

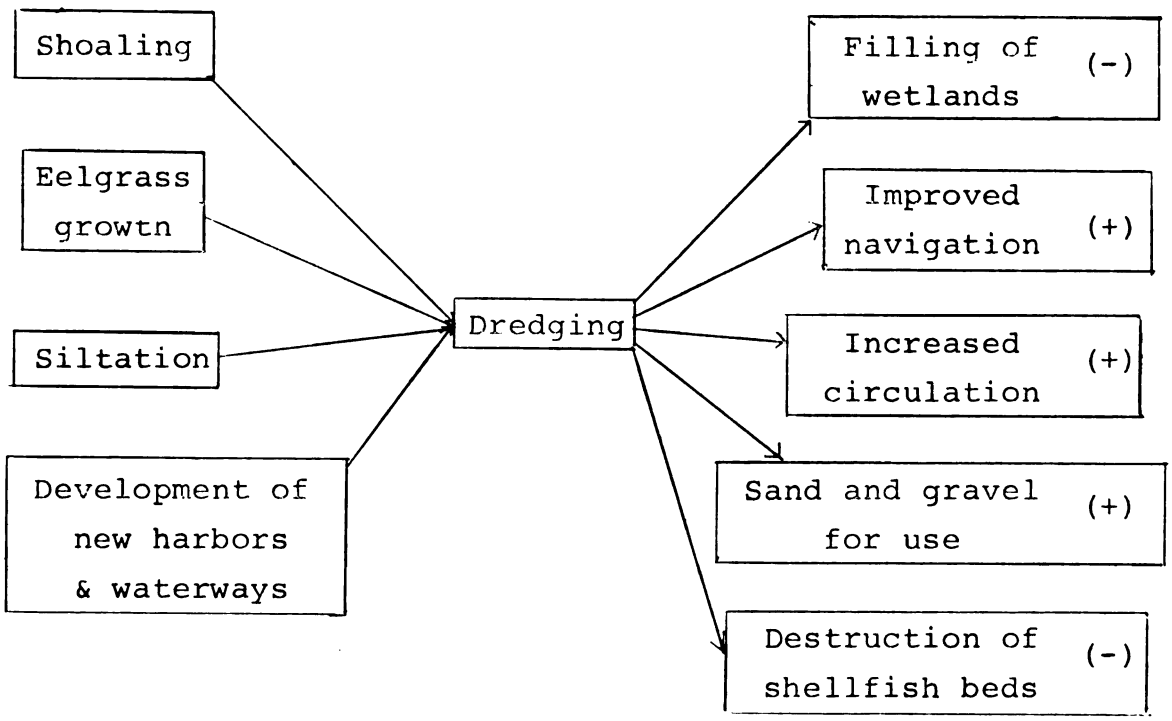

Figure 4.--Positive and negative effects of dredging. (From material prepared by the Travelers Research Corporation, Hartford, Connecticut.)

Source: Travelers Research Corporation, The Development of a Procedure and Knowledge Requirements for Marine Resource Planning (Hartford, Connecticut: The Travelers Research Corporation, 1969), pp. 25-63.

physical deposits and their use values in estuaries, some results of wetland destruction and selected positive and negative effects of dredging. In studying these diagrams, it is well to realize that it is the unrestricted competitive market which largely renders decisions as scarce resources are allocated in a sub-optimal manner, and

> The only solution to the problem seems to be some form of public intervention which will result in a net gain from wetland alteration through a consideration of the uniqueness of the resource, its future possibilities, and alternate means of solution.

Wass and Wright contend "Until such a mechanism is operative, wetland alteration must be viewed with trepidation and prevented when possible."[16]

At this point, it is appropriate to take a closer look at the nature of the economic problem. The thinking which prevails in the economic scheme must also be considered.

The Real Problem

If wetlands have such well established values, then why does the rapid decline in wetlands acreage take place? Many writers believe that the problem lies within the nature and mechanics of our economic system.

It has been found that with respect to certain environmental matters, including that of wetlands protection, former reliance on the price-market mechanism no

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[16]Wass and Wright, op. cit., p. 96.

longer serves as a vehicle for guiding the behavior of producers and consumers in our economic system. Prices, set largely by supply and demand, have served a double purpose of rationing available resources and signaling options among production and consumption alternatives. But unfortunately, this mechanism and thus the system has failed when relied on to determine the optimum choice between a given production-consumption pattern and the impact of that pattern on environmental quality. Indeed, if one considers the example of filling wetlands for residential housing construction, it can be seen that not only has the market demanded a greater supply of such waterfront and waterview property to be available for housing, but also has indeed paid rapidly increasing prices for such property as the supply decreases. Thus, increasing price and inflation have not yet signaled an end to this demand. It will now be necessary, then, to put an extra environmental price tag on this resource commensurate with the environmental loss incurred. Perhaps this technique will diminish demand for the resource, and even signal the beginning of new and, from an environmental standpoint at least, superior uses of the resource.

The basic reason why negative and undesirable externalities exist in association with estuarine resource usage is simply that conventional cost accounting on the

part of the users ignores the damage to environmental quality.[17] This enables both the producer and the consumer to avoid paying for the full cost of production. Thus, the cost must be absorbed by society, as a monetary cost in itself, or in the form of suffering with the problem. And, indeed, there is no incentive for this cost accounting to do otherwise.

> The resulting calculations have weakened or eliminated important incentives for encouraging the use of environmentally beneficial production methods and/or consumption patterns. To the extent this is true, market prices are too low and give a misleading cost of production 'signal' in the marketplace; there is no computation for operating externalities.[18]

Of course, the problem is not solely limited to the guiding force of incentives, for we are still faced with the problem of developing consistent and reliable social cost estimates of these undesirable externalities. The task of developing such estimates is truly an imposing one. Care is necessary so that overly strict and unnecessary standards are avoided, too, for as DeForest warns,

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[17] An externality or external cost or benefit of an activity is defined as one which is borne by parties outside the economic unit engaged in that activity. If it is a cost, it is a negative externality. If it is a benefit, it is a positive externality.

[18] J. D. DeForest, "Economic Implications of Environmental Policy: An Overview," working draft of a paper presented at the University of Wisconsin Conference on Environmental Studies, Green Bay, Wisconsin, December 1, 1972, p. 2.

"The costs a society must bear for setting unrealistic standards will be substantial in terms of wasted resources."[19]

The economic problem as witnessed in the coastal zone, and particularly on wetlands, differs from that in many inland sites, in that the threat of certain kinds of new development (housing, highways, power plant siting, etc.) is more often the issue than is the forced closure of an already established operation such as a paper mill polluting the air or a river. The latter situation does on occasion arise, but is less common than the ever-constant threat of new development. Hence, in the coastal zone situation, serious economic dislocation and significant unemployment resulting from environmental decisions is, fortunately, rather infrequent. This is one major area of environmental economics, then, to which a great deal of attention need not be paid. In the few instances where major economic dislocation does arise as a result of protecting an estuary, temporary government assistance is called for and is justifiable.[20]

A number of writers seem convinced that coastal zone problems do not stem from lack of morality or an environmental ethic, nor from a lack of planning or poor

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[19] Ibid., p. 4.

[20] Interview, J. D. DeForest, Environmental Economist, Office of International Resource Development, U.S. Department of Commerce, Green Bay, Wisconsin, November 30, 1972.

planning, but from the failure of the incentives of our economic system to guide man to make the best use of his resources. "The pricing system provides a perverse incentive structure that most directly results in the real plight of environmental degradation that now exists."[21] Knetsch believes that, for prices to serve as an acceptable basis for social choice, the opportunities foregone in the use of resources for any purpose must be reflected in the price figures. However, in the coastal zone, the conditions for using prices as guides for resource use simply don't prevail. The true values per acre of marshland are rarely reflected in the sale price. Hence, dredging, pollution, and landfill are only the result of one real problem: the people who are making the decisions concerning the disposition of these wetlands and marine littoral resources are not accountable or held responsible for their actions, and have no incentive to be so.

Knetsch questions the value of public acquisition, for though it may be an answer to preserve a given marsh, it cannot solve the total national problem. He also questions reliance on planning and land use controls such as zoning to accomplish the task. One problem here is that zoning benefits some and hurts others to far too great an

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[21]Jack L. Knetsch, "Economics and Management of Coastal Zone Resources," in James C. Hite and James M. Stepp, Coastal Zone Resource Management (New York: Praeger, 1971), p. 85.

extent, while in fact society should be required to share both the benefit and the burden. This point was raised by several judges in recent wetlands decisions. Knetsch questions the use of subsidies to communities to solve problems (again except in very local instances), since it rewards those who permit or who do the most serious damages, while not challenging the incentives which caused the problem to begin with.

To remedy this weakness in the economic system, Knetsch proposes the alternative approach of market simulation, an approach which would make the prices reflect the true costs incurred in wetlands alteration. This approach basically assigns an environmental value to each and every wetlands parcel and other coastal zone habitat, and the charge system would account for varying productivity of different habitats, ". . . that is, a higher charge would be levied for disturbing a more productive marsh than a less productive one."[22] This approach would admittedly place an enormous burden on those ecologists studying productivity of estuarine environments, but has the advantage of providing an additional incentive of varying the nature of resource change toward the preservation of more natural values.

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[22] Ibid., p. 89.

> In this way, those parcels of land that are in greatest demand for, say, home-site development would be developed for that purpose much more in areas where the environmental values were smaller in comparison to the development values; that is, where it is less costly.[23]

Presumably, those parcels with the smallest environmental values would be less costly, and thus, theoretically at least, developers would be most attracted to them. "Further," says Knetsch, "as development proceeded, the remaining undeveloped areas could have still higher fees imposed to reflect an increasing scarcity value."[24]

Knetsch further offers the possibility of turning the situation completely around and assessing the charge to those who most benefit from the current resource use. In other words, the value does not automatically accrue to the party who benefits from the status quo--it could accrue to the party who is denied the right to change the status quo for giving up that right. This simply represents a bribe to forego a right. In fact, in terms of resource use, it simply doesn't matter, according to Knetsch, "whether the polluter pays a charge for the costs incurred to others as a result of his polluting or if the downstream water users pay him a bribe not to pollute."[25] It does seem, however, to be very much in the American tradition to assess or charge the party who brings about

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[23] Ibid.

[24] Ibid., p. 90.

[25] Ibid.

change rather than to the party protecting the status quo, especially when the change to be brought about is likely to destroy tangible values. Therefore, assessing the one who brings about change would probably gain wider acceptance, though the writer submits that failure to reach consensus on this issue could very much be the greatest weakness of Knetsch's proposal. Perhaps most importantly, though, the Knetsch approach is desirable because it ". . . builds on the inherent nature of the cause of the concern,"[26] and provides incentive for more efficiency and equitable allocation in resource use.

In debating the Knetsch proposal, William Ward, a fellow resource economist, sharply questions the difficulty of defining property rights and ascertaining the value of the resource, and notes that market imperfections have not been corrected. He questions the equity of the proposal, especially in light of the fact that the land developer or speculator would not necessarily bear the opportunity cost, but the cost would be borne only by he who had the misfortune of owning the land at the time of the property rights redefinition. But, as Ward says,

> If the developer is anyone besides the initial owner, the tax will not be borne by the real culprit. Thus, there is some question as to the equitability of the incidence of the tax.[27]

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[26] Ibid., p. 93.

[27] William A. Ward, "Analysis," in James C. Hite and James M. Stepp, Coastal Zone Resource Management (New York: Praeger, 1971), p. 97.

Ward's point leads this writer to believe that the Knetsch plan might work in those areas where most of the land is now owned by speculators and subdividers, if not elsewhere. And this leads to the thought that, in the Northeast littoral zone, at least, most owners of unspoiled acreage are themselves subdividers or at least speculators, whether they are conscious of this or not. Thus, contrary to Ward, the burden would be falling on the real culprit, which is not necessarily the individual owner but just as often the temptation to make the money which can be made through deleterious but legal alteration of the environment.

Ward also notes that the market and pricing imperfections remain under the Knetsch plan. In essence, the people who suffer do not get the money to justify putting up with the suffering. All society receives the value while only one or a few suffer, which is a very imperfect market situation, and one which has been noted particularly in the court case of Maine v. Johnson (see Chapter V.)

Ward further suggests that there is a real disparity of interregional distribution of wealth attendant on Knetsch's proposal, since most of the really environmentally productive estuaries are located in the same region (the South). He not only sees this as discriminatory against this one region, but speaks of a kind of negative multiplier effect built into this system which would multiply differences and make for an increasing

divergence of regional income between this region and other parts of the country. The disparities get built into the system and grow as national income grows. Ward's approach on this matter seems to indicate he has little faith in the ability of unaltered wetlands and estuaries to generate much income even within one region, a point with which this writer strongly disagrees. In the long run, presumed regional diversity and the multiplier effect should not be at issue in this matter of wetlands preservation.

Property rights are very much at issue here and the assessment of fair market value, taking into consideration ecological parameters, certainly will be a most difficult though not necessarily impossible task. Because a difficult task is presaged, however, does not justify its rejection or avoidance. There are some flaws but indeed much merit in what Professor Knetsch proposes, and it certainly merits further practical testing before judgment is passed. Some other related considerations in the economics of saltmarsh will be treated and possibilities discussed.

Approaches to Pricing the Resource

Contrary to the view of many that wetlands and saltmarsh in their natural form have largely intangible values which cannot be measured or priced, there at at

at least two ways (and perhaps more) of arriving at a value for a "saltmarsh experience":

1. Alternative values foregone--namely, what is the best estimate available for the monetary value of the saltgrass and other plants if harvested (if any), of known economically obtainable mineral resources, or developed forms of recreation projects, of space foregone for housing, marinas, etc., if landfill were to be placed and channels constructed, and so on. The sum total of this figure is a possible monetary value which can be assigned to the saltmarsh in question, since this sum total figure is a cost in the sense that it has been foregone by society in favor of preservation (an opportunity cost);

2. Cost to society to administer, protect, and maintain the wetland area--this could be considered separately, or even combined with the opportunity cost figure above to arrive at a net total figure. Important in this cost is the in-lieu tax payments which will have to be paid to local governments because of the removal of land from the tax rolls.

Another possibility here is to assess the profit-making of commercial and sport fin and shell fisheries, establishments catering to waterfowl and other hunting, trapping, etc., and resort industry which develop in or around the periphery of the wetland once the area has been set aside for preservation. In addition, there is no

reason why benefit-cost analysis cannot be applied to such preservation decisions, using the figures derived from the above formulae, just as such benefit-cost analysis is applied to certain water resource and other "development" projects.

With reference to these criteria, John McKee has developed several cost-benefit models applicable to certain aspects of coastal development, specifically housing subdivision on a seasonal basis in Maine. He believes that seasonal development, as long as it stays seasonal, benefits both the townspeople and the municipal budget, but there is risk if there is a chance that seasonal development might turn into year-round housing, thus requiring more in services than contributing in property taxes. In this situation, a park or some type of open space would be more desirable than housing. McKee presents a number of alternative plans for the development of coastal sites (including saltmarsh, headland, clam flats, etc.) along the Maine coast, plans which cost the least in municipal services, preserve the most of the ecosystem, and still provide taxable revenue for the municipality. Most such plans involve reservation of the immediate shorefront and all wetlands as public property, and the clustering of dwellings as much as possible in one or a few places, with a minimum amount of road and transmission line footage.

It is now becoming more widely realized that residential housing can be a very poor tax ratable, since very often the cost of services demanded (especially school services) are greater than the income generated by property taxes. Putting it simply,

> . . . if it costs the town $500 to educate each child in its schools, and if new houses will each have two children, then the town must realize $1000 in taxes from that home to break even, ignoring the service costs for sewerage, trash pickup, police, fire, road maintenance, and so on.[28]

Thus it can be seen that an argument in favor of filling in and developing wetlands for residential housing in order to increase local tax revenue is often an invalid one, and the wetland is actually, then, a positive rather than negative value in its natural state. Although industrial development brings in more tax revenue, the cost of a deteriorated environment and the cost of cleaning up that environment are at issue. Indeed, the current administration in Washington has made vague references to requiring local governments to deliberately assess development on wetland and certain other sites at higher rates so as to deter or discourage development in such critical zones, though whether such a policy will come into reality remains to be seen.

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[28]John McKee, Coastal Development: Cost-Benefit Models (Brunswick, Maine: Bowdoin College Public Affairs Research Center, 1969), p. 1.

On April 27, 1972, Representative Byrnes of Wisconsin introduced a bill into the Congress to ". . . amend the Internal Revenue Code of 1954 to encourage the preservation of coastal wetlands, open space . . .,"[29] if passed to be known as the Environmental Protection Tax Act of 1972. The bill defines coastal wetlands as per the physical and biological definition officially accepted by the U.S. Fish and Wildlife Service (and largely detailed in an earlier chapter), and provides for tax depreciation for those people who make developments or improvements on their income-producing coastal wetlands property which is in keeping with the preservation of ecological values of these wetlands. Acceptable coastal wetlands improvement is any change or alteration approved by the Secretary of the Interior as

> . . . not being in conflict with applicable regulations of Federal and State agencies relating to the protection of the coastal wetlands, and as not requiring an environmentally undesirable degree of draining, dredging, or filling in the coastal wetlands affected.[30]

The bill also provides for income tax deductions for the transfer of partial interests (i.e., easements) in property for conservation purposes, whether the property be wetland or dry upland.

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[29] U.S., Congress, House, A Bill to Amend the Internal Revenue Code of 1954 to Encourage the Preservation of Coastal Wetlands, Open Space and Historic Buildings, and for Other Purposes, H.R. 14669, 92nd Congress, 2nd sess., 1972, p. 1.

[30] Ibid., p. 3.

Before too much reliance is placed on the use of the taxing power, however, Barlowe asks recognition of three facts:

1. . . . taxes often have a beneficial effect upon property ownership in the sense that they provide services which have a value to the property owner in excess of the cost of the tax . . .;
2. many taxes have a relatively neutral impact upon property owners and their operator decisions . . .;
3. some taxes have adverse effects upon property owners. These adverse impacts may come as the accidental, incidental or deliberate results of tax policy.[31]

Roland Clement of the National Audubon Society recently said that the biologist who wishes to see wetlands preserved has three options:

1. with the help of economists, he can learn to quantify his values so as to make them comparative in the economic calculus;

2. he can educate the public to accept his values, as stated in non-economic terms; or

3. he can reduce the political acceptability of present economic judgments by showing them to be invalid.

Clement says we must combine all three of these options, learn to quantify and tabulate and assign dollar values, and, perhaps most difficult of all, the ecologist must learn to ". . . identify his factors so well that he

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[31]Raleigh Barlowe, "The Effects of Taxes on Land Use" (paper delivered at the Seminar on Taxation of Agricultural and Other Open Land, Michigan State University, East Lansing, 1971), p. 2.

can state how much of an estuarine zone can be sacrificed to other uses without destroying the ecosystem."[32]

A way of changing the economic value of wetlands to benefit ultimate preservation is deliberate planning to destroy marginal shellfish resources in heavily polluted areas while utilizing sand and gravel from the bottom of such areas, thus lessening the pressure for sand and gravel mining in ecologically healthy wetlands.

As an example of direct economic calculation, Robert August determined that one acre of saltmarsh in a particular area of Maryland had a monetary value of $2,400, in contrast to the $100 per acre value previously assigned by the state. The higher figure was arrived at in the following manner:

1. the fair market commercial value of marsh in the area (the "going" sales price) was $100-$125 per acre (with nearby upland going for $8,000 per acre, undeveloped);

2. looking at combined sport fishing, waterfowl hunting, recreational clamming, and commercial fish harvest, totally $120 per acre, based on annual yield;

3. considering that the state was selling dredged sand and gravel from ten cents to fifteen cents per cubic yard, dry weight, that the nutrient and basic food-producing capacity of a marsh is about $80 per acre, and that the

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[32]George P. Spinner (ed.), Proceedings of the Conference on Evaluation of Atlantic Coast Estuarine Zone (Baltimore: Atlantic Waterfowl Council, 1968), p. 8.

state has a bulkhead line established by law within which values must be computed, the capitalized per acre value comes out to $4,000 at 5 percent.

Then, under this formula,

> . . . the capitalized value per acre ($4000), multiplied by the number of acres owned by the state outside the bulkhead line, plus seventeen cents per cubic yard of fill taken would give the basic value of the land.[33]

Thus, $2,400/acre replaces $100/acre as the fair value for which the state should sell or permit the destruction of wetlands. If this figure were held to, precious little wetland would be dredged or spoiled. Further, a wetland having a capital value of $4,000/acre should be regulated so that the acreage could not be altered for purposes which would not increase the capital value.

Others suggest that one should not ask what a given estuary is worthy, but ask what the total objectives for the estuary are, in terms of economic, recreational, transportation, and ecological components, and then try to determine the objects that might appear to be appropriate for the people living in the area.

In addition to dollar values just mentioned, any estuary, as natural open space, has other values which cannot be calculated. These include the dilution of water and air pollutants (especially sulfur dioxide around large cities), dilution of noise pollution, and the many

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[33] Ibid., p. 29.

psychological values inherent in open space. So, no matter how high a figure we arrive at for capitalized value per acre, we will always know that the true value of that acre to man is somewhat higher, and rarely if ever less than the capitalized figure.

An Innovative Approach

Henry Lyman states that commercial fishing people want a maximum sustained yield of any fishery product, meaning the fisherman goes out and catches fish, in the two or three year age class, and brings in protein in the amount of X number of tons per year. On the other hand, the sport fisherman wants a maximum economic yield, meaning that he wants to obtain a large size fish regardless of its abundance, and therefore must expend a great deal of money, making his economic input far greater per fish. "A major game fish in the water is worth approximately $4.50 per pound to the local coastal community from the sport fishing point of view,"[34] says Lyman, and the same fish on the commercial market does not come close to that price. Thus, we have some justification for dividing and separately considering the sport and commercial fin fisheries when dealing with marsh productivity, and for considering marshes which produce sports species to be of perhaps greater economic value.

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[34] Ibid., p. 50.

Lyman feels strongly that we must develop a system of monetary criteria if we are to save the marshes, even if only a crude effort, and puts forth a most interesting proposal to solve the economic valuation problem and save marshes in the process:

> One of the great arguments for industrial and real estate development of an estuarine marsh is that it will broaden the tax base of local communities. Many marshland owners pay relatively low taxes on undeveloped wetlands, and they get absolutely nothing in return except their own pleasure if they use the wetlands. Isn't there some way of rewarding the owner of this marsh so he won't be tempted by the quick dollar? . . . This is the establishment of a marine estuary authority. . . . Such an authority would control and manage an estuarine area for maximum economic yield. . . .
>
> . . . Say the authority takes over X number of acres of marshland owned by twenty different people. At the end of any given calendar year, these people who pay taxes on this marshland will be rewarded by the profits from this managed fishery on a pro rata basis according to the acreage they own. . . .
>
> . . . Some may argue that one fellow owns all the oyster beds. However, the other acreage of the marsh is contributing nutrients to that bed. I submit that this same concept could be carried on at the local level. A coastal community could take half a dozen owners of marshland and say to them: we will get a trained biologist, a trained economist, and a trained salesman to manage this chunk of marsh. At the end of the year you will get some of your investment bait back. . . .[35]

In other words, Lyman's ideal is to manage the whole system as a single unit, and then share the collective profits. The big problem here, even beyond the difficult task of educating people to accept this somewhat socialistic arrangement, is to win the cooperation of local government

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[35] Ibid., p. 52.

so that the zoning is not changed to industrial use or some other expensive category which would sharply raise taxes and force the owners to sell out. Education, then, is needed on both sides, and is an exceedingly difficult task.

With this economics foundation in mind, some of the more important state statutes which have been enacted in the Atlantic Coast states over the past several years will be treated in some detail.

CHAPTER IV

SALTMARSH AND TIDELANDS STATUTES

The body of law pertaining to saltmarsh, tidelands, and the intertidal zone which has developed over the years derives largely from English common law, as handed down over the centuries since the Middle Ages, and is based on the premise that the sovereign has an interest in all tidelands. On accepting this premise, then, one is faced with two problems: to define the tidelands and to locate the boundary separating the private and sovereign interests. In most instances, the rule of law is clear, but its application is clouded, a situation which leads to widespread lack of enforcement of the law. It seems to be well established in common law that the line of designation between the private and public interests is ". . . a line of ordinary high water, as modified from time to time by accretion, erosion, or reliction."[1]

According to English common law, the title to all lands submerged to washed by the even flow of the tide, below mean high tide rests with the sovereign, the purpose

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[1]Alfred A. Porro, Jr., "Invisible Boundary--Private and Marshland Interests," Natural Resources Lawyer, 3(3):514 (July, 1970).

being to provide the king with the right to all watercourses, navigable streams and waterways. It did not vest ownership but rather a "heriditament," a kind of use easement providing for the right of fishery and navigation, for

> . . . Under the old English law a navigable tidal watercourse constituted a public easement highway or right-of-way set aside for the free public use which was said to be sovereignly held as trustee or guardian.[2]

This was not so much a title of ownership as it was a title of governance over use. In American usage, however, actual ownership title became accepted.

Alfred Porro, a New Jersey attorney with great interest in tidelands cases, submits that

> . . . although the crown could convey its corporeal hereditmement it could never transfer or convey [emphasis added] to any subject the public rights either of navigation or fishery. . . .[3]

for these incorporeal hereditaments are held in the public trust for all. Porro contends this fact will become better known when the public interest to save marshlands demands an end to former conveyances of sovereign rights by states to private enterprise.

Legally, "tideland" is the term that must be used when speaking of English common law, and it refers to the intertidal zones. Saltmarsh, wetlands, etc., are not legally acceptable terms. The mean tide line (usually expressed specifically as mean high tide line) referred

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[2] Ibid., p. 515.

[3] Ibid.

to is the only legal line of demarcation, and the National Oceanic Survey measurement, scientifically based on an eighteen-year average, is the accepted source. Mean high tide and low tide are derived from local mean sea level.

Origin of Federal Powers in the Coastal Zone

The United States Government officially derives its power to control and regulate activities in and affecting estuaries from five constitutionally granted powers:[4]

1. the power to regulate commerce among the several states, among the broadest of all powers.

> To the extent that estuaries are used as ports for such commerce and otherwise in connection with navigation, federal law and the implementing administration of it can be made directly applicable.[5]

2. the power to tax.

> Since the tax laws are often shaped with an eye to their effect in influencing conduct as well as to the raising of revenue, federal taxation can be used to shape certain types of estuarine development or preservation.[6]

3. the "war powers," which involve the U.S. Army Corps of Engineers in navigation improvements and permit granting for alteration of navigable bodies of water;

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[4] U.S., Constitution, Art. I, sec. 8.

[5] U.S., Department of the Interior, Fish and Wildlife Service, National Estuary Study, Vol. 6, Appendix I, "Federal, State and Local Laws and Tax Policies Affecting the Use of Estuarine Resources" (Washington: U.S. Government Printing Office, 1970), p. 2.

[6] Ibid., p. 3.

4. the proprietary power, in that the federal government has authority to manage federal property under both jus publicum and jus privatum;

5. the treaty power, here pertaining mostly to matters affecting the migratory bird and fish species regarding the preservation and management of which we have signed treaties with other nations.

From under these very broad powers have come federal statutes of a regulatory, public works, and tax nature, and those providing for grants, technical assistance, and other kinds of incentives to improved management of estuarine land and water resources. Additionally, vehicles of administrative law in the form of executive orders, guidelines for administering particular statutes, and regulations implementing Congressional acts play an important role in the federal legal setting.

Origins of State and Local Powers

The state level of government has a much freer hand in its ability to shape the development of estuaries, its only real constraint being its own constitution. The states are the repositories of the very broad police power, and under this power may act to regulate in the name of health, safety, morals, and general welfare. States are only circumscribed by ". . . the extent of authority which the people of a particular state have chosen to allow their executive, legislative and judicial branches

of government to exercise."[7] It is true that ". . . state constitutions have often been used consciously to restrict governmental action in favor of protecting private property. . .,"[8] so they are a force to be dealt with by any agency seeking to protect or influence actions over estuaries, though it is true that, since state constitutional restrictions are self-imposed, they can be lifted. However, too often this is politically a most difficult job.

Local governments, of course, only exercise those powers delegated to them by their states. In some areas this delegated power is inconsequential, but in the subject area under study, the Northeast coast, this power is already highly significant and becoming more so. The visible increase in county and town planning, zoning, and subdivision regulation power, not to mention increasingly wider powers granted to town conservation commissions and boards, county boards of environmental quality, and other such officially designated quasi-governmental citizen bodies, is progressing so rapidly that it is now difficult to keep abreast of all of the changes, even in one state or area. As will be seen in a later chapter, Town Conservation Commissions in New England, New York, and New Jersey are now beginning to have a major impact on government acquisition of saltmarsh, and on the changing public

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[7] Ibid., p. 3.

[8] Ibid., p. 5.

attitude regarding the value and disposition of these environments.

The Role of the Public Trust Doctrine

Before prceeding further on the subject of specific government powers and laws pertaining to the saltmarsh, it would be well to investigate further this most basic concept of the public trust doctrine lying behind every saltmarsh legal enactment.

Professor Joseph Sax cited in a recent article a Maryland case where the State Board of Public Works deeded to a private real estate developer 176 acres of state-owned submerged land for only $100 per acre, plus ten cents per ton for state-owned sand dredged from the bottom and used for fill.[9] On this land and with this fill, lots of a fraction of an acre each were established and sold for $5,000 to $7,300 each. A suit was filed objecting to the state's action. Why, Sax asks, should a state agency supposedly invested with the public trust, grant away tidelands in exchange for a tiny sum of money representing only a fraction of market value? Or why, for that matter, should a resource of significant value to the public be reallocated to the benefit of private citizens? In defending the grant, the state says the development will

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[9]Joseph L. Sax, "The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention," Michigan Law Review, 68(3):471-566 (1970).

produce a multimillion dollar increase in the taxable property base of the local area. There is a clear disregard for the public interest here, and Sax contends that the courts could easily intervene on the grounds that the state statutes contain nothing authorizing "give away" grants of this type.

Professor Sax also discussed a Virginia case involving a specific bill being rapidly approved by the two houses of the legislature, with no debate, on days when fifty to one hundred other bills were passed. The bill in question was then signed into law granting desirable tideland to a developer for only $1,600 per acre when fair market value dictated a figure closer to $140,000 per acre. In partial defense of this action, Sax asserts that Army Corps permits were necessary before building could take place on this land and that "If permits are necessary . . . uncertainty about obtaining such permits must be reflected in the price of the land."[10] However, Sax does not fully subscribe to this and argues

> That a property is or may be, ill-suited to private development should enhance the government's doubts about removing the land from public trust uses and should not encourage disposal by the state at a very low price.[11]

Sax suggests there is a great deal of ingenuity which courts can use in very factual cases of this sort, and that

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[10] Ibid., p. 636. [11] Ibid.

> public trust law is not so much a substantive set of standards for dealing with the public doman as it is a technique by which courts may mend perceived imperfections in the legislative and administrative process.[12]

Sax considers the public trust concept to be more than anything else a medium for democratization.

In speaking of a need to restrain localism in decision-making, Professor Sax asserts that there should be specific state-wide rather than merely local authorization, and thus decisions likely to inhibit public uses must be made in a public forum and they must be part of a public program which provides for a permit system applicable to the private use of public lands. He speaks of ". . . how very reluctant courts are to overturn an explicit legislative authorization even if that authorization seems to go to the outer edge of legitimacy. . . ."[13] With respect to the judicial role in decision-making, he comments,

> There is another useful role that the courts are willing to play. . . . That role is one in which the courts attempt to affect future cases; it is illustrated by their use of language which suggests to legislatures and to administrative agencies that there are limits which courts may impose and that those limits were nearly, but not quite reached in the particular case at bar. In this manner, the court suggests to other branches of government that they should be relucant to adopt a more permissive view of the public trust.[14]

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[12] Ibid., p. 638.

[13] Ibid., p. 674.

[14] Ibid., p. 675.

Public trust cases are often dismissed in court, according to Sax, on one or more of the following grounds:

1. the lawsuit was an impermissible action against the state's sovereignty;

2. an order granting authorization for a given act within the administrative agency's unreviewable discretion; or

3. the plaintiff had no vested property rights at stake and thus no litigable interest in the controversy.

All of these grounds have been used in saltmarsh cases, as will be seen in the next chapter.

Finally, Professor Sax urges that judicial intervention must and should be used ". . . as a technique to thrust a problem of significance upon a busy legislature's attention."[15]

In a recent article in The Yale Law Journal, it was noted that public trust theory traditionally held the public to have certain important rights in the foreshore, ". . . which rights superseded any conflicting private rights, including those claimed by the King."[16] The King was admittedly a trustee for these rights, but he could not appropriate them for his own private use. Drayton claims the current law of tidal areas is confusing and difficult to work with for it

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[15] Ibid., p. 689.

[16] William Drayton, Jr., "The Public Trust in Tidal Areas: A Sometime Submerged Traditional Doctrine," The Yale Law Journal, 79(4): 762-789 (March, 1970), p. 769.

> . . . straddles different and sometimes inconsistent goals; it has ill-defined boundaries; it encompasses more or fewer interests at different times and places; the degree of enforcement varies depending upon the balance of interests asserted, when, for whom, and where; and . . . there is considerable ambiguity regarding the state's role as trustee and regulator.[17]

And, finally, Drayton gets to the crux of much of the problem when he speaks of the all too frequent attitude on the part of state government to want to dispose of the public's rights in the tidelands. He says,

> . . . many governments have confused their roles as private owner and sovereign trustee of public interests and have attempted to give or sell portions of their trusteeship powers along with alienable interests. Although some such distributions have since been sanctified by judicial myth-making and/or by prescriptions, they are theoretically invalid.[18]

The Decision-Makers and Their Authority

Attention should now be devoted to the various decision-makers who have jurisdiction over coastal wetlands and saltmarsh, ownership and jurisdictional problems, and some of the statutes, ordinances, and regulations that have been passed (or introduced) specifically pertaining to the saltmarsh environment.

In addition to the federal government and its five broad previously enumerated powers, there are a number of other formal decision-makers at work on the scene:

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[17] Ibid., p. 774.

[18] Ibid., p. 775.

1. state legislators, and in particular state legislative committees working in conservation;

2. state conservation, natural resources, fish and game departments, especially marine resources and land use divisions;

3. state agricultural departments, especially relative to pesticides, drainage, mosquito control, agricultural run-off and sedimentation;

4. regional planning commissions and agencies;

5. county environmental quality, public works, and mosquito control boards;

6. town and village boards, trustees, conservation commissions, and planning and zoning boards.

There are also at least three informal decision makers:

1. politically active citizens and their groups and organizations;

2. public users;

3. interested non-users among the general public.

The nature of official and direct public decision-making control by these groups and federal agencies would include:

1. issuance of permits for dredging in navigable waters, by the U.S. Army Corps of Engineers, with mandated review by the U.S. Fish and Wildlife Service; also, in some cases, permits by state, county, or town agencies;

2. zoning regulations by the local town or village board, under the advisement of town or village

planning boards, comprehensive master plans and, in some critical areas, a regional planning agency;

3. property tax policies and condemnation proceedings, by the local municipality (tax assessors for income and town board for outgo, plus the state legislature for mandated expenditures in education and welfare);

4. drainage ditching for mosquito control, by a local county mosquito control commission or department of public works, with influence on or from the town board (technically under town or county aegis, but they frequently wield influence over government);

5. wildlife management and protection programs, by the state conservation or natural resources department, but frequently under strong influence from legislative committees on conservation, and from local politicans, organizations, and landowners; and,

6. proprietary responsibility of outright ownership, by any agency, for better or worse, depending on which agency controls and on strength and disposition of the agency head, as well as external pressure.

Another restraint factor to be considered is that of bonded indebtedness and financial condition of the municipality in question, and the upper permissible limits of indebtedness set by the state legislature on the advice of the state controller or other fiscal officer. After the limits are set, it is strictly up to the local town or

village board, in conjunction with a majority vote of all those voting in a local public referendum, to determine how far the municipality will go to sell such bonds to raise money for either acquisition of wetlands in fee simple, or to purchase easements for such areas. The final decision, then, is a combination of the local governing body, the voting public, and, less directly, the state legislature, as it may be influenced by the state's chief fiscal officer.

Some Selected Examples of State Action

Now that it has been seen that government does have a public trust to protect and specified authority to do so, it is proper to survey some of the more pertinent state jurisdictions in the saltmarsh and statutes applicable to them, with particular emphasis on the Northeast. This survey is not meant to be comprehensive, but only representative.

Massachusetts

Of all the states in this study and even the nation which have passed wetland protective legislation, two rank as outstanding in protecting this resource: Massachusetts, which pioneered in the early 1960s, and New Jersey more recently in 1970 with the most comprehensive law in the nation. Many other states have patterned their legislation after that of Massachusetts,

and undoubtedly others will now follow New Jersey. (New York has already made an effort to do so, but has thus far failed.) In 1963, the Massachusetts legislature enacted the Coastal Dredge and Fill Law, better known as the Jones Act, which provides that no person shall remove, fill or dredge any bank, flat, marsh, meadow or swamp bordering on tidal waters without written notice to the selectmen and to appropriate state agencies, and the state Department of Natural Resources has been given great responsibility under this act to protect shellfish and marine fisheries. Under this act, the Department of Public Works may enjoin any activity or seek criminal punishment if it appears that the digging or removal of sand, vegetation, or any natural material from any shoreline would prove detrimental to any harbor or tidewaters, a broad task, indeed. Fines up to $500 are provided for each violation. This represents a degree of public protection in Massachusetts in 1963 which is not to be found in many states even today, and stems from a long heritage of liberal judicial philosophy dating from as far back as 1851 when Chief Justice Lemuel Shaw of the Massachusetts Superior Court stated:

> . . . all real estate, inland or on the seashore . . . is taken and held under the tacit understanding that the owner shall so deal with it as not to cause injury to others; that when land is so situated . . . that it forms a natural barrier to rivers or tidal watercourses, the owner cannot justifiably remove it, to such an extent as to

> permit the waters to desert their natural channels, and overflow . . . and thereby destroy the valuable rights of other proprietors, both in the navigation of the stream, and in the contiguous lands.[19]

This law has been challenged, as will be seen in the following chapter.

Two years later, the Coastal Wetlands Act of 1964 became law. This act employs both the police power and the power of eminent domain to preserve wetlands. The act provides that, after a hearing, the Commissioner of Natural Resources can impose regulations on the uses of certain specific coastal wetlands and their adjacent uplands. Under this act, once the Department of Natural Resources decides that a certain wetland is of value, a public hearing is held and thereafter the Commissioner files an order which limits the uses to which the property may be put, thereby establishing a Coastal Wetlands Protective Area. Title remains in the hands of the original private owners, only usage is restricted. Obviously, the Commissioner must be careful not to authorize an unfair taking if he is to withstand a court challenge, as the owner does have recourse.

> Within ninety days of receiving notice, an owner of the property at the time the order was recorded who objects may petition the court to be relieved from the order on the grounds that it so restricts

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[19]Metropolitan Area Planning Council, Open Space and Recreation Program for Metropolitan Boston, Vol. 4--Open Space Law (Boston: Metropolitan Area Planning Council, 1969), p. 44.

> the use of his property as to deprive him of the practical uses thereof and is the equivalent of a taking. If the court so finds, the order is revoked as to him, and the Department may then acquire the owner's land or an easement by purchase or eminent domain.[20]

Most importantly, this act for the first time placed the initiative in the hands of the regulatory agency, the Department of Natural Resources, which can now act to preserve a marsh before the development pressures become enormous. Thus far, the results have been successful, and it has been reported that in the act's first major application ". . . 3,500 acres of the Ipswich salt marsh were restricted and no appeals from the more than two hundred owners were received."[21] Grice further reports that

> . . . since 1965 with public support and approval eleven areas comprising about 13,500 acres can now be managed for their best use. This is one-fourth of the Commonwealth's coastal wetlands area.[22]

Applications under the earlier Jones Act have ranged from small filling and dredging operations for single family use to large scale alterations of saltmarsh for industrial complexes and marinas, and each one is investigated by a state-employed biologist. In the fiscal year 1969-1970, 121 new Jones Act applications were

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[20] Ibid., p. 53. [21] Ibid.

[22] Frank Grice, "Estuarine and Coastal Management in Massachusetts," in New England Coastal Zone Management Conference Proceedings (Durham, New Hampshire: The New England Center for Continuing Education, 1970), p. 148.

recorded. As of December, 1970, 11,250 acres of saltmarsh had been placed under restrictive order under the Coastal Wetlands Act of 1965, and another 9,524 acres were pending for inclusion.[23]

The typical order under the 1965 statute declares that the Commissioner of Natural Resources is acting for the purpose of promoting the public safety, health and welfare and public and private property, wildlife, and marine fisheries (a typical and legally very acceptable use of the state's police powers); cites the specific location of the affected wetlands; delineates specific acceptable uses of the land; further delineates uses acceptable after written approval of the Commissioner; and further delineates uses acceptable after written approval of both the Commissioner and the state's Board of Natural Resources; denotes prohibited activities; and finally, outlines an appeal procedure for aggrieved persons.

The Massachusetts statutes in this area have been landmarks of natural resource law, and have not gone without challenge. Attention will be directed to a few of these challenges in the following chapter.

Public ownership of the marine littoral varies greatly from state to state, even in the Northeast.

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[23]Massachusetts, Division of Conservation Services Annual Report--1970 (Boston: Department of Natural Resources, Division of Conservation Services, 1970), p. 21.

Maine and Massachusetts, for example, own only the fully submerged lands up to the mean low tide or low water mark, their heritage being similar since Maine was part of Massachusetts until 1820. New York owns all the way up to the mean high tide mark, as does Rhode Island (although title to the marine littoral in the eastern towns of Rhode Island is in some doubt, those towns having been ceded to Rhode Island by Massachusetts, where a different law prevails).

At this point, all of the northeastern states, and many of their local subdivisions, have passed laws and ordinances pertaining to protection and preservation of wetland ecosystems and their adjacent lands and waters. As previously mentioned, Massachusetts has been in the forefront of this effort, and her neighbors Rhode Island and New Hampshire have patterned their legislation largely after the Massachusetts example, only in the context of their own situations. While enforcement in these two states has not been as strict, probably because of their "wait and see" attitude with respect to the courts and Massachusetts statutes, their laws are on a par with those of Massachusetts. Maine, Connecticut, and New York have somewhat weaker laws and much less enforcement, while New Jersey has recently enacted the strictest and seemingly most effective tidelands legislation in the whole Northeast region.

Maine

Maine has become much involved in coastal zone planning in recent years, but has relatively little saltmarsh acreage and has not shown great interest in protecting saltmarsh in particular. Most early Maine law on tidelands pertains to the protection of the rights of commercial fishermen, fishing being the state's prime income source over much of its history, and oftentimes fishing rights (including access) are held superior to land ownership rights.[24] Maine passed a compromise Dredge and Fill Law in 1967 which lacked real enforcement power, and has since been challenged and overturned in the courts. While the law did require a permit from and a public hearing by a state Wetlands Control Board prior to alteration of saltmarsh, the law was extremely vague in denoting circumstances under which a permit may be granted or denied, and the board may grant an exemption for almost any reason. Consequently, permits were almost always granted on request, many exceptions were made, and fines were low. Maine's law has, however, received much publicity as a result of the historic challenge to it in Maine v. Johnson, discussed in the succeeding chapter.

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[24]Richard B. Parks, "Public and Private Rights to Maine's Tidal Waters," Maine Fish and Game, 9(3):31 (Summer, 1967).

New Hampshire

New Hampshire likewise has a relatively small amount of saltmarsh, due to a short coastline. The state also passed a Dredge and Fill Act in 1967. This law gives permit-granting authority to the New Hampshire Port Authority, under a similar public hearing procedure, but again the wording on conditions of granting the permit are broad and vague, making the law itself most questionable. The whole New Hampshire coastal wetlands picture is overshadowed by the possible construction of a large nuclear reactor, which facility would have a profound influence over the future of New Hampshire's marsh, and there is some feeling in the state that this question must be decided before any other protection is afforded.

Rhode Island

Rhode Island approved an act to prohibit the spoliation of intertidal saltmarshes in 1965. It is short and sparing of words, is based on the biological productivity value of saltmarshes, and also provides permit-granting power, in this case to the state Department of Public Works, and provides that the complainant shares 50% of all fines collected, thus giving economic incentive to those who would complain. This was one of the first laws based on a vegetative definition of saltmarsh, but was unfortunately insufficient in length or detail to be comprehensive. In the same year a much stronger wetlands

act was introduced in the Rhode Island legislature, an act which would provide for state designation of ecologically valuable saltmarsh similar to that of Massachusetts, but this bill failed of passage.

Bradford Monahon of the Rhode Island Department of Natural Resources reported in late 1970 that his state's tidelands legislation was definitely veering in the direction of Massachusetts, though at a slower pace.[25] Bouchard reports a very serious problem of lack of money and grossly under-informed political leadership in answer to why Rhode Island has fallen behind her neighbors.[26] George Thurston, Jr., Chairman of the Portsmouth, Rhode Island, Town Conservation Commission, reports that his and other town conservation commissions are at work mapping saltmarsh and field checking to curb violations of the 1967 saltmarsh act (Dredge and Fill Act of 1967).[27]

The major Rhode Island accomplishment with respect to saltmarsh in recent years is not to be found in wetlands legislation per se, but in the passage and enactment

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[25]Personal correspondence, Bradford Monahon, Information and Education Specialist, Rhode Island Department of Natural Resources, Providence, Rhode Island, December 9, 1970.

[26]Personal correspondence, Leo Bouchard, President, Rhode Island Association of Conservation Commissioners, Esmond, Rhode Island, January 6, 1971.

[27]Personal correspondence, George Thurston, Jr., Secretary, Portsmouth Town Conservation Commission, Portsmouth, Rhode Island, September 11, 1971.

in 1971 of an act creating a Coastal Resources Management Council, a council advisory to the Governor and with significant power to influence coastal zone management decisions, including those pertaining to wetlands and saltmarsh. The Council almost came into being in 1970, but the enabling legislation at that time was defeated by a coalition of local town and village interests who feared erosion of their power. The act was eventually passed following the issuance of a voluminous and very detailed report of the Governor's Technical Committee on the Coastal Zone. While not as strong or specific as some other state's legislation, this act does provide the state some authority to intervene in intertidal saltmarsh cases beyond the authority granted in the 1967 act, and many feel this will mark the beginning of effective state control of the situation. The Rhode Island Coastal Resources Management Council was the first of its kind in the nation, and also features the important task of inventorying in detail all of the state's coastal resources.

Connecticut

After a lapse of many years, the state of Connecticut is now beginning to make major strides in saltmarsh protection, both on the state level and the local town level, partially via highly successful town conservation commissions.

Connecticut, with traditionally weak statutes in this area, is now working under the quite strong Tidal Wetlands Act of 1969, as amended in 1971. The tidal saltmarsh is defined by the occurrence of some, but not all, of nineteen vegetative species, in keeping with other more recent wetlands laws. It denotes a wide number of established wetlands values, authorizes the Commissioner of Agriculture and Natural Resources to make an inventory of all tidal wetlands in the state, delineate the boundaries on a line at or below an elevation of one foot above local extreme high water, hold public hearings on the designations, and authorize a permit system for any alterations on wetlands within the announced boundaries. A person proposing an alteration must apply to the Commissioner for a permit, the application containing a full description of all proposed work, which description shall be sent to a number of state and local agencies qualified to pass judgment on the proposal. The Commissioner must then hold a public hearing on the application, and then may grant, deny, or modify the application, as per its possible effect on the public health and welfare, marine fisheries, shellfisheries, wildlife, flood protection, and established public policy. The latter criterion is especially important in light of the current trend toward the passage of broadscale environmental protection legislation in many of the states,

including Connecticut. The Commissioner may impose any limiting conditions consistent with public policy, and may require a bond ". . . securing to the state compliance with the conditions and limitations set forth in the permit."[28]

According to the law, "If the court finds that the action appealed from is an unreasonable exercise of the police power, it may set aside the order." The law continues,

> If the court so finds that the action appealed from constitutes the equivalent of a taking without compensation . . . it may at the election of the commissioner (1) set aside the order or (2) proceed to award damages.[29]

Violators must be responsible to the state for the cost of restoration of the affected wetland to its condition prior to the violation, insofar as this is possible, and may be fined up to one thousand dollars.

This new Connecticut statute is considered to be quite strong, but does have a few weak spots:

1. the applicant who wishes to make an alteration is not required to file an environmental impact statement, but rather the burden and expense of proof falls to state agencies;

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[28]Connecticut, Public Act No. 695 (1969), p. 3. This act generally refers to dredging and filling in Connecticut estuaries.

[29]Ibid.

2. activities of the state mosquito control division, conservation activities of the Department of Agriculture and Natural Resources, and actions of state or local health officers are specifically exempted from all provisions of the act; and

3. the requirement that the violator be responsible for the cost of a saltmarsh's restoration to original condition is fine in theory but unrealistic in practice, for such a cost could hardly be determined with the present state of knowledge.

Thus far, the legality of this act is untested and no court decisions had been rendered with regard to the act as of early 1972.[30]

A notable strength of this 1969 legislation is that, in the case of any wetland under consideration for state acquisition by any agency, a permit for alteration is automatically denied. In 1971 a new Tidal Wetlands Act was passed similar to that of 1969, except for one important amendment which indicates the crisis of the too rapidly disappearing wetlands. The new law provides that

> If, before the (inventory) maps are prepared, the commissioner finds that an area is in immediate danger of being despoiled by any activity which would require a permit if such area were designated as wetland and that such area shall probably be so designated when such maps are completed,

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[30]Personal correspondence, James J. Grady, Assistant Attorney General of Connecticut, Hartford, Connecticut, April 20, 1972.

> the commissioner may designate such area as wetland, provided, if such map of such area is not completed within sixty days, such designation shall be void.[31]

Thus, the new law is designed to cover the interim between the present and the earliest time the maps can be completed and made effective.

Connecticut has acquired 4,500 acres of saltmarsh in recent years, and has a stated goal of acquiring an additional 7,000 acres. This would leave about 2,500 acres of undespoiled saltmarsh to be otherwise protected or destroyed.[32]

New York

New York State, though more advanced than her neighbors in planning sophistication, is unfortunately behind in saltmarsh protection. New York remains one of the few coastal states with no state statutes specifically relating to wetlands.[33] In 1959 the state did enact the much heralded Long Island Wetlands Act which accepted the town's claims to wetlands ownership. Funding was for state management and development of these town-owned

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[31]Connecticut, Public Act No. 138 (1971), p. 1.

[32]Horace H. Brown, "Coastal Zone Planning in Connecticut" in New England Coastal Zone Management Conference Proceedings (Durham, New Hampshire: The New England Center for Continuing Education, 1970), p. 140.

[33]Personal correspondence, Thomas F. Harrison, Assistant Attorney General, New York State Department of Law, New York, New York, May 12, 1972.

wetlands. However, very little funds were ever appropriated and thus very little was accomplished by way of actual management or protection. However, some small saltmarsh acreage on western Long Island was protected cooperatively with local government as a result of the act.

New York has statewide freshwater and Great Lakes wetlands legislation, but Nassau and Suffolk Counties on Long Island, where most of the state's marine wetland acreage is located, are exempt from the legislation. Home rule and local powers on the town level are very potent on Long Island (especially on the less developed eastern end), and town power usually supersedes state power in these matters. Town government on eastern Long Island was established in 1640, while the state government was not established until about 1787. When state government was established, these towns in practice surrendered very little of their rights and power to the state government. For example, according to the colonial Dongan Patent of 1686, the towns hold in common for the people's benefit all of their submerged lands and bottoms, marine waters, finfish, shellfish, etc., and this proprietorship of the towns has largely been recognized by state government. Fortunately, however, many of the Long Island towns have passed quite strict wetland ordinances, as have a number of their sister towns and some municipalities across New England. The colonial patents

and some of these local ordinances will be further discussed in this and in the following chapter.

A very comprehensive act to amend the New York conservation law to provide for an inventory of tidal wetlands and regulation of alteration of such wetlands was passed by both houses of the New York State Legislature in the spring of 1972, but was vetoed by Governor Rockefeller. The bill bore some resemblance to the similar Connecticut statute, but was more comprehensive, outlining in detail the numerous values and functions of wetlands, and basing its definition of tidal wetland on the occurrence of any of some twenty species of vegetation and certain physical and geological descriptions. The bill authorized a complete tidelands inventory by the latest photographic and cartographic techniques, and also authorized a moratorium on wetland alteration during the inventory. The inventory is now proceeding in spite of the governor's veto of the bill, but no moratorium is in effect. The usual public hearing procedure following public designation, and grievance procedure, are authorized. A clause was included which authorized alteration of the boundary maps in keeping with possible natural changes through erosion and accretion. In regard to the moratorium,

> No person shall alter the state of any tidal wetland or of any area immediately adjacent to such wetland as the commissionery may reasonably deem necessary to preserve in order to effectuate the

> policies and provisions of this act, prior to the completion of the inventory of such tidal wetlands pursuant to this act.[34]

Title 3 of the bill, "Program and Land Use Regulation for Tidal Wetlands," provides for cooperative agreements with local government requiring 50 percent share of costs to maintain and protect wetlands. Under the agreements, wetlands must be maintained in their natural state, except that local government cooperators may

> . . . operate or lease for operation shellfish beds lying within the area, and a reservation of the income from such operation or lease for the village, town or county shall be allowed and not considered a violation of preservation and maintenance of a natural state.[35]

This clause could become most important in establishing a vested government (and private) economic interest in the saltmarsh which could be a factor in offsetting future pressures to alter the marsh.

The act would then have implemented a form of dominant use zoning, after delineation of "compatible uses" for each mapped marsh. And, significantly,

> The placing of any tidal wetlands under a land use regulation which restricts its use shall be deemed a limitation on the use of such wetlands for the purposes of property tax valuation. . . . Assessment shall be based on present use under the restricting regulation.[36]

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[34] New York, Senate Bill 7939 and Assembly Bill 9046, February 1, 1972, p. 8.

[35] Ibid., p. 10.

[36] Ibid., p. 16.

After zoning is declared, a permit system for almost any conceivable use resulting in an alteration of the natural environment would be established, but specifically excluding sport or commercial finfishing or shellfishing, aquaculture, hunting or trapping. Activities of departments of health are also exempted, but mosquito control commission activities are subject to control and modification, unlike similar activities in Connecticut.

The applicant for a permit is charged with the responsibility of demonstrating that the proposed activity is in accord with the policy and provisions of the act, but is not as demanding as recent New Jersey legislation which requires the applicant to submit an environmental impact statement written by a qualified individual at the applicant's own expense.

In granting or denying the permit, the commissioner is bound by law to consider the compatibility of the proposed action with reference to the public health and welfare, marine fisheries, shellfisheries, flood, hurricane and storm dangers, as in Connecticut, plus the dominant zone land use regulations. Also as in Connecticut, upon notice that the state or any of its agencies is in the process of acquiring the subject tidal wetlands, the permit application will be automatically denied. A bond of guarantee may be required to insure compliance with the commissioner's modifications on a given application.

The bill further provided,

> Any applicant for a permit to dredge, excavate or remove soil, mud, sand, shells, gravel, or other aggregate from any publicly-owned tidal wetland shall be required to pay to the public owner thereof such amount, which shall not be nominal [emphasis added], as the office of general services . . . shall determine to be the value of the aggregate extracted.[37]

Likewise, an amount more than a nominal charge must be paid for the privilege of dumping on the wetlands. This feature is unique to New York's tidal wetlands bill.

The bill also set a minimum fine for first violation at five hundred dollars, and maintained the usual one thousand dollar maximum limit. It also included a one thousand to two thousand dollar range for succeeding violations, making it the costliest proposed wetlands bill in the nation, at least with respect to fines for violations. It also included a requirement for the somewhat unreasonable payment of a cost of restoration of the affected tideland, along with a set time period for the period of restoration, to be determined by the court.

The final section of this lengthy bill, Title 6, provided for the abatement of all types of water contamination and pollution in the wetlands, by action of the commissioner of conservation and the attorney general.

As aforementioned, this bill was passed by both houses and vetoed by the governor, who gave vague reasons

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[37] Ibid.

of "broadness" for his action. However, legislative leaders predict the bill will be reintroduced in the next session with only minor modification, and a second passage is foreseen. In an interview, Helms reported that general feeling was that the bill was much too broad to be enforceable, especially with respect to the definition of wetlands.[38] A wildlife biologist with the New York State Department of Environmental Conservation remarked,

> We as professionals who would administer the Act found that there were many difficulties in the proposals. For one thing, we were ordered to produce a map; however, no funds were allocated. The moratorium as originally proposed would have continued indefinitely until we got around to finally funding the mapping. There was severe doubt that the bill would stand without being thrown out by the court as being confiscatory. Also, the bill included a hearing procedure on all alteration of wetlands or areas not necessarily significant which would fall within the unfortunately broad description of lands coming under the jurisdiction of the Department. These hearings would have bankrupted us as far as manpower and funds were concerned. A hearing would have been required for every bulkhead repair in New York City whether or not we objected to it.[39]

New York: Long Island

On the local scene in New York, all the townships of Nassau and Suffolk Counties, with the exception of the

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[38]Interview, Carl Helms, Manager, Quogue State Wildlife Refuge, Quogue, New York, August 11, 1972.

[39]Personal correspondence, John L. Renkavinsky, wildlife biologist, New York State Department of Environmental Conservation, Stony Brook, New York, January 17, 1973.

incorporated villages, have ordinances pertaining to the dredging and filling of wetlands, shellfishing, boating, and other recreational use thereof. The Town of East Hampton is probably the most advanced in this respect, having enacted, in June, 1970, a rather comprehensive flood control and wetlands preservation ordinance. Citation of wetlands values and functions, and definitions by comprehensive vegetative parameters, are included, and the ordinance prohibits placing or depositing fill or any material, including structures ". . . within or upon any tidal waters or other water courses, wetlands, tidal marshes or flood plain lands"[40] or filling, digging, dredging or otherwise altering any materials from these environments, except in compliance with a very restrictive code dictating the exact nature of what may or may not be done. Permits are issued, but far more are denied than granted, with the usual result being alteration sufficiently removed from the marsh to avoid ecological problems. The existence of this strict wetlands ordinance is largely the result of the work of the Town Conservation Advisory Council, both in originating the ordinance and obtaining its acceptance.

With respect to public lands, in 1968 the Town of Hempstead took a further step in stating

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[40]Town of East Hampton, New York, Zoning Ordinance of 1970, p. 17.

> . . . all of the tidal wetlands and underwater lands owned by the Town of Hempstead are hereby dedicated to marine recreation and conservation purposes and are hereby declared to be held in the public trust for the purposes and upon the conditions hereinafter set forth, and no such lands shall be sold and conveyed by the Town of Hempstead unless such conveyance be authorized by local law subject to a mandatory referendum. . . .[41]

The small incorporated village of North Haven on eastern Long Island passed a strong Flood Plain Zoning Ordinance in 1970 which defined the flood plain as ". . . all land within the village subject to flooding by tidewater rising to a height of seven (7) feet above mean sea level," and provided that in this zone "No person shall build . . . any building, house, residence, dwelling or other structure intended for human habitation"; "No road traversing land lying within the Flood Plain Zone shall be added to the official map of the Village"; and "No land in the Flood Plain Zone shall be subdivided into lots."[42] A strict procedure for making exception and permitting building on the floodplain is outlined, ensuring many safeguards to marshland ecology, and a performance bond to guarantee the safeguards is provided for.

Some New York coastal municipalities, such as the Town of Southampton, encouraged by recent judicial decisions, have taken it upon themselves to intensively

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[41]Town of Hempstead, Public Wetlands Preservation Act of 1968, p. 2.

[42]Village of North Haven, Flood Plain Zoning Ordinance of 1970, p. 1.

survey and map tidal wetlands and saltmarsh through sophisticated multispectral aerial photographic techniques, and Guss reports confidence that such techniques are of sufficient scientific validity to stand in court, and are preliminary to New York's eventual approval of a protective law which would require such a precise survey.[43]

New Jersey

The New Jersey Legislature succeeded in enacting, in 1970, a very strong, broad and comprehensive Wetlands Act, with the enthusiastically vocal support of the governor. In a speech on November 5, 1970, Governor William T. Cahill remarked,

> The thrust of this law, and of the subsequent orders which will be adopted, is to protect the state's endangered tidal marshlands. . . . The lands to be regulated will be only those which meet both the tests established in the act. Regulated lands must have growing on them, or be capable of support, biologically valuable grasses, and these lands must also be below the line one foot above local extreme high water. A substantial amount of land may pass the one foot test, but will not be subject to regulation since it does not support the requisite vegetation, and hence is not within the purview of the statute.[44]

The essence of this statute is that the state's wetlands would be mapped and inventoried by the Commissioner of

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[43]Interview, Philip Guss, Consulting Engineer to the Town of Southampton, Quogue, New York, August 18, 1972.

[44]Governor William T. Cahill, Statement on the New Jersey Wetlands Act, November 5, 1970.

Environmental Protection, who would then issue orders affecting the use of this land. Mapping would be carried out on a priority basis, with those most endangered attended to first. The orders regulating land use specify those uses which are not subject to regulation, those classes of land use which may proceed only with a permit, and those which are entirely prohibited under any circumstances.

The statute is, as usual, based on the police power to protect the public health and welfare, and provides a very specific wetlands definition based on mathematical and vegetative parameters, and also specifically denotes geographically all of the state's major estuaries and associated wetlands. It includes ". . . those areas now or formerly connected to tidal waters,"[45] a definitely broadening provision extending coverage to those zones which are no longer tidal due to the interference of man. There are, however, two notable weaknesses in this otherwise comphensive legislation: "The term 'coastal wetland' shall not include any land or real property subject to the jurisdiction of the Hackensack Meadowlands Development Commission,"[46] a political compromise due to very heavy pressure to develop these meadows for a large sports

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[45]New Jersey, Wetlands Act of 1970, New Jersey Statutes, 13:9A-1, et. seq., p. 2.

[46]Ibid., p. 3.

stadium, industrial complexes, and new towns. Also, "No action . . . shall prohibit, restrict or impair . . . the State Mosquito Control Commission,"[47] a testament to the power of this entrenched agency.

Regulated activities are specified, and involve the usual kinds of deposit and removal of materials, alterations, etc. However, "Regulated activity shall not include continuance of commercial production of salt hay or other agricultural crops . . .,"[48] a potentially major weakness.

This act contains an unusual safeguard against the court's finding the order unconstitutional for

> If the court finds the order or permit to be an an unreasonable exercise of the police power, the court shall enter a finding that such order or permit shall not apply to the land of the plaintiff; provided, however, that such finding shall not affect any other land than that of the plaintiff.[49]

The New Jersy Wetlands Order which results from this statute is very comprehensive, specifying in detail the cartographic technique which must be used and the degree of accuracy required, explaining in some detail the general ecological and geophysical nature and specific values of the estuarine zone, a rationale for the order, and conclusions. The rationale as given is that

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[47] Ibid., p. 4.

[48] Ibid., p. 3.

[49] Ibid., p. 4.

> . . . balance is central to the Order. . . . [The Order] recognizes that destruction eliminates choice. . . . The balance sought to be injected is not a balance between developed and underdeveloped pieces of wetland, for nowhere do the criteria exist to strike an accurate balance in this way. The balance of this Order is a mental or internalized balance in which the adverse effects of development are weighed before the fact, rather than after.[50]

Typical of the many Wetlands Orders now being issued by the New Jersey Department of Environmental Protection is the one covering portions of Ocean and Salem Counties for which hearings were held in January, 1972. This was a twenty-four page Order of text and some maps outlining the specific area affected and citing definitions. It also noted Type A regulated activities (for minor change with abbreviated procedure), Type B regulated activities (for major change with full procedure), prohibited activities, other related state statutes, local ordinances, appeals, and exceptions. An enclosure on the basis and background of the Order, as previously described, is appended to the Order, along with the pertinent maps.

Type A permits under an abbreviated procedure are issued for

> . . . the reconstruction, repair or renovation of existing structures or facilities in wetlands in a manner which will not increase the area covered

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[50]New Jersey Department of Environmental Protection, Notice of a Public Hearing on a Proposed Wetland Order, November 15, 1971, p. 4.

> by the structures or facilities and/or which has a total construction cost of not more than $5000, and for the construction of new facilities which have a total cost of less than $5000.[51]

Type A permitted activities are then described, and include the cultivation of agricultural products, the excavation of small boat mooring slips for non-commercial use, the repair of sea walls, the repair or replacement of existing bridges (with no size increase), the construction and maintenance of catwalks, wharves, boat shelters, etc., on pilings of specified dimensions, and other minor activities. A notable weakness of this section is that the acceptable size of permitted small boat mooring slips is not specified, while the vague word "small" is used. This use does provide, however, that no spoil be placed on wetlands. The application procedure for Type A permits is outlined in detail, and a full written explanation of the proposed activity and its need is required. A non-refundable fee of $25 is assessed for such a permit. A review procedure is provided, and the Commissioner may grant the permit only if he finds that the proposed subject:

> . . . requires water access or is water oriented as a central purpose of the basic function of the activity;
>
> . . . has no prudent or feasible alternative on a non-wetland site;
>
> . . . will result in minimum feasible alteration or impairment of natural tidal circulation;

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[51] Ibid., p. 5.

> . . . will result in minimum feasible alteration or impairment of the natural contour or the natural vegetation of the wetlands.[52]

Point two is especially interesting, for it does ask that attention be given to alternatives.

The kinds of activities demanding a more restrictive Type B permit include aquaculture, commercial recreation development, the installation of utilities, excavation for boat channels and mooring basins, the construction of single lane driveways and paths, appropriate use or consumption of water, and many other activities involving any permanent physical change to the wetlands. The application procedure is much more involved and requires, among other things, proof of property ownership, a list of all adjoining landowners, notification to the local municipality, general and specific location maps of the property, detailed plans for the proposed activity, and a written explanation of the proposed activity and its need. Also required are a complete environmental impact statement obtained at the owner's expense, which statement shall

> . . . describe and analyze all possible direct and indirect effects of the proposed activity on the site itself . . . and on adjacent and non-contiguous areas. . . .

and, further,

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[52] Ibid., p. 6.

> it shall relate the ecological and physical characteristics of the proposed activity site to the local and regional functioning of microscopic marine life, vegetation, birds, mammals, tidal circulation, hydrology, meteorology, geology, soils, land use, recreation, and history, and, in addition, it shall describe and analyze:
>
> --alternatives to the proposed action that would reduce or avoid environmental damage, including the no-action alternative;
>
> --the relationship between local and short-term uses of man's environment and the maintenance and enhancement of long term productivity;
>
> --the reasons that structures cannot be located on uplands,[53]

among other things.

The application examination and hearing procedures are stringent, and the review procedure provides extra safeguards, particularly in the areas of pollution, waste disposal, pesticides, and other contaminants. The applicant must also provide information on the location of freshwater outflows in the vicinity, and the maximum recorded hurricane and storm tides in the area.

Prohibited activities under this order include:

> Placing, depositing or dumping any garbage, refuse . . .;
>
> Dumping or discharging treated or untreated domestic sewage or industrial wastes . . .;
>
> Applying any pesticide on areas containing significant stands of salt marsh cordgrass, three square, wild rice, and cattail, as shown generally on wetlands maps;
>
> Applying persistent pesticides to coastal wetlands;
>
> Driving or causing to pass over or upon wetlands any mechanical conveyance which may alter or

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[53] Ibid.

> impair the natural contour of the wetlands or the natural vegetation including, but not limited to, snowmobiles, motorcycles and marsh buggies.[54]

The last activity cited is one which appears on no other state's wetlands statutes, and it seems the only obvious weakness detectable in any of these prohibited activities is the lack of a definition of "significant stands" in the prohibition on pesticide application.

An interesting final point on this broad yet specific statute is that existing man-disturbed areas are excluded from the act, and the Department of Environmental Protection took a conservative position and advocated this exclusion because

> Disturbed wetlands are not easily repaired or replaced; their value in the food chain is greatly reduced since most disturbed wetlands no longer support . . . the kinds of vegetation listed in the Wetlands Act of 1970,[55]

though their values as open space and storm buffers is acknowledged.

This significant New Jersey statute is now under legal challenge in cases pending in the courts. A discussion of these challenges can be found in the following chapter.

Maryland

Although the state of New Jersey represents the southernmost boundary of the primary study area of this

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[54] Ibid., p. 8.

[55] Ibid., p. 10.

dissertation, it would be of value to observe the tidal saltmarsh situation extant in selected South Atlantic and Gulf Coast states. Their example and experience can provide additional insight into the problems encountered in the Northeast.

The state of Maryland, rich with Chesapeake Bay and other tidal saltmarsh, also passed a wetlands law in 1970. Due to the tremendous navigational significance of the Chesapeake, dredging of the bottom of this shallow estuary to combat sedimentation is almost constant, and thus Maryland has a more aggravated problem of how to dispose of the fill. Traditional deposition on the wetlands, of course, destroys them permanently, and thus Maryland faces the dual problem of not only preventing excess dredging to protect wetlands but also redirecting fill deposition away from these environments. A recent report claims

> Even more acute is the problem of disposing of the 1.5 to 2 million cubic yards of spoil which are produced annually from ship channel dredging, without degrading marine life. Most of this material is dredged from the bottom of Baltimore Harbor and in the past has been dumped in other portions of the Bay. . . . Since much of this spoil is contaminated by industrial wastes, dumping presents a significant water quality hazard.[56]

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[56]Garrett Power, Chesapeake Bay in Legal Perspective (Washington: U.S. Department of the Interior Federal Water Pollution Control Administration, 1970), p. 211.

This same source severely criticizes Maryland's (and Virginia's) piecemeal approach to wetlands policy, a problem somewhat remedied in the new 1970 statute.

Under the statute, a Wetlands Preservation Division has been established within the Department of Environmental Protection. However, in many respects, the law is vague and weak, preserving private ownership rights at the expense of the public interest in wetlands, for it gives the owner of land bounding on navigable waters the right to

> . . . make improvements into the waters in front of said land for the purposes of preserving his access to navigable water or for protecting his shore against erosion . . .,[57]

without specifying how this might be done to protect the saltmarsh. The law does prohibit dredging and filling on state-owned wetlands without a license from the Board of Public Works (excepting the dredging of sea food products, and for purposes of mosquito control). But, it does specify as being lawful on private wetlands

> . . . the exercise of riparian rights to make improvements to lands bounding on navigable waters to preserve access to such navigable waters or to protect the shore against erosion.[58]

Unfortunately, almost any alteration could be permitted under this vaguely worded provision.

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[57]Maryland, 1970 Wetlands Act, Maryland Statutes (1970), Art. 66C, Sections 718-731, p. 3.

[58]Ibid., p. 4.

Similar to that of New Jersey, the law does provide for the survey of all private wetlands in the state and the institution of a hearing procedure prior to the issuance of official maps. A permit system for proposed activities not permitted by rules and regulations specified is established but, as previously mentioned, those permitted are so broad as to negate the need to apply for a permit for many kinds of harmful projects. With the exception of this notable and significant flaw and very low fines, the remainder of the law is simar to those of other states already described.

Further weakening of the law is, however, found in the concluding section on riparian rights wherein it is stated

> It is the intent of this subtitle that no riparian owner shall be in any way deprived of any rights, privileges or enjoyment of such riparian ownership that he had prior to July 1, 1970, . . . and that the provisions of this subtitle not be construed to transfer the title or ownership of any lands or interest therein. . . . And be it further enacted, that the provisions of this act shall in no way affect . . . the Code of Public Local Laws of Worcester County. . . .[59]

Thus, a Maryland county containing some significant wetland acreage is totally exempted from the provisions of the act.

The Secretary of the Maryland Department of Natural Resources recently sought the opinion of the state Attorney General as to whether he (the Secretary) is authorized to

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[59] Ibid., p. 7.

implement the private wetland provisions of the 1970 statute on a county-by-county basis (in keeping up with the progress of the mandated inventory) or to promulgate rules and regulations for the whole state at once. After raising the issue of poor publicly owned wetland vs. privately owned wetland differentiation, Attorney General Burch responded,

> The single issue presented is whether the rules and regulations prescribed by the statute may be made effective for one county at a time or whether it is necessary to complete all of the delineated procedures for every affected county (and Baltimore City) and only then promulgate rules and regulations simultaneously for all areas. Stated another way, the question is whether the private wetlands of some counties may be brought under regulation before those of other counties by virtue of the issuance of rules and regulations on a county-by-county basis. . . . Promulgating rules and regulations in all sixteen affected counties and Baltimore City at the same time is desirable. . . . It is our opinion, however, in this particular case that the implementation of the statute by a progressive or sequential promulgation of rules and regulations on a regular basis as the preliminary conditions of inventory and mapping, consultation, notice and hearing and filing of an order are completed is neither illegal nor improper.[60]

Further,

> In our opinion the effect of your proposed procedure (of sequential promulgation) . . . is not a violation of the constitutional right of equal protection. A reasonable classification does not offend constitutional principles and a state does not violate the Equal Protection Clause merely because classifications made by its laws result in

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[60]Letter of Francis B. Burch, Attorney General of Maryland, to James B. Coulter, Secretary of the Maryland Department of Natural Resources, Baltimore, Maryland, January 21, 1972, p. 4.

> some inequity. . . . In our opinion your proposed county-by-county approach . . . is neither so arbitrary nor so unreasonable as to offend constitutional principles. . . . The Equal Protection Clause does not require that a state must choose between attacking any aspect of a problem or not attacking the problem at all. Similarly, the implementation of the Wetlands Act . . . is not required to be launched on an all-or-nothing basis.[61]

Virginia

Recent legislation was passed in Virginia to protect wetlands through an ordinance providing for the creation of wetlands boards, requiring permits for certain activities, and providing a review and appeal process. The statute is rather comprehensive and closer in nature to those in the Northeast than to that in neighboring Maryland. Bearing some resemblance to the New Jersey Wetlands Act, the Virginia statute permits similar activities as those under New Jersey's Type A category, and requires a permit for activities similar to New Jersey's Type B. Thus, Virginia's law is less restrictive, but at least permitted and prohibited activities are specified clearly, without the vagueness attendant on the Maryland law.

An added feature of Virginia's statute is a provision for counties, cities, or towns to enact wetlands zoning ordinances and to establish wetlands boards of local residents to administer such ordinances. Thus, more attention is given in Virginia to local home rule than is found

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[61] Ibid., p. 7.

in states to the north. It is conceivable that these local wetlands boards could function in a manner similar to that of New England's town conservation commissions, working positively as a watchdog over violations of state laws or negatively to foil preservation under the influence of local vested interests. The result of this interesting provision remains to be seen.

Under the act, decisions of the local wetlands board may be appealed to the Commissioner of the Virginia Marine Resources Commission. However, the Commission may review a local decision only if twenty-five or more property owners in the affected municipality petition him to do so, a notable violation of the one-man vote philosophy. The Commission has been given very broad grounds on which to overturn the decision of the local board. The Commission also has the authority to investigate all projects which alter wetlands and ". . . may receive gifts, grants, bequests, and devises of wetlands and of money . . ." and ". . . shall manage such wetlands in such a way as to maximize their ecological value. . . ."[62]

As of amendments approved in 1972, private property in Virginia extends all the way to the mean low water mark, making most tidal saltmarsh private, except where it has been acquired by the state. Another recent

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[62]Virginia, Virginia Statutes (1972), Title 62.1, Chap. 211, p. 8.

amendment has given the state Marine Resources Commission the right to establish bulkhead lines and issue permits beyond those lines for the use of submerged bottom.

There has been a dispute in Virginia over the public use of federally owned beachfront, and this conflict could have wide ramifications on the use of tidal saltmarsh as well. In 1970 the U.S. Fish and Wildlife Service closed to vehicular traffic the entire Atlantic Ocean beachfront of the Back Bay National Wildlife Refuge for the purpose of protecting sand dunes from degradation. Since the general public had been using that ocean beach for hundreds of years, a legal question arose as to the government's right to take such action. Following a broad study of this question, the Attorney General of Virginia wrote in a letter to Andre Evans, Commonwealth's Attorney for Virginia Beach, that, according to established legal precedent, ". . . all public recreation use . . . within individual areas or in portions thereof may be curtailed when it is considered that such action is necessary," and thus that the federal authorities can legally close the beachfront to public vehicular traffic.[63]

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[63]Letter of Andrew P. Miller, Attorney General of Virginia, to Hon. Andre Evans, Commonwealth's Attorney for Virginia Beach, Richmond, Virginia, October 18, 1971, p. 5.

With regard to ownership and jurisdiction, Wass and Wright report

> . . . only . . . the natural oyster beds, rocks and shoals can be accurately located. The location of much of the commons land bounding the shores of the sea has long been lost to record. Historians and jurists have attempted to locate these lands without success.[64]

And they advocate

> The highest priority should be assigned to locating precisely state-owned marshland, particularly on the Eastern Shore off Virginia, and reclaiming any marshlands that have been claimed by individuals in error.[65]

South Carolina and Georgia

States like Virginia and Massachusetts which were settled so long ago by the earliest of colonists often have great difficulty tracing their ownership claims from early colonial days, both because of primitive and often unintelligible record-keeping in earlier times and because of the time that has ensued since then. However, maritime-oriented states like Massachusetts, which developed elaborate institutions of ownership and use rights and privileges for marine and coastal resources from the very beginning have a much easier task in deciding such matters than do more southerly states like Virginia and

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[64] Marvin L. Wass and Thomas D. Wright, Coastal Wetlands of Virginia (Gloucester Point: Virginia Institute of Marine Science, 1969), p. 101.

[65] Ibid., p. 103.

the Carolinas which were more agrarian and less maritime oriented.

The states of South Carolina and Georgia have been very active in recent years in trying to determine the legal aspects of state ownership in the estuaries and wetlands, and until very recently have been preoccupied with these matters to the extent that little has been done to control use on either the private or public salt-marsh. Settlement of the question of outright ownership is important, however, for, unlike more northerly states, both of these states have increasingly valuable deposits of phosphate and other minerals underlying their salt-marsh, and mining pressures are understandably increasing.

In South Carolina, while interest has been very great and a voluminous inventory report on South Carolina tidelands has been issued with numerous recommendations, "There is at present no general regulatory legislation providing for the protection and management of estuarine areas in South Carolina."[66] Perhaps the greatest positive role in wetlands preservation in the state is the work of the Wildlife Resources Department in acquiring estuarine areas for game reserves, but this is somewhat overshadowed by the great authority given to the State Ports Authority

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[66]Carroll Leavell, Legal Aspects of Ownership and Use of Estuarine Areas in Georgia and South Carolina (Athens: University of Georgia Institute of Government, 1971), p. 77.

to acquire, regulate, develop and destroy wetlands in carrying out its purposes. According to Leavell, ". . . present statutory control is fragmented and scattered among a number of agencies with differing, and often conflicting powers and objectives."[67] The foundation has been laid with the publication of the comprehensive South Carolina Tidelands Report, and now it remains for the people of the state to selectively implement its recommendations to protect this resource.

Much more discussion and debate on this subject has taken place in Georgia, where some further statutory action has been taken. The Georgia Attorney General has held in a recent opinion ". . . the State of Georgia is the legal owner to much, if not all, of the coastal marshland now being privately claimed . . ."[68] in that state. Further,

> . . . it is the position of the Attorney General that the marshlands of Georgia are not susceptible to private exploitation or conservation without regard to the common-law trust purposes to which these lands have long been dedicated.[69]

The Attorney General bases his argument on the original English feudal system and the direct land grants of the

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[67] Ibid., p. 78.

[68] Bolton, "Legal Ramifications of Various Applications and Proposals Relative to the Development of Georgia's Coastal Marshes" (Atlanta: unpublished memorandum of the Attorney General of Georgia, 1971), p. 1.

[69] Ibid., p. 2.

English kings under that system, namely, that the title, the jus privatum, in the tidelands was in the Crown as sovereign, and the dominion, the jus publicum, in the Crown as the representative of public trust and for the public benefit. Consequently, the original states of the United States succeeded to the Crown's trusteeship status. He notes "Under the English common law, the landward boundary of the trust property is prima facie the high tide line" and, therefore,

> . . . the State's legal title to which the trust attaches began at the high-tide line, the line of demarcation between the property of the State and the property of the upland owner.[70]

The Attorney General holds that the trust property was located in terms of tidal flow and not navigability or any other parameter (as supported in Martin v. Waddell, 41 U.S. 367, 1842), a position not held by some others in the legal profession. In the 1849 Georgia case of Young v. Harrison, it was stated that

> The net effect of the common-law trust was to vest in the State legal title to all lands, waters and beds held by the Crown in trust as of July 4, 1776, from the line of high tide seaward without respect to navigability [emphasis added].[71]

Hence, as a result of these and other court decisions, the boundaries of private landowners were held to extend only to the ordinary high water mark. Not content

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[70] Ibid., p. 5.

[71] Ibid., p. 7.

with the trend of these decisions, however, the Georgia legislature,

> . . . apparently replying to the Supreme Court, attempted to extend the boundaries of owners abutting tidal waters to the low water mark of such waters. . . . This attempt to grant by legislative enactment the State's interest in the tidal flat was in obvious violation of the constitutional prohibition against legislative grants . . .,

opined the Attorney General.[72] This seems probable but not obvious, depending on one's viewpoint.

Since Georgia contains the second greatest acreage of tidal saltmarsh (after South Carolina) on the Atlantic Coast, legal developments in that state are of potentially immense importance. Abbott, in a recent article, views the conflict participants for this resource as divided between builders and subdividers, phosphate miners, shrimp and other aquacultural farmers, those dredging and filling for navigation and highway construction (both within and outside the marsh areas themselves), wildlife lovers, recreationists, and ecological researchers.[73] She advocates the development of a master plan to satisfy the greatest number of these conflicting users.

Abbott traces the history of conflict in Georgia's tidelands from the 1860 statute which extended title from high land to the low water mark, and dictated that taxes

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[72] Ibid., p. 9.

[73] Laurie K. Abbott, "Some Legal Problems Involved in Saving Georgia's Marshlands," Georgia State Bar Journal, 7(1):28 (August, 1970).

must be paid on these lands. Then, in 1901, the Georgia Supreme Court interpreted the Act of 1860 as not being applicable to the tidal zone, following which the legislature, in 1902, passed the act previously referred to which extended title to the beds of tidewater back to the adjacent upland owner. The new Constitution of 1945 further reaffirmed this legislative enactment. Private ownership then went unchallenged until the enactment in 1970 of the Coastal Marshlands Protective Act (the Reid-Harris Act). With this enactment, the state's official position is now that:

> . . . the Act of 1902 extending title or ownership of lands abutting all tidal waters to low water mark was and still is void . . .;
>
> . . . even if the 1945 Constitution successfully validated the 1902 grant, the State succeeded to the Crown's title to jus publicum lands in trust for the people and cannot convey the land free and clear of this trust . . .;
>
> . . . marshes are not the bed of tidewaters and, therefore, the 1902 Act extending title of lands abutting on tidewaters to the low water mark did not affect title to Georgia's marshes . . . .[74]

Abbott rebuts each of these positions, and contends that the new law of 1970, as many of the newer state wetland laws, will have to withstand at least three major tests in the courts:

1. Can the General Assembly of Georgia (or any state legislature) delegate to a state agency the right to zone?

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[74] Ibid., p. 29.

2. Can the Coastal Marshlands Protection Agency (established under the law) ". . . refuse a permit for the use of marshlands without having the courts hold the same to be an uncompensated taking of private property without due process of law?"[75]

3. Do the act's procedures provide the permit applicant due process of law?

In answer to these points, a Georgia Supreme Court case in 1954 (Herrod v. O'Beirne, 210 Ga. 476) held that the state legislature had no inherent right to zone. As will be seen in the following chapter, a number of New England decisions have been found to be unjustified and illegal takings (Dooley v. Town Zoning Commission of the Town of Fairfield, Connecticut, 151 Conn. 304, 1964; Commissioner of Natural Resources v. Volpe and Company, 349 Mass. 104, 1965). Thus, the second question is valid. And, finally, while the act does provide for public hearings prior to the adoption of rules and regulations, no provision is made for requiring a public hearing on any one property owner's application for a permit, and thus the matter of due process is brought into question.

Abbott is troubled by these weak points in the new law and warns

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[75] Ibid., p. 33.

> Unless the states begin to plan wisely the use and conservation of these estuarine areas the Federal Government will move to usurp the states' roles. It has warned the states of this fact in loud, clear and unmistakable terms.

And, in concluding remarks, attorney Abbott relates

> . . . the Attorney General's opinion and the Reid-Harris Fill are viewed by this writer with mixed emotions. As a lawyer, I am distressed that the action so far taken seems to me vulnerable to the attacks which it must sustain in our courts. As a citizen of Georgia, deeply interested in, and involved in, this issue of the conservation of our marshes I am pleased that Georgia has shown its concern and demonstrated its intention to act in the interests of its people.[76]

Georgia's Coastal Marshland's Protection Act of 1970 bears some resemblance to similar laws in other states, but is clearly a compromise in that it contains in its preamble the remarks

> . . . the State of Georgia recognizes that it is necessary for the economic growth and development of the coastal area that provision be made for the future use of some of the marshlands for industrial and commercial purposes . . .

and that

> . . . it is the intent of the General Assembly that any use of the marshlands be balanced between protection of the environment on the one hand and industrial and commercial development on the other.[77]

Thus, those who would alter or destroy the marsh for their own purposes are given significant assistance in this act right from the start.

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[76] Ibid., p. 36.

[77] Georgia, Coastal Marshlands Protection Act of 1970, Georgia Laws, No. 1332, p. 940.

The definition of marshland (saltmarsh) is a rather narrow one, ecologically (plants, substrate, seawater, etc.) with only three plants cited, and with the law covering all lands from 5.6 feet above mean tide level and below.

As previously mentioned, the Act creates a Coastal Marshlands Protection AGency as an autonomous division of the State Game and Fish Commission to administer the act. The agency is made up of seven members, three being drawn from conservation-oriented state agencies, three from development-oriented state agencies, plus the Attorney General. Private citizens or groups are not represented.

Under the law, permits from this agency are required for any kind of removing, filling, dredging, draining, or otherwise altering the estuarine area. There are a number of requirements for the permit, including a certificate stating that the proposal is not in violation of any zoning law or other local restriction (so there is some local check on the permit), and a fee of $25 must be collected for each acre affected under the permit, with the total amount not to exceed $500. For a private single owner applicant, this represents somewhat of an economic constraint.

The agency's decision on granting the permit is based on whether or not the natural flow of navigational water will be affected, whether or not unreasonable erosion

or shoaling of channels or the creation of stagnant areas will result, and whether or not fish, shrimp, oysters, crabs, clams or any other marine life or wildlife will be adversely affected. The word "unreasonable" is not defined, and there is no question that the third criteria, as written, is so broad as to be unenforceable.

The act was weakened by a number of exceptions. These include all activities of the State Highway Department and of public utilities regulated by the State Public Service Commission; activities of any companies constructing or maintaining railroad lines, bridges, and pipelines; and the building of private docks on pilings above the marsh grass.

These exceptions alone represent significant weaknesses, and, while the maintenance of certain facilities and structures is understandable, the construction of entirely new ones is quite another story, and is subject to review and permit in other more restrictive states.

The possibility of a constitutional challenge to the Georgia wetlands law on due process grounds, and on the possibility of an unconstitutional delegation of zoning power, has been suggested. The issue is one of maintaining a balance between the public interest in stopping the despoliation of our natural resources against the protection of private property rights. A number of judicial decisions have determined that, if benefits from

preservation extend beyond local lines, then the cost of preservation, including the negative cost of prevention and destruction, must be borne by the state and not simply by the local private owner. And, ". . . that the question is of more than local significance is evidenced by the array of state programs directed toward conservation of estuarine lands."[78]

It has been found by the courts that if a zoning ordinance is so restrictive that it in effect deprives the landowner of all practical uses of his property, it amounts to a confiscation without just compensation, and will be found illegal. In Georgia a heavy conservative emphasis seems to favor protecting private property rights, even when such a course is harmful to society at large. Due to this position,

> . . . it is arguable that the Georgia courts will characterize the restrictions imposed by the Marshlands Act as land-use zoning. The special problem this poses in Georgia . . . relates to limitations on the power of the General Assembly to delegate zoning authority. . . .[79]

This is questionable, however, especially since the case of Herrod v. O'Beirne determined that the only authority of the legislature to enact zoning laws was limited to the delegation of that right to local government.

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[78]Anon., "Regulation and Ownership of the Marshlands: The Georgia Marshlands Act," Georgia Law Review, 5(3):568 (1971).

[79]Ibid., p. 570.

The article deals somewhat with the problem of delineation of the tidelands boundaries, the author noting

> When an application (for a permit) is made (to the Marshland agency), certain public rights must be considered where the land is below the high water mark. Above that boundary, public trust rights are non-existent. Accordingly, it can be seen that no permit application can even be considered until this line of demarcation is established.[80]

It is for this reason that very sophisticated survey methods are now being applied to delineate the boundaries in several states.

To improve the Coastal Marshlands Protection Act of 1970, it has been recommended that a constitutional amendment be proposed to give the legislature power to delegate zoning matters to the Marshlands Agency, and that steps be taken to reduce the likelihood of a constitutional challenge based on a taking without compensation. Preferably, this could be accomplished by providing the agency with powers of eminent domain.

The Gulf Coast

On the Gulf Coast comparatively little has been done to protect saltmarsh *per se*. Mississippi's Coastal Wetlands Protection Act of 1972 has been referred to in an earlier chapter, and that state with its short coastline and offshore islands is now at least on record as wishing to preserve in their natural condition at least

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[80] *Ibid.*, p. 578.

all state-owned wetlands. Like Georgia, the state has set up a permit structure regulating the typical draining, dredging, dumping and filling activities in the marshes, and the state Marine Resources Council is made responsible for issuing the permits. And, again like Georgia, local governmental bodies are much involved in reviewing permit applications. There are, unfortunately, many subregions and activities of various agencies (like the Biloxi Port Commission, Hancock County Port and Harbor Commission, Mississippi Coast Coliseum Commission, etc.) which are exempt, which fact significantly weakens the effect of the law. However, the state has taken a position which certainly can be used to further protection of the state's saltmarsh in that

> In determining the propriety of issuing permits . . ., the council and courts are to interpret broadly the provisions of this act in favor of the preservation of wetlands as opposed to any alteration of the character of such wetlands and to favor the best public interest as opposed to private or corporate pecuniary interest.[81]

Louisiana has generated much discussion of her coastal wetlands, their nature, values, legal situation, etc., but little of substance has yet been produced by way of protective legislation. Louisiana, Texas, and other Gulf Coast states have a major vested interest in

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[81]Mississippi, House of Representatives, Committee Substitute for House Bill No. 467--Wetlands Bill (Jackson: Mississippi Legislature, 1972).

the marshes and offshore submerged lands in the form of oyster-shell dredging and mining farms and the customer, the highway departments, construction industry, and unions depending on them, and this powerfully entrenched group works hard to see that no restrictive legislation is passed governing use of the saltmarsh.

It is now appropriate to investigate a number of recent legal challenges to these wetlands protective statutes. A number of the challenges are strengthening currently existing statutes, while some are or have overturned statutes and perhaps indirectly caused other statutes to be enacted.

CHAPTER V

CHALLENGES TO WETLANDS PROTECTIVE LEGISLATION: THE JUDICIAL PERSPECTIVE

The true worth, potential effectiveness, and, obviously, the validity of any statute does not come to light until and if the statute in question is legally challenged in a court of law. Most of the more meaningful legislation seeking to protect saltmarsh wetlands and estuaries is of rather recent origin, and thus has not had an opportunity to be tested in court. However, there have been enough meaningful challenges (many of them still unsettled and of uncertain outcome) to provide contents for a separate chapter surveying the wetlands vis-a-vis the courts.

Upon reading any numer of relevant cases on this subject, four points immediately become apparent:

1. some protective statutes have been upheld, while others have been overturned, with no trend apparent in either direction;

2. most of those which have been overturned were overturned on minor legal technicalities pertaining to individual cases, at the same time as the courts involved lauded the philosophy of saving ecologically valuable

wetlands--indeed, no laws were overturned on the grounds that these environments were not worth preserving;

3. in most cases, the party who sought to alter wetlands claimed that the law at issue was unconstitutionally confiscatory of private property without sufficient justification, and oftentimes was unconstitutionally vague in defining "wetland," "saltmarsh," or "tide line"; and,

4. in each case where the alterator or would-be alterator was victorious, the presiding judge found that too great a taking by the state was involved without justification, unfairly placing the social burden of wetlands protection on one party.

Hence, what constitutes an illegal taking of private property is purely a matter of degree, and also the disposition of the judge toward the issue, and thus a study of these cases does not give us any magic formula for developing ideal or even necessarily adequate protective legislation. It is up to each law to perform its own task, and the enforcement authority must try to avoid overstepping his jurisdiction in carrying out the enforcement aspect, at least initially before the law has been tested. After meeting the test on a few occasions, precedent has been established and the risk factor should all but disappear.

With these thoughts and cautions in mind, we may now proceed to a look at some individual cases, following

a geographical format parallel to that of the statute survey in the preceding chapter.

Maine v. Johnson

In the year 1967 the people of the state of Maine, following the lead of their New England neighbors, enacted through their legislature a law to control and manage developmental activities on the state's rather small but valuable saltmarsh acreage. The law was almost identical in nature and design to earlier legislation in Massachusetts previously treated, and it was widely believed it would accomplish the task of preserving Maine's coastal wetlands in a reasonable manner. As expected, it was not long before the law was challenged in the courts but, on May 21, 1970, something quite unexpected happened. On that day, the Supreme Judicial Court of the state of Maine, the highest court in the state, handed down its decision in State of Maine v. Johnson, finding the application of this law in at least this instance to be an unconstitutional taking of private property and deprivation of a citizen's rights. This decision was unexpected and created worry in the minds of those interested in protecting coastal wetlands, especially in view of the fact that most other states' legislation was so similar in content and wording as to be equally vulnerable. Because of the merits of this case and decision, it is appropriate to open this chapter with a discussion of the nature and meaning of

the judicial handling of Maine v. Johnson, for the case will undoubtedly set a precedent and serve as an example for many further cases and statutes in this complex area of law.

The Maine Wetlands Law of 1967 (P.L. 1969, Ch. 379, 12 M.R.S.A., pp. 4701-4709) establishes a permit system similar to those described in the preceding chapter, and establishes a Wetlands Control Board to administer the provisions of the act, including the approval and denial of applications to significantly alter wetlands. Under this procedure, the Johnsons, two riparian landowners on the Maine coast, were denied the right to fill some of their marshland for housing construction. The denial was first made by the Wetlands Control Board, which decision was upheld by the lower state court on appeal. The Johnsons then further appealed the decision to the state's highest court, and in the case of Johnson v. Maine Wetlands Control Board (250 A.2d 825), the Supreme Judicial Court of Maine remanded the case to determine whether or not the permit denial amounted to an illegal taking of property without reasonable compensation. A further given reason for remanding the case was insufficient information on the value of these wetlands. During the time the case was in the courts, the Johnsons allowed fill to be deposited on their property. The State of Maine then ". . . obtained a temporary restraining order, and, eventually, a permanent

injunction from the Supreme Judicial Court, prohibiting further filling on the Johnson's land."[1] The Court then found the saltmarsh to be of value for conservation of fish and wildlife, and the Johnsons initiated an appeal of the permanent injunction in the new case of State v. Johnson. On appeal and on agreement of all parties concerned, these two cases were consolidated into one before the state Supreme Court. In addition to a request for a favorable decision in their own case, the defendants also asked that the Maine wetlands itself be declared unconstitutional on due process grounds.

Under the Maine Constitution, the

> question whether injunction placing restrictions on alterations and use of wetlands constituted an unreasonable exercise of police power . . . was to be determined by consideration of extent to which landowners were deprived of their incidence of ownership,[2]

a very subjective distinction indeed. In this instance, plaintiffs (Johnsons) claimed that their property was reduced to a point of no commercial value whatever by this law, and thus the denial of permit was an unconstitutional taking. The basic issue before the court in the two combined cases was

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[1]Environmental Law Institute, The Environmental Law Digest (Washington: Environmental Law Institute, 1970), p. 45.

[2]State of Maine v. R. B. Johnson and Mabel F. Johnson (265 A.2d 711), Supreme Judicial Court of Maine, May 21, 1970, p. 712.

> . . . whether the denial of permit and the injunction so limit the use to plaintiffs of their land that such deprivation of use amounts to a taking of their property without constitutional due process and just compensation.[3]

For reasons of denial of profitable use and imposition of restrictive conditions, the court did find there to be here a deprivation of property which is contrary to constitutional protection. However, much more significantly, Mr. Justice Marden, speaking for the court, did find

> . . . the area of Wetlands representing a valuable natural resource of the state, of which appellants' holdings are but a minute part, is of statewide concern. The benefits from its preservation extend beyond town limits and are state-wide. The cost of its preservation should be publicly borne. To leave appellants with commercially valueless land in upholding the restriction presently imposed is to charge them with more than their just share of the cost of this state-wide conservation program [emphasis added].[4]

And, further, that

> their compensation by sharing in the benefits which this restriction is intended to secure is so disproportionate to their deprivation of reasonable use that such exercise of the State's police power is unreasonable.[5]

The Justice did not agree that the law itself was unconstitutional, due to vagueness, as had been charged, but that the law was sufficiently clear to fulfill constitutional requirements, and that restrictions as to draining sewage into wetlands do not necessarily represent an unconstitutional taking. Thus, the Maine Wetlands Law of

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[3] Ibid., p. 714.

[4] Ibid., p. 716.

[5] Ibid.

1967 was upheld, but somewhat weakened by this judicial decision.

In December, 1970, the Maine Wetlands Control Board motioned for a rehearing, review, and clarification of the implications of this decision. This action was taken on the grounds that none of the parties considered the applicability of the Colonial Ordinances of 1641-1647, which have the state sovereignity over the intertidal zone, and thus whether the Maine Wetlands Act is ". . . a clarification and redefinition of already existing public and private property rights in the intertidal zone."[6] Further, the Board reminded the Court,

> . . . there are not sufficient facts regarding the establishment of a market price for lands of the type in question, there are not sufficient facts relating to alternative architectural or engineering means by which residential housing or any other structures could be built on unfilled or partially filled coastal wetlands.[7]

The motion further criticized the Court for neglecting to

> . . . discuss the economic and environmental interrelationships of all the coastal wetlands owned by Appellants and whether they should be allowed reasonable economic return on each parcel including that for which application was made, or rather merely a reasonable economic return on all contiguous coastal wetlands owned by Appellants taken as a whole.[8]

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[6]Motion for Rehearing, Review and Clarification by Wetlands Control Board and State of Maine in the Cases of Johnson and Johnson v. Wetlands Control Board and State of Maine v. Johnson and Johnson, 1970, p. 4.

[7]Ibid., p. 5.

[8]Ibid.

This is a very important fine legal question which could have major implications on other decisions in other states, and it is unfortunate that it was avoided. Petitioners for this motion question whether residential housing is the highest and best use for this land, especially if

> . . . such use could not be maintained on this property because of the technical and legal impossibility of disposing of sanitary sewage on land such as that in question.[9]

(In this latter regard, the Wetlands Control Board is in the peculiar position of being asked to grant permits to avoid unconstitutional takings of private property, and also to deny permits on the grounds of violation of state sewage and waste disposal laws.)

> Conceivably the situation may arise where the land is filled for residential housing, but subsequently cannot be so utilized because of the impossibility and illegality of disposing of human sewage . . . this possibility relates directly to the Court's prior conclusion that residential housing is the highest and best use of this land. In point of fact, it may be an impossible use.[10]

Petitioners question further,

> Are the Appellants entitled to maximum commercial value for every square foot they own, or rather is a reasonable return on the entire parcel sufficient?[11]

They contend it is possible to build and void filling wetlands by building on stilts, cement blocks on pilings, and that applicants for a permit should be required to present

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[9] Ibid., p. 6.

[10] Ibid., p. 20.

[11] Ibid., p. 17.

alternate construction plans to the Board, so that the applicant could not allege a taking. In spite of these strong arguments, however, the Motion for Rehearing was denied in late 1970.[12]

New Hampshire: A Problem of Definition

In a similar but much less momentous decision in New Hampshire, the court, in the case of Howard W. Sibson v. State of New Hampshire (1969), reaffirmed a number of points giving recognition to a public interest and public trust in the intertidal zone, but at the same time permitted the plaintiffs to fill in their wetland. In this case, plaintiff Sibson, owner of four acres of wetlands along the New Hampshire coast, sought permission of the New Hampshire Port Authority, the appropriate permit-granting agency, to fill the acreage for housing construction, and was denied on two occasions, on the grounds that the state Fish and Game Department marine biologist had determined that there was saline water on the property and that circulation takes place. The latter department, fearing destruction of a productive marsh, thus prevailed on the Port Authority to deny the permit. However, another marine biologist testifying in the case claimed that this site

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[12]Personal correspondence, John M. R. Patterson, Assistant Attorney General, Environmental Protection Division, Maine Department of the Attorney General, Augusta, Maine, August 29, 1972.

> . . . is part, not of the salt marsh proper, but of the landward side of the salt meadow, an area of differing conditions and properties from the rest of the productive estuary . . .

and that "these areas do not add to the estuarine ecology."[13]

In arriving at this decision, the Court noted

> A body or stream of water cannot be considered as tidal merely because, under unusual circumstances, the level of water is affected by the tide, nor is the amount of salt in the water material.[14]

The Court did note, on the other hand, that

> the rights of (littoral) owners are burdened with a servitude in favor of the State which comes into operation when the state properly exercises its power to control, regulate and utilize such waters,[15]

as long as the property in question is in fact littoral. Holding that the legislature meant the law to be "an exercise of its dominant servitude over tidal waters and to apply only to land in or contiguous to tide waters,"[16] the Court held that this property does not fall within the purview of this law and that the Port Authority thus has no jurisdiction in the matter. Plaintiffs appeal was therefore sustained.

Hence, the Johnson cases in Maine illustrated an unconstitutional taking of private property, whereas

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[13] Howard W. Sibson v. State of New Hampshire (New Hampshire Port Authority #5916), November 28, 1969, p. 2.

[14] Ibid.

[15] Ibid.

[16] Ibid., p. 3.

Sibson v. New Hampshire illustrated a problem of wetlands definition relative to the statute in question (New Hampshire Port Authority RSA ch. 271-A).

Charles H. W. Foster, Commissioner of Natural Resources v. S. Volpe and Company: A Landmark Case in Wetlands Law

The Coastal Wetlands Act of 1965, a widely acclaimed Massachusetts statute treated in the preceding chapter, was successor to the earlier Coastal Dredge and Fill Act of 1963 (Jones Act), and resulted from a court challenge to the earlier act known as the Broad Marsh case.

In 1960 S. Volpe and Company purchased a parcel of land totalling 49.4 acres in a 78 acre saltmarsh, known as Broad Marsh, near Wareham, Massachusetts. On October 3, 1963 the firm notified the Departments of Public Works and Natural Resources that it intended to dredge a channel and basin into the marsh for the purpose of constructing a marina at a future time. The local governing body, the Selectmen of Wareham, conducted a hearing, and then sent the request to the Massachusetts Department of Natural Resources for review. The Director of the Department of Natural Resources responded that, due to the high value of marine fisheries in the area, no dredged fill be placed on the marsh. He raised no objection to the dredging as such. The firm, however, ignored the Director's ruling and commenced both dredging and filling in the marsh until

enjoined by the local court (Superior Court) on January 20, 1964. Volpe and Company in defense argued that all necessary permits had been granted: that the Director had no legal power to restrict filling while approving dredging; that the area is not a true saltmarsh but a "salt field"; that the statute in question is in violation of state and federal constitutions; and that this restriction constituted an unlawful taking of property without just compensation. Superior Court upheld the Director's view that the imposed "no-fill" condition was reasonable since it permitted the petitioner (Volpe) to do essentially what he wanted to do, and also provided alternatives. The Court also found Broad Marsh to be a true saltmarsh and thus within the jurisdiction of the law. It was further determined that the imposed condition was not an unlawful taking, saying "It has been consistently held that the General Court has power, by appropriate legislation, to affect property rights by reasonable exercise of the police power."[17] After distinguishing at length between the use of police power and eminent domain, Justice Cahill of the Superior Court found ". . . the regulation effected by the statute in question . . . is a valid exercise of the police power and not an improper taking by eminent domain."[18]

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[17]Metropolitan Area Planning Council, Open Space and Recreation Program for Metropolitan Boston (Boston: Metropolitan Area Planning Council, 1969), p. 129.

[18]Ibid., p. 130.

S. Volpe and Company was not satisfied with this trial court decision upholding the action of the Department of Natural Resources, and appealed the decision to the Commonwealth's highest court, the Supreme Judicial Court, which rendered its decision on April 26, 1965.

Attorneys for S. Volpe and Company argued primarily that the condition imposed by the Director of the Department of Natural Resources, an absolute prohibition on filling of the property, was a severe deprivation on the use of private property and thus an unconstitutional taking without compensation.

Speaking for the Supreme Judicial Court, Chief Justice Wilkins reviewed the salient points of the case and recognized Justice Cahill's contention that the protection of marine fisheries is a public purpose for which this law was enacted. He remarked,

> This is not the whole matter, however. A crucial issue is whether, notwithstanding the meritorious character of the regulation, there has been such a deprivation of the practical uses of the landowner's property as to be the equivalent of a taking without compensation.[19]

Mr. Justice Wilkins recognizes the issue was dealth with broadly in the trial court, but holds that the decision is based on degree and must rest on the facts of a given case. In support, he quotes from Mr. Justice Holmes in Pennsylvania Coal Company v. Mahon (260 U.S. 393, pp. 415-416):

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[19] Ibid., p. 131.

> We are in danger of forgetting that a strong public desire to improve the public condition is not enough to warrant achieving the desire by a shorter cut than the constitutional way of paying for the change. As we already have said, this is a question of degree. . . .[20]

In their own defense, S. Volpe and Company testified that the contemplated project could not be carried out without filling the marsh as proposed, no use could be made of the land, and there was no point in dredging without filling.

The Chief Justice finds that the Court ". . . is in no position to find whether there has been such a deprivation of the practical uses of the marsh as to be the equivalent of a taking without compensation,"[21] and a finding in this regard is necessary to decide the case. On the one hand,

> The plaintiffs [Department of Natural Resources] argue as though all that need be done is to demonstrate a public purpose and then no regulation in the interests of conservation can be too extreme,

while the Court retorts, "An unrecognized taking in the guise of regulation is worse than confiscation."[22]

The Massachusetts Supreme Judicial Court thus finds the law perfectly valid, but that the determination as to a possible unlawful taking must depend ". . . upon further findings as to what uses the marshland may still be put and possibly upon other issues which have not been

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[20] Ibid., p. 133. [21] Ibid.

[22] Ibid.

argued. . . ."[23] Mr. Justice Wilkins then reversed the lower court decree and remanded the case for the taking of further evidence on a number of issues, including alternative uses which can be made of the land in its natural state, both independently of and in conjunction with other land of the owner; the comparative fair market value of the land, both under limitations imposed by the Department of Natural Resources and without such limitations; the cost of the land and the cost of proposed improvements to the owner; and the assessed value over a number of years. The Court also sought to determine whether or not there was an illegal taking if in fact there was no alternative use; whether the land should have been considered in conjunction with other land or separate and apart; if it was relevant that the land is not suitable in its present state for residential and commercial development; if the colonial ordinance had any effect on the case; and if matters other than navigation would be affected by this ordinance.

Perry and Perry v. Wilbour

Another trial court opinion which upheld the Jones Act was the Bristol County case of Perry and Perry v. Frederick C. Wilbour, Jr., Director of Marine Fisheries (Superior Court in Equity, Bristol County No. 8412), also

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[23] Ibid.

decided by Justice Cahill, the decision being rendered on October 23, 1967. The case was a reversal of the usual situation, in that the illegal removal of fill and natural vegetation was at issue instead of the usual placing of fill. The Perrys, private owners of saltmarsh property, removed fill to a depth of one foot and associated grasses in the intertidal zone, without applying for a permit. They were ordered by the state to stop, which they did, but then applied to the local Board of Selectmen and to the Departments of Public Works and Natural Resources for permits to legalize the project. The Selectmen and the Public Works Department approved but the Department of Natural Resources rejected the application, ordering the Perrys to return all material to its original location, and further ordering that no more work be done because the area contained valuable shellfisheries. The Court agreed with the Department of Natural Resources that the area was a saltmarsh governed under Massachusetts statutes and that the limitation was not an unreasonable taking. The Perrys claimed the property would be worth less than $1,000 under the order, and over $10,000 without the order. Justice Cahill found these figures to be grossly exaggerated and based on self-interest, after consulting with an appraiser who claimed the land was worth $6,000 with or without the limitation on fill removal. Perry admitted to the Court under questioning that

> . . . he could still (a) build his proposed home without danger of tidal action, (b) use the public beach facilities immediately adjacent to the property, (c) use his property for fishing, boating and water sports, and (d) take advantage of the fine view and other aesthetic features.[24]

In sum, there is only slight inconvenience involved, and so the Court concluded that, in this case, the Commonwealth could take action to somewhat diminish the value of a private owner's property, provided it was for a public purpose, and the owner's right in her property ". . . is subject to the right of the Commonwealth to preserve marine fisheries on such property."[25] Thus, the Superior Court upheld the order and overruled the property owner, based on a judgment of degree.

These two cases sharply illustrate three salient points regarding saltmarsh in Massachusetts:

1. the people of Massachusetts, through their Division of Marine Fisheries in the Department of Natural Resources have a strong interest in and place high value on their marine finfish and shellfish resources;

2. the lower trial courts of Massachusetts seem prone to decide in favor of the Department of Natural Resources and against the private citizen, whereas in many areas the trial court usually seems more sympathetic to private interests in natural resource cases;

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[24] Ibid., p. 135. [25] Ibid.

3. the definition of what is or is not an unreasonable taking of property values is based strictly on degree and circumstances, and thus no set rule can be made. A Department of Natural Resources must always be prepared to defend itself on this issue.

A Test of the Connecticut Wetlands Act

In this case, which remains undecided to date (1973), the Town Conservation Commission in Redding, Connecticut, purchased 312 acres of freshwater wetlands along the Saugatuck River, and later learned that an owner of eight wetland acres upstream was about to dredge and fill-in his acreage for the purpose of subdivision and housing construction, an action which would impair the ecological value of the newly acquired public wetlands, as well as pollute the mainstream of the river, a public resource. Specifically, the Redding Conservation Commission

> . . . was convinced that the wetlands fulfill an important filtration function both in terms of preventing siltation and filtering out pollutants, and development of the wetlands would adversely affect the quality of water downstream where it flows through the 312 acres held as open space by the town.[26]

The Commission thus sought and was granted a restraining order by the local court, on the grounds that this dredging

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[26]Environmental Defense Fund, Circular #187, The Redding Conservation Commission and Environmental Defense Fund v. Armondo Bonsignore, et al., Setauket, New York, p. 1 (1972).

and filling action was in violation of the Connecticut Environmental Protection Act of 1971. This act is similar to a Michigan statute which gives the individual citizen the right to sue to enjoin the state to protect the environment. Because the Connecticut statute's constitutionality had never been tested in the courts to determine such, the case attracted the interest of a New York based private conservation organization with major interests in environmental law, the Environmental Defense Fund. Thus, the Environmental Defense Fund joined the Redding Conservation Commission in bringing this suit.

In the case of Redding Conservation Commission and Environmental Defense Fund, Inc. v. Armondo Bonsignore, et al., the defendant, Bonsignore had moved a dragline onto his property and announced his intention to begin dredging and filling his wetland for purpose of resale. He never sought any permit to carry out this action. The plaintiffs contend that any such dredging and filling will

> unreasonably pollute, impair and destroy the public trust in the water or other natural resources of the town and the state by, inter alia, impeding and obstructing the flow of the Saugatuck River, causing siltation of the river and ponds downstream from said site, destroying the ability of this wetland to cleanse the waters of the Saugatuck River, to offer flood plain protection, and to recharge ground water, and impairing wildlife.[27]

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[27]Environmental Defense Fund, Inc., Complaint of Environmental Defense Fund, Inc., Superior Court of Fairfield County at Bridgeport, Connecticut, January 31, 1972.

The Environmental Defense Fund thus asks in this complaint for:

1. a declaratory judgment as to whether the proposed action will adversely affect the environment;

2. an injunction prohibiting the defendants from carrying out the action; and

3. an order remanding both parties to the administrative proceedings available to determine legality under the Connecticut Environmental Protection Act of 1972.

At the time of writing (1973), no further decision was available in this case. In recent correspondence, David Tundermann, Assistant to the Connecticut Commissioner of Environmental Protection for Legal Affairs, informed the author that the courts have not invited the department to be a reference in the case.[28]

The wetlands in question in this Connecticut complaint are freshwater in nature and, as such, are not within the stated confines of this dissertation. However, the case is worthy of some attention, for it involves a set of circumstances common to many present and potential marine wetlands cases, including:

1. the complaint of a public body (town conservation commission) that the activities of private individuals

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[28]Personal correspondence, David Tundermann, Assistant Commissioner for Legal Affairs, Connecticut Department of Environmental Protection, Hartford, Connecticut, November 2, 1972.

are harming its own proprietary lands as well as publicly owned resources; and

2. the intervention of an interested private organization in order to test the strength of a broad state environmental protection statute, particularly with respect to its provisions to protect public rights to water quality and to enforce exercise of the public trust doctrine.

The Geiler Decision in New York

In a Long Island, New York, wetlands case with significant legal and perhaps national ramifications, the Trustees of the Town of Southampton in Suffolk County defended themselves against plaintiff Dolphin Lane Associates, Ltd., a private wetland owner, after plaintiff alleged that certain wetlands zoning ordinances enacted by the town were unconstitutional. The defendants claimed that they, on behalf of all the people of the town, ". . . have superior title and/or interest to certain portions of the real property claimed to be owned by plaintiff in its zoning action."[29] This case created basic questions as to the title of certain littoral and shoreline properties in the town.

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[29] Dolphin Lane Associates, Ltd., v. Town of Southampton (Suffolk County Supreme Court #73873/68), Supreme Court, Suffolk County, New York, December 29, 1971, p. 1.

The essence of this case is somewhat different from that of the preceding cases, in that the rights of the state or society to use police powers to control wetland usage is not so much at question here as is the basic ownership of the intertidal zone in this immediate area. A further problem is that this area has been settled for 350 years or more and most present-day land and water law is based on very vague generalized colonial ordinances which do not readily lend themselves to modern interpretation, though nevertheless long accepted in law. For example, this particular case raises such questions as did the plaintiff's (that is, Dolphin Land Associates, Ltd.) earlier forebearers have the right to convey legal title to this land? Other questions dealt with which party (if either) holds title to beach lands between the high tide line and the dune crest (and if so, are the beaches subject to public use easements); and with the source of title on low-lying islands and certain parts of the littoral lying below the mean high water line. The New York State Appellate Division ". . . ordered that all issues of title raised in defendants' answers be separately tried" and "that the trial of the zoning issue be held after the issue of title has been determined."[30] Thus, Justice Geiler of Suffolk Supreme Court did not

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[30] Ibid., p. 7.

deal with this issue, but only with questions of title in rendering his decision.

It was necessary in a case of this sort to investigate thoroughly the past history of the Township of Southampton back to the earliest settlement in 1640. The original territory of Southampton (and all eastern Long Island) was granted by the King of England through his representative, Edmund Andros, to a group of proprietors and freeholders settled there, this grant known as the Andros Patent.[31] This grant was made in 1676, but was superseded (for Southampton, at least) by the Dongan Patent of 1686, granted by the new Governor, Thomas Dongan. This patent or grant gave to the Trustees of the Town of Southampton all lands and waters, including shorelines, the intertidal zone, bay bottoms, waters, and all the creatures in and on these areas, as long as it had not already been granted. Thus, this patent affected the great bulk of land and waters in the town. The patent was recognized by the Colonial Assembly in 1691 and the state constitution of 1777. It has been recognized by the State of New York and the County of Suffolk since that time.

For the next thirty to forty years, the proprietors of the town, descendants of the original proprietors, were

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[31] Ibid.

active in selling off the trustees' lands in order to raise money. They also asserted a right to share in the products of the town's waters, and conflict arose between them and the people of the town as to control of the fisheries, clam beds, and other marine products. Compromise resulted in a law in 1818 providing for the public election of trustees (previously an inherited position) who were given power to superintend, manage, and sell, lease, or partition any of the unclaimed lands and associated resources in the town.[32]

In March, 1861, the elected proprietors gave a deed to plaintiff's remote ancestors, and said deed contained the following:

> . . . All the several tracts of salt or sedge meadow situated on such part of the south side of Shinnecock Bay in said town . . . and also including the Sedge Flat or Island. . . .[33]

All this was thus given to the plaintiff's ancestors. There was further conflict, which resulted in 1899 in a compromise which further resulted in the quitclaiming to the town of all interest in the islands as long as they remained islands. In return, the town quitclaimed to the proprietors all the shore property, except for certain roads.

However, at present the town claims that

> . . . the proprietors never received legal title to the subject premises under the Acts of 1818 and

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[32] Ibid., p. 5.

[33] Ibid., p. 6.

> 1831, but merely received a power to sell and an equitable interest in the proceeds from the sale of the Common and Undivided lands of the Town.[34]

Thus, the town is contending that the proprietors were only granted ". . . a power in trust over the subject premises and were not able to convey legal title."[35]

Justice Geiler noted in his historical survey that so many conveyances were made in the 19th century alone that the Court cannot now question the basis of transfer without causing great injustice. The Court accepted the possibility that plaintiff's ancestors may indeed have received such a conveyance, though not necessarily to all the subject premises, and thus must now decide what property the plaintiff actually owns.[36]

Considering the traditional legal definition of "beach," the Court decided in favor of plaintiff; namely, that he did in fact own the Atlantic Ocean beach from the mean high tide line to the dune crest. The Court did find, however, that the ocean beach was subject to public use easement. "This Court holds that the Act of 1818 reserved to the inhabitants of the Town of Southampton for all time a public easement over the subject beachers,"[37] from the crest of the dunes to the water.

We are more concerned in this dissertation with the disposition of the low sedge islands and coastal

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[34] Ibid., p. 7.

[35] Ibid.

[36] Ibid., p. 8.

[37] Ibid., p. 13.

wetlands. These are saltmarsh, and thus more appropriate to this study.

As previously mentioned, the town received full title to the islands in the compromise agreement of 1899, as long as the islands remain unattached to the mainland. The town had not made any conveyance of this land since that date. But plaintiff claimed ownership to one of the largest of these islands, Gull Island, on the grounds that the island has at times since 1899 been attached to the mainland, as a result of shifting channels and currents. Plaintiff claimed a return to ownership from the first attachment, whereas the town claimed plaintiff's ancestors never had a right to impose such a condition in the first place, and the town had illegally and erroneously recognized this errant claim. The town further argued that Gull Island has technically always remained an island. Regardless of the other arguments, the Court agreed Gull Island has always been an island and thus remains in town ownership.

Judge Geiler next raises the question of whether the boundary of plaintiff's private property is the edge of the line of vegetation or the high water mark of the bay. Or, in other words, who owns the wetlands? There is no doubt, states the judge, that the Town Trustees, through the Andros and Dongan Patents, succeed to the sovereign rights of the English Crown with respect to the

town's non-navigable waters, a fact recognized by the Colonial and state legislatures. The Acts of 1818 and 1831 do not constitute a grant by the state, but are simply a recognition of an adjustment between the Town and the proprietors. The Town has proved many times that the Shinnecock Bay is legally navigable and has always been so, and "It therefore follows that a conveyance by a governmental agency of land fronting on a navigable body of water conveys title only to the high water line."[38]

Should the Court interpret that it is right and proper for either the state and/or the Town to grant away major interest in real estate such as tidal and intertidal lands which it holds in trust for the people? In an earlier decision (Coxe v. State, 144 N.Y. 396, 39 N.E. 400), the New York legislature made a grant of similar tidal lands which the Court held invalid, for

> The title of the state to the sea coast and the shores of tidal rivers is different from the fee simple which an individual holds to an estate in lands. It is not a proprietary, but a sovereign right, and it has been frequently said that a trust is engrafted upon this title for the benefit of the public of which the state is powerless to divest itself.[39]

(Perhaps this decision should be circulated in Georgia, which has the same legal heritage.) Further,

> The title which the state holds and the power of disposition is an incident and part of its sovereignty that cannot be surrendered, alienated

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[38] Ibid., p. 16.

[39] Ibid., p. 17.

> or delegated, except for some public purpose, or some reasonable use which can fairly be said to be for the public benefit.[40]

The Courts have held that, under the acts of 1818, the Proprietors or their Trustees acquired no rights in property under water, and no power to sell or convey any such rights. The title to such property has always remained in the Town. The Courts have further recognized that none of these lands were ever sold or subjected to individual ownership, and the Town's usage and rights have been uninterrupted for over three centuries, with no evidence of a relinquishing of title by the Town. In the case of Town of Southampton v. Flanders Club (1920), it was stated that "There is no record in the history of the town that any land under water was ever specifically allotted or sold . . . and policy of the Town has always opposed such action."[41]

Hence, Judge Geiler disposed of the grants argument, and declared that plaintiff's shoreward property boundary is the high water mark. It is, perhaps, for the Judge's legal definition of "high water mark," based on largely biological parameters, that this case will most be remembered. Due to the local and perhaps regional significance of this decision, Judge Geiler's words are presented in full:

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[40] Ibid., p. 18.

[41] Ibid., p. 19.

> The uncontradicted evidence in the record indicates that the marshes lying north of Dune Road bear certain types of grasses. One type is Spartina alterniflora. This type of grass thrives naturally in salt water areas only if the soil from which it grows is regularly inundated twice a day by the tidal flow. Spartina alterniflora may persist but cannot bloom or thrive in an area which, though thoroughly saturated with salt water, is not subject to daily tidal overflow.
>
> Another species of grass found in this area is known as Spartina patens. This species grows naturally in low-lying areas above the daily tidal flow, but within the monthly range of spring tides. Inundation for more than a few days will cause decline in vigor, and daily inundation will cause it to disappear.
>
> Thus, lands where Spartina alterniflora predominates must be below the high water line. Also, lands where Spartina patens is the dominant vegetation must be above the high water line and is no longer subject to the daily tidal flooding [emphasis added].
>
> . . . within this mixed strip of the marsh there can be found the location of the Bay's average high water line. . . .
>
> . . . the patterns indicated by these strands in this area are indicative of the tidal flow for all the months of the year, over the course of several years. . . .[42]

He says the Court cannot be more specific in spelling out a more definite high water line due to a lack of a "metes and bounds" description, but a survey would remedy this.

Hence, Judge Geiler found that the Town of Southampton had title to these wetlands, and this is the first instance to the writer's knowledge that a court fully accepted a purely biological delineation of the high tide line. The decision's impact is already being felt,

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[42] Ibid., pp. 19-20.

in that the town has now contracted for a very expensive aerial photo survey of all the intertidal zone wetlands and saltmarsh hoping to officially map these based on the Spartina grasses and other vegetation, thus building evidence as insurance against future court challenges to ownership of these lands.

According to Judge Geiler's law secretary, Seymour Himmelstein, this decision does not necessarily apply to other areas of Long Island outside the Town of Southampton,[43] though it seems to this writer that it should apply if relevant to a case elsewhere, for the factual scientific data upon which the decision rests is valid anywhere in the Northeast region where the vegetation is of this type.

The Court and Water Quality

In another unusual and rather significant case in the Town of Southampton, the office of the Attorney General of New York felt it necessary to intervene in a local case in order to save wetlands which it deemed the local municipality incompetent to save.[44] Only the already documented

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[43]Personal correspondence, Seymour Himmelstein, Law Secretary to Justice William R. Geiler, Supreme Court of the State of New York, Huntington, New York, April 12, 1972.

[44]Interview, Charles B. Belt, Natural Resources Commissioner, Town of Southampton, Southampton, New York, August 5, 1972.

major values to society of wetlands could justify intervention in this case.

In March, 1970, Landing Estates, Inc., a realty subdivider, submitted application for the subdivision of a tract of its property into fifteen lots, some of them bordering a largely unaltered ecologically productive salt pond estuary and associated saltmarsh. The Suffolk County Health Department received this application, held a hearing, and determined that approval should be granted, but with two conditions: that a public water supply be provided, and that four of the lots in the lower portion of the property along the shoreline be combined into two larger lots, thus reducing the total number of lots from fifteen to thirteen. An application for a thirteen lot subdivision was then approved by the County Health Department and submitted to the Southampton Town Planning Board. The latter, acting under apparent pressure from commercial baymen, fishermen, and conservationist groups, then modified Landing Estates' subdivision plan by granting approval for only eight lots instead of thirteen.

Landing Estates, Inc. then decided to take the matter to court contending that the Town Planning Board acted illegally. Their contention was based on a number of highly technical legal points unrelated to wetlands, health, or the ecological issues at hand.

It appeared for a time that the Planning Board would succumb to this attack, until the New York State Attorney General became interested and, in a very unusual action, intervened in the case on the grounds that this pristine saltmarsh and estuary were in danger of being needlessly destroyed due to the inability of the town to resist attack.[45]

In his statement of explanation on intervening in this case,[46] the Attorney General noted that the Planning Board's action was not arbitrary and capricious, as had been charged, and further noted the expert testimony presented by Professor Ral Welker of Southampton College, a locally recognized expert on saltmarsh ecology, and one thoroughly familiar with the marsh and pond at hand. Professor Welker's testimony catalogued the detrimental nature of subdivision in this area. In further defense of the Board's decision, the Attorney General submitted to the court an affidavit of Peter N. Skinner, Environmental Engineer in the Office of the Attorney General, along with a letter of marine biologist Roy Hase of the New York State Department of Environmental Conservation, and an affidavit of Assistant Attorney General James P. Corcoran,

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[45] Louis J. Lefkowitz, Attorney General of New York, Statement of Intervention in the case of Landing Estates, Inc. v. Southampton Town Planning Board (Suffolk County Supreme Court 71/4234), July 15, 1971, p. 7.

[46] Ibid., p. 3.

all of which supported Professor Welker's position attesting to the great value of this marsh and the destructive environmental results of the subdivision proposal.

Attorney General Lefkowitz concluded the strong rationale for state intervention in the case with the prophetic words

> We have passed the stage in our history where real estate developers can simply tear down and build without regard to the consequences of their acts upon our natural environment. The health, safety and well-being of our people must take precedence over the developer's desire for financial profit.[47]

He then recommended that the whole proceeding against the Town Planning Board be dismissed.

The testimony of Skinner was especially strong and outspoken against the subdivision action. Skinner attests to the unique natural values of this marsh and pond, and states

> Waters polluted with sewerage nutrients such as phosphate and nitrate in this kind of a contained pond would be laden with different kinds of algae and debris caused by overfertilization. Such is not yet the case in Squires Pond, but it will be very soon if the petitioner is allowed to develop the area in the irresponsible way that it desires.[48]

Skinner further notes a three-fold effect on the saltmarsh by the subdivision:

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[47] Ibid., p. 12.

[48] Affidavit of Peter N. Skinner in Support of Intervention in the case of Landing Estates, Inc. v. Southampton Town Planning Board, July 15, 1971, p. 3.

1. The water quality of the pond would be changed due to rapid exfiltration of pollutants from the sand hill adjacent to the pond;
2. Runoff from lawn herbicides, fertilizers and pesticides would also have a deleterious--indeed, hazardous--effect on water quality;
3. This deterioration would be evidenced by a rise in coliform levels, nitrate and phosphate levels, and greater concentration of toxic materials.[49]

Finally, Skinner concludes,

> By the very nature of the saltmarsh, water quality is the most important parameter of its environment and will determine more than any other single element the nature and viability of that ecosystem,[50]

thus connecting the potential degradation of the water quality with the final demise of the marsh. He maintains that limited development such as that fostered by the Planning Board is more consistent with the protection of the Squires Pond environment than is that promoted by the developer.

In support of its position, the Attorney General's office attached to its brief a copy of the petition of the Environmental Defense Fund on the subject of the advisability of federal grants for construction of sewage treatment facilities in Suffolk County, Long Island. In the full petition, Environmental Defense Fund points out that ". . . full sewering of Suffolk County, with effluent discharge to salt water, will eventually lead to a reduction of 75% in ground water levels . . .," which in turn will ". . . lead to a corresponding reduction in streamflow

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[49] Ibid.

[50] Ibid.

and the drying up of ponds. . . ."[51] This has lead further to high salinity levels in the bays, estuaries, and marshes ". . . as the missing fresh water has been replaced in these bodies by saline ocean water."[52] And,

> As the bays have become more saline they have also become more polluted. Not only is the stream water that empties into them more contaminated; its reduced flow means less flushing through tidal exchange.[53]

Thus, the point is made that dense population on or close to the shoreline of marshes and ponds will both initially pollute the adjacent body of water and also soon lead to mandatory sewering which will decrease freshwater discharge and therefore increase salinity in ponds like Squires Pond, causing numerous ecological alterations and ultimate loss of the pond as a desirably productive estuary.

To date (1973), Squires Pond remains in healthy ecological condition, as evidenced by the presence of naturally occurring plant and animal species, with only the minor modification of limited upland housing construction of a few structures so far. In addition, a paved road has now been constructed along the upland fringe of the marsh, though clearly above the high water line. With the recent passage of the Environmental Quality

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[51] Petition of the Environmental Defense Fund for Preparation of Environmental Impact Statements Concerning Federal Grants for Construction of Sewage Treatment Facilities in Nassau and Suffolk Counties, New York, June 29, 1971, p. 5.

[52] Ibid.

[53] Ibid., p. 6.

Bond Act and referendum by the voters of New York on November 7, 1972, it is possible that this estuary and saltmarsh will be acquired by the state for preservation, since a portion of the bond monies has been specifically set aside for the acquisition of Long Island wetlands.

A Federal Denial of a Dredging Permit

In another recent Long Island wetlands case, United States v. Town of Brookhaven (2 ERC 1761), the question of federal authority in granting dredging permits was debated. The U.S. Army Corps of Engineers had determined in 1967 that the waters of Mt. Sinai Harbor were navigable and had granted a permit in that year to the Town of Brookhaven for dredging navigational channels. The work was done and the permit expired, but in the spring of 1971 the town contracted to have more dredging done. At this time, the town did not apply for a Corps permit, claiming one was not needed. The Army Corps (the plaintiff) then asked the United States District Court for an injunction to enjoin the town from further dredging. Justice Judd, in rendering his opinion, pointed out that

> There have been sufficient changes in the law in recent years so that the granting of the 1967 permit to the Town of Brookhaven cannot be taken as evidence that the Corps of Engineers must grant the present permit,[54]

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[54] United States v. Town of Brookhaven (2 ERC 1761), Suffolk County, New York, July 3, 1971, p. 1.

an indirect reference to ecological considerations. However, the Justice looked upon the dredging in question as simple maintenance dredging and felt no significant ecological damage would result, though he upheld the temporary restraining order for other reasons.

In a Memorandum of Law filed by United States Attorney Robert A. Morse of the Eastern District of New York, it was noted that in the Florida case of Zabel v. Tabb (276 F. Supp. 764, 1969), Chief Judge John Brown held that

> . . . under the National Environmental Policy Act of 1969 and the Fish and Wildlife Coordination Act (1958), the Secretary of the Army could refuse to authorize a dredge and fill project in navigable waters for factually substantial ecological reasons even though the project would not interfere with activities relating to navigation, flood control, or the production of power.[55]

This case is further described later in this chapter.

Having established justification for federal denial of the permit on ecological grounds by citation of this and other cases, Attorney Morse cautions against rash approval of maintenance dredging, noting

> Maintenance dredging may have a limited effect on ecology when only one party is involved in these activities but taking the decision away from the appropriate governmental agencies may lead to a situation whereby many so called 'minimal' activities may in the aggregate have a substantial effect on ecology.[56]

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[55]United States District Court, Eastern District of New York, Memorandum of Law, undated, p. 3.

[56]Ibid., p. 4.

Morse then emphasizes the federal government's overall power and responsibility to control the navigable waters of the United States in all their uses, and notes finally that "Lands are impressed with a trust or a servitude in favor of the state in which they are located."[57] No fruther decision has been rendered to date on this matter.

Thomas Harrison, Assistant Attorney General of the State of New York, recently informed the author that the Attorney General's office has recently created a Wetlands Task Force, composed of the Attorney General, other elected officials, and private citizens. The Task Force is

> . . . designed to educate the public on the importance of wetlands, to provide a central complaint bureau where citizens can report on threats to wetlands and seek legal action, and to obtain support for local and state legislation to protect these resources.[58]

A Case of Conflict Between Town and State Jurisdiction in New York

In a case of town v. state jurisdiction over wetlands on Long Island, People of the Town of Smithtown v. Poveromo (Suffolk County District Court No. SMO 258-70), the Court held to the tenet of basic state jurisdiction over marine wetlands, in the short run overturning a protective action of the town to save its wetlands, but probably in

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[57] Ibid., p. 5.

[58] Personal correspondence, Thomas F. Harrison, Assistant Attorney General of New York, May 12, 1972.

the long run insuring greater protection to Long Island wetlands by clarifying the state's jurisdiction over the town in these matters. In this case, decided October 10, 1972, defendant Vito Poveromo was charged with illegally filling in property along the foreshore of the Nissequogue River, including a portion of the shore below mean high tide. This act was alleged to be in violation of Local Law No. 1 of the Marine Law of 1970 (Chapter 25 B-3), a law which said simply that one may not remove from or deposit in the bed of any watercourse or wetland, public or private, any material without first obtaining a permit from the Town Clerk. Violation is a misdemeanor punishable by a maximum fine of $100.

Poveromo contended that

> . . . the definition of 'wetland' is so ambiguous and vague that the town could not rely upon the language that was set forth in the ordinance as to the meaning of the word 'wetland' and therefore depended on experts to describe what was meant.[59]

The Court, however, did not agree that there was sufficient vagueness as to void the constitutionality of the law.

Poveromo also stated the ordinance wrongfully restricted his use of his private property without compensation, a point raised in so many other wetlands cases, and the Court at this point presented a lengthy chronology

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[59] People of the Town of Smithtown v. Vito Poveromo, District Court of Suffolk County (No. SMO 258-70), New York, October 10, 1972, p. 2.

of grants and other events taking place over this property since colonial days. In essence, the King owns all the lands and waterways in England and the American colonies in a jus publicum manner, that is, in trust for the people, under the rule of discovery. However, New York was the only colony operating under the rule of conquest, since it had been retaken by force from the Dutch at New Amsterdam. And the rule of conquest gave the king jus privatum ownership, that is, ownership in a proprietary sense, and therefore he might do with the property as he pleased. The Province of New York thereafter never received a charter from the Crown and

> . . . had the distinction of being the only province among the thirteen original colonies held as a conquered territory under the uncontrolled rule of the King, down to the Revolution of 1776.[60]

In the late seventeenth century a number of patents were made to several people, which were to be redistributed and held in trust for the common good of the people. It was early decided that no person could become invested with absolute ownership of the land, but that this ownership would pass to the citizens of each state. As previously mentioned, two of the most notable patents were the Dongan Patent of 1686 and the Andros Patent of 1677. The former, affecting much of Suffolk County but not the Town of Smithtown, was extensive and absolute, and included all

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[60] Ibid., p. 6.

river beds and submerged lands. The Andros Patent, applicable here, was not so extensive and did not convey rivers. Thus,

> Title to the land under the Nissequogue (River) did not pass with the Andros Patent, but was retained by the sovereign. When the states succeeded to the rights and titles of the King, the reservation in favor of the sovereign became vested in the State of New York subject to the trust in favor of the people. It was not until the 18th day of June, 1963, when by letters patent, the people of the State of New York granted the land under the Nissequogue to the Town of Smithtown.[61]

And it has been substantiated in many previous cases that, while the state may divest itself of the river bottom in question, it may not divest itself of the public trust inherent over that bottom. Thus, the state still has and always will have this trust.

Now, the Court found further that

> A grant of authority by the Town to a licensee to deposit fill upon the ecological support system of a river would simultaneously diminish the system and the river . . . to the detriment of the public's interest.[62]

And,

> Not only is there no evidence of a grant of powers by the state to the Town which would enable the Town to grant a permit, the legislature in enacting Article V of the Conservation Law has reserved that power to the State.[63]

It is widely accepted, of course, that a municipality, as a creature of the state, can exercise only that power

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[61] Ibid., p. 13.

[62] Ibid., p. 20.

[63] Ibid., p. 24.

which is granted to it by state statutes, and no other. In view of this, the defendant, Poveromo, is found not obligated

> . . . to apply to the Town Clerk of the Town of Smithtown . . . for a permit to place earth fill or to dredge within the wetlands of the Nissequogue River when neither the town nor its agents possess the power to so grant.[64]

While the Court does not wish its findings to be so taken as an open invitation to those who would destroy wetlands, or mean to suggest that the town may not prohibit alteration of the wetlands, the District Court does find that

> . . . there can be no filling in of wetlands or removing soil from the ecological systems of rivers unless said filling or removing is done with strict adherence to the applicable provisions of Article V of the Conservation Law . . ., effective May 31, 1972.[65]

Thus, the Court found the town ordinance unconstitutional, in that it gave the state's powers illegally to the township.

The Element of Time in a Tidal Wetland Suit

The year 1971 also featured an unusual Hudson River tidal saltmarsh case, United States v. Baker (2 ERC 1849), in which the New York National Guard was accused of causing irreparable harm to saltmarsh, and was ordered under the Rivers and Harbors Act of 1899 to

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[64] Ibid., p. 26.

[65] Ibid.

cease filling activities and to remove fill already deposited on a marsh adjoining Camp Smith, a national guard installation along the Hudson River. In defense of the accusation, Major General John C. Baker and Colonel Arthur Sulger, defendants, claimed they intended to cease filling and remove the debris fill in any event. However, the federal government held such action was not forthcoming. The federal government took the position that ". . . it is necessary to issue the injunction at the present time and to include the mandatory provisions in order to save the wetland marsh area in question."[66] On the other hand, it is the State of New York's position that

> . . . since the State presently . . . does not have funds specifically allocated for the purpose of correcting the situation, it ought not to be ordered by the federal government to take action immediately.[67]

Justice Lasker based his decision on the Rivers and Harbors Act of 1899, and noted major ecological, educational, and economic values in preserving the marsh. He accepts the word of a submitted affidavit which alleged that if the fill is left in the marsh, ". . . it will be impossible to revive the ecological characteristics of the marsh after the end of August, 1971 . . .,"[68] which was just one month later.

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[66] United States v. Baker (2 ERC 1849), July 29, 1971, p. 2.

[67] Ibid.

[68] Ibid., p. 3.

In a strongly worded Memorandum of Law, the federal government made it clear that the tidal saltmarsh was valuable, that irreparable damage was being done to the saltmarsh by the action of the New York National Guard, and that the government had jurisdiction to intervene, basing the latter premise primarily on the Fish and Wildlife Coordination Act of 1958, which ". . . was intended by Congress to cover the situation disclosed in this case,"[69] and secondarily on the National Environmental Policy Act of 1969. United States Attorney Whitney North Seymour, Jr., in submitting this Memorandum of Law for the Plaintiff, United States of America, requested that Defendant, New York National Guard, be restrained and enjoined from further filling of the marsh, and that an order be required to remove material already deposited thereon. This request was granted by Judge Lasker in rendering his decision.

The Role of a Public Interest Group in a Tidal Wetland Case

There are no court tests of record against the recently enacted New Jersey wetlands legislation, though some will undoubtedly emerge in the near future. However, there was at least one major test of earlier New Jersey wetlands protective statutes which is worth

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[69] Government's Memorandum of Law, United States of America v. Major General John C. Baker and Colonel Arthur Sulger, June, 1971, p. 11.

mentioning, and that is Cape May County Chapter, Inc., Izaak Walton League of America v. Tito Macchia, et al., the Army Corps of Engineers, and the State of New Jersey (Civil Action, uncited).

In August, 1965, Tito Macchia and associates, private landowners, began dredging and filling operations which are resulting in the destruction of Gravens Island and adjacent tidal marshes and waters. Gravens Island, located in Cape May County in southern New Jersey, consists of 110 acres of filled land and 250 acres of tidal saltmarsh, and is completely bounded by navigable waters of the United States. The saltmarsh in question has been determined to be very productive of finfish and shellfish. The State of New Jersey has title in the subaqueous lands surrounding the island, as confirmed by the federal Submerged Lands Act of 1953.

There are a number of separate counts relating the factual parts of this case, based on different geographical areas affected, and different actions taken.

Count 1 pertains to the portion of Gravens Island north of Avalon Boulevard. On August 28, 1965, defendant Macchia conveyed certain riparian interests to portions of the island to the Cape May County Bridge Commission, for a sum of one dollar, for the purpose of constructing a road, Avalon Boulevard, across the island. This conveyance was subject to Macchia's reservation of the right

to construct one intersection across this Avalon Boulevard to give him and his heirs access to the lands and waters of the island.

In 1966, the New Jersey Department of Conservation and Economic Development granted a permit (illegally, according to plaintiff Izaak Walton League) to Macchia to dike off and fill 65 acres of the island north of Avalon Boulevard. Macchia then proceeded to dike off and fill 90 acres,

> . . . completely obliterating the tidal character of the northern portion of the Island, including several small unnamed tributaries which were in fact and in law navigable and subject to the ebb and flow of the ordinary mean high tide.[70]

This action is alleged to have caused irreparable damage to publicly owned marine resources dependent on the natural saltmarsh for their existence. It is also contended that the State of New Jersey exercised a fiduciary or public trust obligation toward these resources.

The plaintiff charges that the Army Corps permit to dredge any material for deposition on the wetlands was a violation of the Fish and Wildlife Coordination Act, the Refuse Act, and the Rivers and Harbors Act. The plaintiff also asserts that the granting of title by the state to the defendant under riparian doctrine is a

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[70] Cape May County Chapter, Inc., Izaak Walton League of America v. Tito Macchia, et al., United States Army and State of New Jersey (Civil Action, uncited), p. 10.

further violation of the public trust. Thus, the complaint goes far beyond that of merely dredging 25 acres beyond the permit authority.

In a second count relating to that part of the island south of Avalon Boulevard, plaintiff argues that a riparian grant of this southerly part of the island, as requested by defendant, would further damage the resources and ecology of the region and that part of Cape May County.

Count III relates to Macchia's action without permit of diking of 200 acres of Gravens Island marshland south of Avalon Boulevard for the purpose of filling the marsh and constructing a housing development on it, and also to Macchia's use of subterfuges to evade a local zoning ordinance designed to protect the wetlands. Further, plaintiff avers that the diking material was dredged from the navigable waters of the United States, and that the permit granted by the Army Corps for this action was in violation of the federal laws just mentioned.

In yet another and final count, plaintiff charges that defendant's application to divert up to 500,000 gallons per day of freshwater from wells in the Township of Middle to serve the proposed housing development must be denied, since this action will contribute to the permanent destruction of the island and the publicly-owned marine resources adjacent to it.

Viewing this state of affairs, the Cape May County Chapter, Inc., of the Izaak Walton League of America, a national, private, non-profit conservation organization, brought this action both on its own behalf to protect members' interests, and also on behalf of all those people whose rights and interests are being diminished, damaged, or destroyed by the actions of Macchia, et al., and public agencies in this matter. The Complaint on the above enumerated counts is for declaratory and injunctive relief and for damages, and is brought under authority of two titles of the United States Code (42 and 28), Article VI, Section 2 of the Constitution, under the Ninth Amendment, the due process clause of the Fifth Amendment, under due process, equal protection, and rights, privileges, and immunities clauses of the Fourteenth Amendment, and finally under the Commerce clause, Article I, Section 8 of the Constitution. Bernard Cohen, attorney for the plaintiff, cited the court's rightful jurisdiction in this case, and based his argument under the National Environmental Policy Act of 1969, the Fish and Wildlife Coordination Act of 1958, the Rivers and Harbors Act of 1899, the Refuse Act of 1899, and the Water Quality Improvement Act of 1970, all of which have held up successfully under similar judicial challenges. And, according to Cohen,

> The claims of the representative being typical of of the claims of the members of the class, and the defendant's actions having substantial effect upon all members of the class thereby making appropriate final injunctive and corresponding declaratory relief with respect to the class as a whole, this action is proper class action under Rule 23(b)(2), Federal Rules of Civil Procedure.[71]

The plaintiff Izaak Walton League essentially asks the Court to enjoin both the Army Corps of Engineers and the New Jersey Department of Environmental Protection to revoke and suspend any and all permits issued in connection with this project; to enjoin the State of New Jersey from any grants of present or former subaqueous lands in the vicinity of Gravens Island; that the state also be enjoined from issuing permits to divert well water into this development; that defendant Macchia be enjoined to remove dikes and other impediments to the tides on and around the island; and, most interestingly, that the Court award $1.5 million in damages, which funds to be placed at the disposal of the New Jersey Department of Environmental Protection and U.S. Fish and Wildlife Service for the purpose of restoring the marine resources of this area.

Questioned in this case was the subject of whether or not grant approvals have authority after the granting officials leave office ". . . if the grant instrument has not been delivered when their terms of office

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[71] Ibid., p. 6.

expire . . .,"[72] and whether a succeeding official has authority to withdraw approval. Attorney General Kugler argues that a succeeding commissioner does possess power to withdraw approvals of a previous commissioner. Thus, the action of Environmental Protection Commissioner Richard J. Sullivan in reversing the state grant of subaqueous lands around Gravens Island made by his predecessor in the previous administration is defended by the Attorney General.

No further decision on this case has been rendered to date.

A Case of Ownership of Riparian Land in New Jersey

In a slightly more recent New Jersey wetlands case, plaintiff Robert F. Garrett, a private landowner, sought to perfect his title to certain lands lying in Ocean City, a part of which lands was at one time the bed of a tidal creek known as Weakfish Creek. In this case, Garrett v. State of New Jersey, City of Ocean City, et al. (Superior Court of New Jersey, No. C-3232-69), Justice Francis of the Superior Court of New Jersey related that a small railroad company obtained a grant from the state in 1922 giving the company a right to fill tidal wetland and dry up this creek by constructing

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[72] George F. Kugler, Jr., Attorney General of New Jersey, Supplemental Brief for Respondents, Superior Court of New Jersey, Appellate Division, 1971, p. 1.

the roadbed. Plaintiff Garrett claimed that his land below this right of way, being dry land, was clearly and exclusively his, while the state claimed that the land was formerly tidal creek bed and thus always remains tidal creek and therefore state property. In his decision rendered March 6, 1972, Justice Francis devotes considerable attention to the restrictions of state granting authority, and stresses the fact that ". . . a legislative grant was to be strictly construed in favor of the sovereign and most strongly against the grantee."[73] He notes that the state has never alienated its interests in tidelands except in very rare circumstances, and notes further that even public agencies must obtain grants before taking riparian lands for their projects. Most importantly to this case,

> At common law, the artificial exclusion of water from a tidal strem does not as a matter of law divest the sovereign of its ownership of the bed of the stream. The State's title to the lands under tidal water is proprietary. But title to such lands may be divested by the State where there is a gradual and imperceptible accretion and erosion along tidal streams.[74]

Further,

> Where by the process of accretion and reliction, the water of a river gradually recedes, changing the channel of the stream and leaving

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[73] Robert F. Garrett, III, Plaintiff v. State of New Jersey, City of Ocean City, et al., Defendants, Superior Court of New Jersey, Chancery Division, Cape May County (No. C-3232-69), March 6, 1972, p. 2.

[74] Ibid., p. 4.

> the land dry that was theretofore covered by water, such land belongs to the riparian owner.[75]

In reiterating a widely accepted premise that the state owns all land under navigable waters, including the bed of any creek artificially filled in, as was Weakfish Creek, he notes also that the state's title in tidelands cannot be lost by adverse possession or use by any person. He concludes

> If the State can authorize the Department of Transportation to construct a road in front of upland abutting a tidal stream and thereby fill in the property without vesting title to the new road in the upland owner, it follows the State can also cause the bed of the stream to be dried out without thereby losing its title.[76]

This case thus establishes the fact that the state maintains sizable proprietary and other interests in riparian lands, including present and former tidal lands, and may not easily or injudiciously grant away this interest or rights. This decision supports the position of those groups who seek to protect the public interest, in that it discourages state agencies from granting property or rights, or otherwise violating the public trust.

Police Power vs. Interstate Commerce

In the summer of 1972, the U.S. Court of Appeals rendered a decision in the case of Transcontinental Gas Pipeline Corporation v. Hackensack Meadowlands Development

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[75] Ibid., p. 5.

[76] Ibid., p. 10.

Commission, an autonomous New Jersey state agency, which severely restricted the potential of state administrative agencies or commissions to protect wetlands or assign special uses to them. The implications of this decision are not restricted to wetlands but could cover any type of natural or man-made environment.

The Hackensack Meadowlands Development Commission had been established by the State of New Jersey in 1968 and given extensive power to adopt a master plan and to insure that only such land usage in compliance with the master plan would be permitted in these meadowlands and tidal saltmarshes bordering the Hackensack River in northern New Jersey. In 1963, the Transcontinental Gas Pipeline Corporation had purchased several hundred acres of these meadowlands as a site for future facilities construction. A Liquified Natural Gas (LNG) storage facility was subsequently built. In 1969 the company applied to the Federal Power Commission for authorization to construct a second storage facility. The FPC granted this authorization. However, the Hackensack Meadowlands Reclamation and Development Act (N.J.S.A. 13:17-1), the enabling legislation establishing the Commission, requires that a building permit must be obtained from the Commission before any construction may proceed on the meadowlands. The Commission refused to issue the permit on the grounds that the construction and operation of the proposed

facility was not a permitted use within the confines of the Commission's master plan.

Transcontinental decided to appeal this decision in Federal District Court, and won the appeal. The Court permanently restrained the Commission from interfering with construction of the facility, saying

> Although the states are not precluded from imposing reasonable restraints and restrictions on interstate commerce, and although the authority to enact zoning ordinances under the state's police power is clear, it is equally settled that a state may not exercise that police power where the necessary effect would be to place a substantial burden on interstate commerce.

Further,

> Although we are cognizant of the tremendous importance of sound community and regional planning, we must also consider the needs of the New York-New Jersey metropolitan area for the adequate and efficient supply and delivery of natural gas.[77]

This case was chosen for inclusion not so much because it pertains to tidal wetlands (meadowlands), but because of the judicial finding to restrict the state's police power to set up a powerful autonomous state commission when that power unreasonably interferes with the federal power over interstate commerce. Hence, no state wetlands protective agency, regardless of how powerfully constituted, may confidently challenge federal powers deriving from the commerce clause of the Constitution.

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[77] Transcontinental Gas Pipeline Corporation v. Hackensack Meadowlands Development Commission (464 F. 2d 1358, 1972), 1362-1363.

A Virginia Grants Corollary

Bernard Cohen of Alexandria, Virginia, an environmentally-oriented attorney with major interests in the preservation of wetlands and estuaries, and especially in preservation of the public trust in such areas, is very much interested in the question of under what circumstances the object of a public trust can be alienated. Further, "What are the criteria and indicia the courts look to in applying the trust doctrine?"[78] he asks. In Fairfax County Federation of Citizens Associations, Inc., et al. v. Hunting Towers Operating Company, Inc., et al. (Civil No. 4963-A), Attorney Cohen states that in this and in many other cases it is often stated that the trust doctrine is a rigid and inflexible rule of law, whereas in reality it is ". . . a standard which must be followed if the state is to meet its fiduciary responsibility in protecting the public interest."[79] He further holds that public lands may not be alienated except in extraordinary circumstances and then only for promoting public benefit, thus establishing a strong position against disposing of or otherwise failing to protect the integrity of those

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[78] Fairfax County Federation of Citizens Associations, Inc., and Northern Virginia Conservation Council, Inc., and Citizens Council for a Clean Potomac, Inc., v. Hunting Towers Operating Company, Inc., and Howard P. Hoffman Associates, Inc., and Francis T. Murtha, Trustee, Plaintiffs' Reply Brief, United States District Court, Eastern District of Virginia (Civil No. 4963-A), January 19, 1970, p. 1.

[79] Ibid.

environments so obviously within the public trust, navigable waters and associated estuaries and tidal lands. Cohen asserts that a comprehensive reading of trust doctrine cases shows that the courts have set standards and criteria applicable only to each individual case, but in all cases there does seem to be one uniform standard: that the transfer from public to private ". . . is necessary for the promotion and benefit of the public beneficiaries of the trust" and that "One consideration in determining necessity is whether or not there is an alternative to the transfer of the trust property."[80] Cohen suggests that the criteria to be used in promoting the public interest in transfer of property (including estuarine lands) from public to private ownership should include:

1. the degree of public control after the transfer;
2. the degree of public use and purpose;
3. the possible basic change in the nature of the resource (e.g., conversion of a salt-marsh to dry land);
4. possible impairment of other uses of the resource; and
5. the chance for greater convenience to the public at large.

Cohen goes on to show that in the case at hand, the granting of public property for private use was a violation

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[80] Ibid.

of public trust, since the project, the building of a residential apartment complex on wetlands, was unnecessary; would not be controlled by a public body; would not be available for public use; the estuary would be changed in nature and lost as an estuary; and finally, the public use of the estuary would be destroyed. Thus, Cohen has taken up the fight against what he considers to be unwarranted grants of the public interest in natural resources to the private sector. A significant result of Mr. Cohen's work in this case was withdrawal of the Corps of Engineers' dredging permit, thus maintaining the wetlands in their natural state.

A Change of Position at Boca Ciega Bay, Florida

The famous Boca Ciega Bay conflict on the west coast of Florida, admittedly somewhat outside the geographical area of this dissertation, has definite applications to the Northeast. In 1957, the Tierra Verde Corporation applied for necessary permits from Pinellas County, the state of Florida, and the U.S. Army Corps of Engineers to dredge and fill within a 1,200 acre area in lower Boca Ciega Bay, for the purpose of marine and subdivision development. At that time, it was customary for agencies ruling on proposals to concur with decisions of the local ruling body--the county,

in this case--on granting the initial permit, and to automatically grant subsequent permits.

A public hearing was held by the Pinellas County Commission in 1957. Attorneys for both sides showed up (pro- and anti-dredging), and the applicants had marine biologists support their contention that there would be no adverse ecological effects. Their biologists even said fishing would be improved in the dredge and borrow pits. No biological testimony was given on behalf of conservation interests. The conservation (anti-dredging) forces objected, but their presentation was weak, and the permits were issued for the first half of the project.

A few years later, the United States Bureau of Commercial Fisheries established a biological laboratory at St. Petersburg Beach. This laboratory soon became a potent force for ecological preservation in the area.

In 1964, dredging and filling for the second half of the project commenced, even though all permits had expired with completion of the first half of the project (which is, perhaps, a testament to the power of dredgers, even at that recent date). The county agreed to hold a public hearing on permit renewal and, in this hearing, biologists testified as to the great importance of the area as a marine nursery. In rebuttal, the developers made sardonic references to protecting the "love life of fiddler crabs," which was not well received by the large

audience, including representatives of the Audubon and Wilderness Societies. The presence of such a large audience at a public hearing was not known to be typical on the west coast of Florida in 1964, and this may be attributed to fast-growing indignation toward the destruction of estuaries. The hearing became a turning point. The county commissioners cast a 2-2 tie vote and, since a majority vote was needed, the permit was denied. Later, the developer submitted a much revised plan, which was eventually found acceptable. Based on this experience, a formula for estuarine resource protection has been suggested, as follows:

1. findings of biological reseach -
2. willingness of scientists to disseminate their findings verbally via reports -
3. support of national conservation agencies and groups -
4. strong assertion of public opinion.

As a follow-up to these kinds of recommendations, much feeling soon developed throughout the country that a U.S. Department of the Interior permit, issued on an ecological and environmental premise, should be required along with the issuance of every U.S. Army Corps of Engineers permit. Thus, a compromise was worked out on this issue, in the sense that the Army Corps of Engineers must now require full information from the permit applicant on possible ecological damages, and the U.S. Fish and

Wildlife Service (Bureau of Sport Fisheries and Wildlife, Branch of River Basin Studies) must conduct a study and issue a report evaluating the proposed project from the point of view of its detrimental effects on fish and wildlife, and also on the "wildlife enhancement values" of the project, if there are any. Unfortunately, however, there is yet no requirement that the Army Corps of Engineers, which has the final say, comply with these recommendations. They need only consider them, and in many instances they have remained just recommendations. Of course, this demand for ecological accountability has had at least one very positive repercussion, and that is the concept of environmental impact statements, formalized in the National Environmental Policy Act of 1969.

Zabel v. Tabb: A Landmark Decision in Florida

The U.S. District Court case of Zebel v. Tabb (1970 276 F. Supp. 764, aff'd F 2nd - 5th Circuit) in Florida is quoted by attorneys, judges, and others more than any other wetlands case with the possible exception of the Volpe case in Massachusetts, and thus is gaining a reputation as a landmark case.

Plaintiffs Alfred Zebel and David Russell sought to force the Army Corps of Engineers to issue a dredge and fill permit so that they might fill their land in order to build a trailer park. This is an especially important

case because it became the judicial basis upon which the Army may consider ecological and other matters not related to traditional concerns of navigability when deciding whether or not to approve a proposed project. Plaintiffs Zabel and Russell, riparian landowners on Boca Ciega Bay, asserted that the Corps may not deny a permit if the proposed project in question does not interfere with navigation, flood control, or hydroelectric power; that the state and not federal government had sole jurisdiction over matters other than navigation, flood control, and power production. Furthermore, the permit denial ". . . constitutes an unconstitutional taking of property without due process of law,"[81] because of dependency on the findings of the U.S. Fish and Wildlife Service, which agency did not require public hearings; the denial deprives plaintiffs of the use of their property; and the District Court had power to compel the Corps to issue the permit.

The District Court did, in fact, so agree to all these points, and so the Army Corps (Col. R. P. Tabb, commanding) appealed to the Fifth Circuit Court, arguing:

1. The Corps can so deny permit applications, under authority of the Rivers and Harbors Act of 1899, the Fish and Wildlife Coordination Act of 1958, and the

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[81] Zabel v. Tabb (1970), in The Environmental Law Digest (Washington: Environmental Law Institute, 1971), p. 72.

Supreme Court's decisions in Scenic Hudson Preservation Conference v. Federal Power Commission (1965), and Udall v. Federal Power Commission (387 U.S. 428 [1967], at 450);

2. the permit denial for dredging and filling was a legal exercise of the federal commerce power;

3. the plaintiff does not have standing to sue; and,

4. the Corp's decision to deny the permit was discretionary and not reviewable by the courts.

Chief Judge Brown on July 16, 1970, overturned the decision of the lower court and decided for the Army Corps, ruling:

1. "Congress has the regulatory power, under the commerce clause, to limit for ecological reasons the use of plaintiff's submerged lands . . .";[82]

2. under recent legislation, the Army Corps must consider environmental factors when granting dredge and fill permits;

3. since plaintiffs obtained a hearing before the Corps, due process was observed;

4. "Submerged lands are subject to the primary servitude of the federal government . . .,"[83] and thus the permit denial was not an unconstitutional taking.

Judge Brown's decision was so clear, obvious, and forceful that it is now being quoted in case after case and gaining a substantial reputation, one almost as famous as the Volpe case, even though for different reasons.

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[82] Ibid. [83] Ibid.

A Case of Restoration of Navigability

In another somewhat similar Florida case, United States v. Moretti (3 ERC 1052), a private landowner, Moretti Construction Company, dredged canals and filled wetlands in and along the navigable waters of the United States illegally without an Army Corps of Engineers permit, and refused to cease and desist when so ordered. The Moretti firm, seeking to build a large mobile home park on over fifty acres of filled lands dissected by dredge channels and canals, worked rapidly, apparently seeking to complete all or most of the work before the Corps stopped them through court action. The government clearly demonstrated in this case that Morettis' action caused major environmental destruction (including destruction of the mangrove habitat needed to support the roseate spoonbill, a vanishing species of shorebird).

In judging this case, the United States District Court found that it had jurisdiction, the Florida Bay is navigable, and that the Rivers and Harbors Act of 1899, which requires the Corps permit, had been violated. Most importantly, perhaps, the Court found that a district court in this situation does have jurisdiction to force ". . . the removal of any obstruction or any diminution of the navigable capacity of a waterway."[84] Thus, the Court

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[84] United States v. Moretti (3 ERC 1052), United States District Court, Southern District of Florida, September 2, 1971, p. 5.

may order that the navigable capacity of a waterway be restored.

In rendering judgment, the Court permanently restrained and enjoined Moretti from conducting any furthere excavation, and furthermore, permanently enjoined him to

> . . . remove all fill, sand, rock, gravel, riprap, and material of any other description the defendants caused to be placed at their trailer park development . . . bayward of the mean high water mark that existed prior to the defendants' operations in this area, and to restore the navigable capacity of Florida Bay to its original condition . . . prior to the defendants' development operations [emphasis added].[85]

The Court further directed that Moretti provide plans for the safe removal of the material without ecological damage within twenty days of the order, and to delineate the kind of equipment to be used and the procedures to be taken in the project.

This case does not involve wetlands or saltmarsh in the Northeastern sense of those words, and it is a rather typical dredge and fill situation. However, it was chosen for discussion in this dissertation because of the rather unusual judicial order of requiring quick removal of the illegal materials deposited on the baybottom and mangrove wetlands. In this respect, the decision was a strong one and a clear-cut victory for those who look to

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[85] Ibid., p. 6.

the courts to protect coastal wetlands and estuaries in their natural condition.

A Case of Mineral Dredging and Estuarine Values

The Gulf Coast wetlands ecosystem, though an area of lesser population and development pressure than much of the Atlantic Coast, is not without its own judicial cases, among the most recent being a pair of lawsuits filed in Alabama by State Attorney General William Baxley seeking to end oyster shell dredging from the bottom of Mobile Bay. In many areas along the Gulf Coast there is economic and political pressure to dredge the inshore oyster shell resource for the purpose of roadfill and highway construction, and oftentimes the method of harvest of this shell completely destroys the saltmarsh (in the fashion of terrestrial coal strip mining), leads to the subsidence and sinking of the shore, extreme sedimentation and increase in water turbidity, as well as other environmental problems.[86]

Before dredging, it is legally necessary to obtain a permit from the Army Corps of Engineers, and the Attorney

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[86]Documentation to support this assertion can be found in many sources, including the seven volume National Estuary Study (United States Department of the Interior, Fish and Wildlife Service, 1970), the proceedings of the Marsh and Estuary Management Symposium held at Louisiana State University (1967), various hearings before Congressional Committees (as cited in preceding chapters), and in other publications and reports, both technical and non-technical.

General charges in one of his suits that the Radcliff Materials Corporation was illegally granted a permit by the Corps without having first filed an environmental impact statement, a violation of the National Environmental Policy Act of 1969.[87] Baxley further contends that such a statement would show that the dredging should be permanently prohibited in the bay. In addition,

> . . . the permit and procedure are also illegal because the Corps of Engineers is not conducting research concerning the environmental impact of the activities of its permitee, Radcliff Materials, Inc., but has instead delegated such research work to its permitee, a private commercial party with an interest in the result of the research.[88]

In a second suit, the state contends that the Radcliff shell dredge is the most extensive industrial polluter of the bay, and that live oysters are being dredged in violation of the firm's contract with the state. In a press release dated July 20, 1972, Attorney General Baxley remarked that ". . . the Seafood Division of the State Conservation Department had dismally failed to prevent the dredging of live oysters . . ." since

> . . . (the Division) has received royalties based upon the amounts of shell produced. This monetary interest has always prevented the Seafoods

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[87] State of Alabama v. U.S. Army Corps of Engineers and Radcliff Materials Corporation, Inc., United States District Court, Southern District of Alabama, June, 1972, p. 2.

[88] Ibid., p. 4.

> Division from admitting or controlling the ecological damage inflicted by the dredge.[89]

Royalty realtionships of this sort between the private exploiter seeking a profit and the agency ordained to protect the resource all too often lead to a conflict of interest situation, and the time of the initial drafting of legislation which designates the decision-makers and their authority is the time to avoid the conflict of interest problem. No further action has been taken to date on these Alabama twin cases.

The Pacific Coast of the United States has experienced a number of coastline cases, notably in the area of dredging and land filling in and around San Francisco Bay, California, and beach use rights in Oregon and Washington. However, these situations are not quite related to those on the Atlantic and Gulf coastlines, and thus will not be treated in this dissertation.

The judicial decisions rendered in the cases discussed in this chapter are exceedingly varied in their nature, as are the cases themselves. Many of the cases represent appeals from lower court decisions, some of which were sustained in the decisions discussed here, others of which were overthrown. And, some of the decisions rendered here are themselves now being appealed, or will be in the future. Some of these decisions represent a traditional

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[89]Press release, William Baxley, Attorney General of Alabama, July 20, 1972, p. 2.

judicial dependence on precedent, while others depart from tradition by setting new precedents. It is the writer's considered judgment that none of these opinions may be fully relied upon in the future to protect the natural integrity of wetlands, for they may be appealed and overruled just as they themselves represent departures from past procedure. There is a very thin line between judicial acceptability of these wetlands protective statutes and judicial rejection of them, and this fine line is especially thin in the area of what constitutes an unconstitutional taking of private property and private property values and what constitutes a legally acceptable taking in the public interest. No clear answer or future trend emerges from the substance of these decisions, and hence no dependence may be placed upon them.

Hence, of the cases discussed in this dissertation and listed in Table 6, it can be seen that ten decisions were made in favor of preservation, four decisions were made in favor of alteration, and three cases were undecided at the time of writing. It should be understood by the reader, however, that a decision favoring preservation or alteration in any of these particular instances does not necessarily favor preservation or alteration of wetland environments in the long run. Each case has its own peculiar set of circumstances and technicalities associated with it, and thus cannot be strictly compared with any other

TABLE 6.--Summary of Case Results.

Case	Decision Favoring Preservation	Decision Favoring Alteration
Maine v. Johnson (265 A.2d 711) (1970)		XXX
Sibson v. New Hampshire (New Hampshire Port Authority #5916)		XXX
Commissioner of Natural Resources v. Volpe (349 Mass. 104, 206 N.E. 2d 666, 669) (1965)	XXX	
Perry v. Wilbour (Bristol County, Mass., #8412)	XXX	
Redding Conservation Commission & EDF v. Bonsignore	(decision pending)	
Dolphin Lane Associates, Ltd. v. Town of Southampton (Suffolk County Supreme Court #73873/68) (1971)	XXX	
Landing Estates, Inc. v. Southampton Town Planning Board (Suffok County Supreme Court #71/4234)	XXX	
United States v. Brookhaven (2 ERC 1761) (1971)	XXX	
Town of Smithtown v. Poveromo, Suffolk County District Court No. SMO 258-70		XXX
United States v. Baker (2 ERC 1849) (1971)	XXX	
Cape May County Chapter, Inc., Izaak Walton League of America v. Macchia, et al. (Civil Action, number unspecified)	(decision pending)	
Garrett v. New Jersey (Superior Court of New Jersey, No. C-3232-69)	XXX	
Transcontinental Gas Pipeline Corp. v. Hackensack Meadowlands Development Commission (464 F. 2d 1358) (1972)		XXX
Fairfax County Federation of Citizens Associations, Inc. v. Hunting Towers Operating Company, Inc. (Civil No. 4963-A) (1968)	XXX	
Zabel v. Tabb (276 F. Supp. 764) (1969)	XXX	
United States v. Moretti (3 ERC 1052) (1971)	XXX	
Alabama v. Army Corps of Engineers and Radcliffe Materials Corp., Inc.	(decision pending)	

case. For this reason, no trend in judicial decision-making is evident in these final decisions rendered.

Dr. Stephen Hitchcock of Madison, Connecticut, a saltmarsh ecologist and author of a number of articles on the subject, has remarked in a letter to the author,

> I strongly feel that the only manner that the marshes will be preserved will be by purchase or with easements. Shifting economies dictate such a varied response to the marshes that I cannot believe they will be preserved by (other means). Specific interests are willing or, indeed, even demand changes in the overall ecology of the marsh to the detriment of other interests. The marshes serve such diverse uses that I feel they should best be left alone. . . .[90]

It is because of the inherent variety and unpredictability of the many judicial decisions on this subject that this writer, too, believes that, while certain elements of the decisions indicate that the statutes may serve as holding actions, they cannot more than temporarily accomplish the task. Only outright acquisition or easements, as Dr. Hitchcock says, can be relied upon, and methodology to be used to attain this goal will be discussed in Chapter VI.

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[90]Personal correspondence, Stephen W. Hitchcock, Madison, Connecticut, July 10, 1972.

CHAPTER VI

SOME POSSIBLE ALTERNATIVES

It now remains, in the final chapters of this dissertation, to distill in summary form the constitutionally acceptable and more effective methods which may be used to preserve and protect the estuarine saltmarsh environment. It further remains to describe the alternatives: acquisition in fee simple, zoning, regional planning, philanthropy, easements, and preferential tax assessment. Finally, it remains to demonstrate that coastal wetlands will only be effectively preserved through public or private acquisition for this purpose, either through easements or in fee simple.

Methods to Preserve the Value of Saltmarsh and Wetlands

In acknowledging the values of wetland environments, it is only natural that society develop economically and politically feasible ways of maintaining them in their open natural state. Some of society's techniques for accomplishing this end are obvious, others less so.

First, direct outright acquisition in fee simple is by far the best technique, and also the safest and surest, for attaining the objective, but it is usually

very, very expensive. It is especially expensive because the most productive and ecologically valuable saltmarshes are located in rapidly growing regions with just as rapidly escalating market values for real estate. And, given the current financial condition of local government, there will probably be less and less such direct acquisition in the future. However, it is still the surest way.

Second, zoning can be effective, but is subject to a great deal of fluctuation, depending on changing economic and social pressures. Down-zoning is usually easy after a change of administration in local government, while up-zoning is now frequently alleged to be discriminatory against various ethnic and economic minorities. It should definitely be less relied on in the future than it has in the past. (Professor Allan Schmid has called zoning a failure, saying that it cannot resist the pressure which results from property laws which say that the impact of community action on property values is captured by the owner.) In addition to the zoning of adjacent upland, there is another form of zoning pertinent to the wetlands themselves. This involves the institution of a permit system to regulate activities in wetland areas, or the institution of restrictive orders placed on wetland areas in order to directly prescribe the uses which can take place on the area. Such prescription represents a positive approach which illustrates what is permitted rather than

what is not permitted, in order to protect the integrity of wetlands ecosystems. Either one or both of these approaches represent key aspects of the statutes discussed in Chapter IV. In contrasting the permit approach versus the restrictive order approach, Bradley and Armstrong have remarked,

> . . . the restrictive order system has the advantage of allowing the cognizant agency to consider what activities are appropriate on an area-wide basis and then to issue restrictive orders that comprise the equivalent of an easement to present unsuitable activities. Institution of only a permit system forces decisions on allowable activities to be made on a permit-by-permit basis. The danger of the latter approach is that the vitality of an estuarine area may be nibbled away by a succession of small concessions to developmental interests.[1]

They further point out that restrictive orders must cover contiguous land which could otherwise be developed adverse to the interests of preserving the wetlands.

Third, regional planning and cluster or greenbelt development is a good, wise, enlightened, and very broad approach, but one which presupposes the presence of a large amount of open, undeveloped wetland to deal with, whereby after 20% to 30% is intensively developed, there would still be a big open tract suitable for dedication as open space. This approach also presupposes on the part of people a disposition to live this way.

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[1]Earl H. Bradley and John M. Armstrong, A Description and Analysis of Coastal Zone and Shoreland Management Programs in the United States (Ann Arbor: University of Michigan Sea Grant Program, March, 1972), p. 24.

Fourth, donation or philanthropy is a solution, but presupposes the existence of wealthy landowners (or corporate interests conscious of public relations values), parties who must both understand the need and be interested and willing (and, of course, own wetlands in manageable parcels which would be of value to the local municipality). Some communities are much more fortunate than others in this regard, and this is one technique which is limited in application and cannot be controlled.

A fifth technique is the use of easements, or less than fee interests in property, rights, privileges, or advantages in the use of land which exist apart from the ownership of the land itself, ownership of a "right" or "control" over land rather than the land itself. Easements are somewhat of a middle-of-the-road compromise in saving the values of saltmarsh. The relative effectiveness of easements depends to some extent on the limitations of the state enabling legislation permitting their use, and to some extent on the vision and foresight of the local government officials who have been empowered to use them.

A form of preferential tax assessment and the use of the taxing power to discourage alteration and development in the wetlands, is a final suggested technique, though there are undoubtedly others.

In a recent article in Land Economics, Barlowe, et al., state that there are three principal motives prompting interest in use-value assessment techniques.[2] These include concern for keeping productive farmlands in agricultural uses, a desire to maintain undeveloped land and farmland as open space around cities, and the wish to use tax measures of this type to insure the orderly development of rural lands to maximize socially desirable uses. About thirty states now have use-value assessment laws of some type, and many of these laws assume or require that eligible lands have histories of agricultural use. In the case of saltmarsh wetlands, presumably only those which had a history of salt hay harvesting would so qualify, which rather limits the use of this particular tool as a protective device over wetlands. However, the law can often be applied to farmed upland adjacent to lowland marshes, thus in effect deterring alteration of the wetlands.

Further, it has been said that the chief problem with use-value assessment is the difficulty inherent in devising an appropriate technique for determining the proper use value. Given the previously discussed difficulty of assigning a total economic value to a wetland, and accepting the fact that salt hay production is rarely if ever more than a marginal enterprise, it can be seen

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[2]Raleigh Barlowe, James G. Ahl, and Gordon Bachman, "Use-Value Assessment Legislation in the United States," Land Economics, 49(2):206 (May, 1973).

that the actual economic use value of a wetland under the requirements of these laws would be both difficult to determine and, in any event, quite low. On the other hand, if the word "agriculture" were broadly interpreted to include the gathering of marine food products as well as the cultivation of crops, the use-value assessment would be significantly higher. Most of these laws have been enacted quite recently, however, and it remains to be seen if they will have a significant effect on protecting or preserving saltmarsh in the coastal states.

According to the Open Space Institute in New York and the Urban Land Institute in Washington, two recognized authorities in the field of land use planning and control, the essence of the problem of open space and wetlands preservation in the rapidly developing urban fringe areas of the Northeast is that tax assessors are no longer taxing just property, but the development potential of property as well, which practice can deplete the finances of any large landowner in such an area, even if he is in a high income bracket. Assessors operate under the strictures of a constitutional or statutory equal (ad valorem) tax provision, and if a landowner, regardless of his intentions, can get a residential subdivision price for his land, he is or soon will be paying a subdivision level tax assessment. Generally, differential taxation (here referring to preferential tax treatment for large saltmarsh

owners as an incentive to them not to develop, but usually referring to special consideration for a particular group or class of people) is illegal in our system. Many states have, however, broken with this tradition and passed amendments to their constitutions to allow for such differential or preferential treatment. Most of the existing examples pertain to commercial farmland, but the laws can easily be carried over to saltmarsh and upland associated with saltmarsh.

These tax problems have arisen from premature land speculation and development in the countryside surrounding metropolitan areas, and the negative results of this premature speculation are now becoming evident, in that, according to Professor Allan Schmid of Michigan State University, land value appreciation levels are significant and now measured in the hundreds percent. It seems that the greater the percent change in population growth, the greater the percent appreciation in land value. Professor Schmid goes on to say,

> Appreciation in land values above costs of development . . . seems to be large and growing larger. . . . There is some evidence that there is considerably more expectation of future value increases built into the prices of current fringe sites than that actually realized in the history of established closer-in lots or than the current market of these older lots recognizes.[3]

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[3]A. Allan Schmid, Converting Land From Rural to Urban Uses (Washington: Resources for the Future, Inc., 1968), p. 54.

The Nature of Easements

As mentioned previously, the dual landowner tax problem and community saltmarsh preservation problem may be abated by the use of a conservation or open space easement, which takes away the one aspect of land ownership which makes the taxes go up in the first place--its potential for development. In the use of open space easement, which is a negative right in land, if the landowner gives a binding guarantee not to develop the land, the assessor must not assess it as though it could be developed. Such an easement need give no rights of public access to a government or any private party. The land under the easement remains private with all its property rights and attributes intact, with the exception of the right to subdivide or otherwise reduce the value as saltmarsh open space, including the right to dredge and fill. The basic legal condition of this concept is that the guarantee that the land will not be developed or destroyed can actually provide a clear public benefit. William Whyte of the Urban Land Institute has said,

> If a property isn't legally available for subdivision, it isn't comparable to properties that are. The very constitutional provision that assessors have followed to raise valuations now becomes the landowner's shield.[4]

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[4]William Whyte, Securing Open Space for Urban America: Conservation Easements (Washington: Urban Land Institute, 1959), p. 56.

Society is now developing some maturity on the subject in arriving at the conclusion that open space does not have to be in public use to serve a public purpose, a conclusion that has already been recognized by many lawyers and land use planners. An obvious big remaining problem which has thus far been ignored, however, is at what rate should the revised assessement be after the granting of an easement (i.e., what tax percentage be discounted?). A related problem is the need for a determination of the amount which people who donate or sell easements should be permitted to deduct from their personal income tax.

New Jersey is one of the many states which permits its agencies to purchase easements. According to their Green Acres Land Acquisition Act of 1961 (Section 12),

> Without limitation of the definition of lands herein, the Commissioner (of Conservation) may acquire or approve grants to assist a local unit to acquire: (a) lands subject to the right of another to occupy the same for a period measured in years or otherwise; or (b) an interest or right consisting in whole or in part, of a restriction on the use of land by others including owners of other interests therein; such interest or right sometimes known as a 'conservation easement.'[5]

The primary asset of the easement is, of course, reduced cost to the governing body, the cost of the easement being the difference between the market value before

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[5]Open Space Institute, Stewardship: The Land--he Landowner--The Metropolis (New York: Open Space nstitute, 1965), p. 80.

the purchase restrictions attach and the market value after they attach. The constitutionality of easements has never been tested in high courts but ". . . as long as only a partial interest in land achieves a public purpose there is not constitutional objection to such a taking."[6]

The Constitution of the Commonwealth of Massachusetts authorizes the state's General Court

> . . . to provide for the taking . . . of lands and easements or interests therein . . . for the purpose of securing and promoting the proper conservation . . . and control (of the natural resources of the Commonwealth) and to enact legislation necessary or expedient therefor.[7]

The same source reminds us that the federal Open Space Act of 1961 promotes the use of legal tools like easements by requiring that the municipality in question make maximum use of them before receiving approval for federal grants. The Massachusetts Bay Circuit Act of 1956 (St. 1956, c. 631) gives the Commissioner of Natural Resources authority to ". . . acquire a wide range of restrictive agreements, easements or other controls to preserve scenic or historic features."[8] The Massachusetts courts, generally liberal on such matters, have interpreted the word

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[6]Northern Virginia Regional Planning and Economic Development Commission, Open Space Easements (Arlington: The Commission, 1965), p. 27.

[7]Metropolitan Area Planning Council, Open Space Law: Government's Influence Over Land Use Decisions (Boston: Metropolitan Area Planning Council, 1969), p. 18.

[8]Ibid., p. 19.

"land" wherever it has appeared in the Commonwealth's statutes to include interests in land. Scenic easements and eminent domain authority in less than fee simple interests in land were given to Massachusetts local government as early as 1893. Considering the early legislation, the many favorable court decisions, and the obvious advantages of easements (including the double tax break of an income tax reduction on the contribution of the easement, and the indefinite and perhaps permanent property tax reduction associated with the reduced market value of the property), one wonders why such little use has been made of the technique in the past. The Metropolitan Area Planning Council in Boston responds to this query by saying

> . . . there is a natural hesitancy to entrust important projects to a relatively new (in terms of practice) legal tool unless its validity is apparent to both conservationist and non-conservationist. . . .[9]

It has been further stated by some pessimists, "No one in his right mind would ever tangle with this morass if any other conceivable course of action were available."[10] The pessimism of these statements is unwarranted, though legislative reform is definitely needed in this area, particularly with respect to a clear definition of the various kinds of easements. Massachusetts began to remedy this situation by enacting into law in 1969 an

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[9] Ibid., p. 23.

[10] Ibid.

act clarifying the law of conservation and historic preservation easements. Most other states, however, are still far from this position.

Overall, easements have the advantage of:

1. insuring the permanent use of land according to the purpose of the easement;
2. being less expensive to the public than the purchase of full title;
3. allowing the land to remain in present use, and thus providing some stability;
4. permitting the land to remain on the tax rolls;
5. requiring little or no maintenance at government expense.

There are, however, some disadvantages of easements which should be acknowledged. Easements

1. lack flexibility;
2. sometimes inflate development potential;
3. can be costly in some urban areas;
4. sometimes provide an unfair payment to landowners who wouldn't sell or alter their land regardless of the easement (which, it can be argued, is not really a disadvantage, since the easement does hinder or stop their right to change their minds).

Considerable space has been devoted to the easement and preferential tax assessment techniques to accomplish saltmarsh preservation because these techniques, when used in conjunction with direct acquisition in fee simple, clear identification of ownership, the application of the public trust doctrine, and proper enforcement of the police

power, are the answer to protection and preservation of these valued environments.

Wetlands Acquisition and the Nature Conservancy

It is worthwhile to consider how the private sector successfully accomplishes and finances preservation of saltmarsh. The Nature Conservancy, a private Washington-based conservation organization which concentrates on acquiring in fee simple or by easements properties of high ecological value, including many kinds of saltmarsh and estuarine lands, is a prime example.

The Nature Conservancy has, of course, the usual General Fund for operating expenses, a fund common to all organizations of this sort. It is derived from various classes of membership dues, general tax deductible contributions from individuals, groups and foundations, and interest on assets, totalling some $729,954 in the fiscal year ending June 30, 1971. But, more important to the outstanding success of the Conservancy in preserving untouched saltmarsh and other environments in their natural state, there are three other fiscal tools:

1. project revolving fund (formerly the matching and loan fund)--presently in excess of $2.4 million--provides funds for the purchase of natural areas. The Conservancy reports,

> The functioning idea behind the fund is to provide money temporarily but quickly where it is most needed. Upon purchase of a given area, it

> becomes the responsibility of the chapter or project committee to raise funds to repay the Project Revolving Fund, usually within three years. No interest is charged during the first ninety days; thereafter, to encourage prompt repayment so that the funds may be used again, interest is set at one percent below the current prime rate.[11]

In recognition of the Conservancy's work, the Ford Foundation recently offered a challenge grant of $600,000 to the Fund, meaning that for every four dollars the Conservancy can raise, the Foundation will give one dollar. This grant will be in effect for three years, and raises the likelihood that the Project Revolving Fund will be worth over four million dollars by late 1973. Thus, ". . . with a comparatively small amount of capital (at any one time), a large number of significant areas can be preserved."[12]

Table 7, taken from the 1970 Annual Report of the Conservancy, indicates how rapidly the net worth and budgets of the organizations have increased in recent years, even prior to the Ford Foundation grant and other recent innovations.

More recent fiscal innovations have included the establishment of

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[11]The Nature Conservancy, "Land Acquisition," The Nature Conservancy News (Spring, 1972), p. 3.

[12]The Nature Conservancy, "Ford Foundation Challenges the Conservancy," The Nature Conservancy News (Winter, 1971), p. 10.

TABLE 7.--Categorial Budget of the Nature Conservancy, 1967-1970.

Category	1967	1968	1969	1970
Assets	$8,232,061	$15,928,139	$19,010,185	$33,166,944
General fund income	334,502	450,427	624,701	632,123
Expenditures	351,385	407,488	421,171	528,962
Natural areas funds	635,485	1,899,879	2,299,998	5,002,177
Endowment funds	516,383	847,113	1,126,202	1,734,674
Value of lands (cost)	5,785,456	13,195,465	13,491,957	24,061,602
Value of lands (conveyed)	--	--	5,715,000	7,575,202

Source: The Nature Conservancy, Annual Report, 1970 (Washington: The Nature Conservancy, 1970), p. 5.

2. lines of credit at several banks (including Manufacturers Hanover Trust Company in New York), which are provided at the prime interest rate, currently represent the loan of "instant money" on demand up to five million dollars, providing much financial flexibility; and

3. a guarantee and income fund, now worth over one million dollars, which provides an endowment, and can be used to guarantee bank loans when the project revolving fund and credit lines are fully utilized.

In summary, it can be said that techniques of acquisition in fee simple and less than fee simple, and the use of the taxing power as incentive, are valuable

tools to accomplish the task of saltmarsh preservation. With the supportive use of the police power, as witness the growing body of law and judicial decisions in this field, there would seem no reason why protection and preservation of saltmarsh wetlands cannot be accomplished.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Thus far, this dissertation has:

--delineated and delimited the physical, biological, and legal boundaries of coastal wetlands and saltmarsh, and described the problems in acceptably defining these boundaries;

--discussed the nature of the coastal wetland and saltmarsh environment, its inherent ecology and biological productivity, as well as its place and setting within the greater ecological whole of the terrestrial and oceanic ecosystems;

--investigated the essential conflict, economic, social, and political, between man and this environment, noting man's past lack of ability to relate positively to the saltmarsh ecosystem;

--seen what man has done by way of statute to protect these environments, and analyzed some of the positive and negative aspects, strengths and weaknesses, of these efforts;

--and, finally, observed how these statutes have been challenged in court and in some cases overturned; and, further, the various judicial decisions resulting in

ultimately strengthening or weakening the overall effort to preserve and protect the natural integrity of the estuarine ecologic processes.

Summary

Coastal wetlands or saltmarsh of the Northeast Atlantic Coast are most difficult to define by any known parameter, whether it be geological, botanical, or geophysical. A clear and acceptable definition of the high tide and low tide lines is not easily arrived at, even by application of the finest legal and scientific minds to the problem. However, a number of apparently locally acceptable definitions for several states have been expounded upon to give the reader an idea of the possible kinds of parameters and measuring tools used in the task, and to illustrate the conclusions thus far arrived at.

The natural history of the coastal wetland or saltmarsh environment has been described in some detail. Two grasses, Spartina alterniflora, or tall marsh cordgrass, and Spartina patens, or short marsh hay, are crucial to the very nature and definition of a saltmarsh, especially in the northeastern coastal zone under study. They are the key indicator botanical species, for they account for the largest part of saltmarsh biomass and energy productivity and they most often illustrate the zone differentiating the high and low tides. Spartina alterniflora can only survive in the low tide zone which

is innundated twice a day by saltwater, whereas Spartina patens survives on higher, slightly less saturated ground shoreward of the Spartina alterniflora which is inundated only irregularly. These two species are also beginning to take on special legal importance, as the zone between them is becoming increasingly recognized as a dividing line between high and low tides. Other species of biological and perhaps legal importance include Distichlis spicata, Salicornia spp. (saltwort), Iva frutescens (marsh elder), Juncus gerardii (black rush), and Phragmites communis (common reed). The latter species (the common reed) holds a special importance as an indicator species of both fresh water in the environment, and as a sign of recent human disturbance, since it is invariably the dominant species to come in on filled land and a dredged substrate. Animal species most commonly associated with the saltmarsh include Uca pugilator (fiddler crab), Modiolus spp. (mussels), and Melampus spp. (snails). All of these organisms combined, in conjunction with their geologic substrate and ecological setting, form the most biologically productive terrestrial environment known to man.

The data reflecting loss of saltmarsh acreage in the Northeast to uses more suited to man's apparent immediate needs indicates to the reader that there is a sharp conflict between the existence of saltmarsh in its

natural state and man's desires for it. Major saltmarsh acreage has been lost to garbage dumps, parking lots, airports, landfill projects for residential housing, and dredging and bulkheading projects for navigation and recreation. Much less saltmarsh acreage has been protected in natural preserves or by use of the police power and other governmental powers designed to prevent or deter their destruction. Documentation in support of the great biological and geological values of coastal marshes now exist and are largely unchallenged. Yet, public disposal and destruction of these same marshes continues. It is now commonly believed that 65% to 75% of all commercially valuable marine finfish depend on the natural vitality of these marshes in some stage of their lives. Likewise, all shellfish of value to man depend on the marshes, many totally. Furthermore, the geologic-hydrologic value of marshes as absorptive buffers to storm tides and other uses has been demonstrated, while their values in alleviating air and water contamination are just coming to be realized. And yet, marshes are granted away or left unclaimed by public agencies, and little serious effort has been exerted to save those which are privately owned. If the trends in marsh destruction evident in the past twenty years continue, there will soon be no marsh left.

Many states along the Atlantic and Gulf Coasts have now passed statutes, most of them quite recent, to

give some measure of protection to saltmarshes. However, each statute is inherently weak, due to its inability to develop a legally acceptable definition of saltmarsh, and also due to legislative desire to avoid charges of unconstitutionality against these laws. The laws vary greatly in the strengths and weaknesses. Some have been challenged in court, and have withstood the test of constitutionality. Others remain to be tested. The more recent trend in these statutes is to present a definition of saltmarsh based largely on vegetative parameters (often on the presence of any one of nineteen selected plant species), and sometimes complemented by geophysical tide-line parameters; order a state-conducted inventory of all saltmarsh, with mapping and set boundaries required; and design a permit system whereby an owner wishing to alter wetlands must present his case to a state agency, pay a fee, and follow specific requirements set down in his permit should it be granted. If the permit is denied, the applicant has recourse to appeal in the courts. If the permit application is considered sufficiently important, a public hearing must be advertised and held. The complexity of the procedure varies from place to place, as does the attitude toward wetlands protection and level of permissiveness of the permit-granting authority and the courts. Generally, the state Department of Natural Resources or Department of Public Works is given the task of granting or withholding

permits. State statutes also vary on the subject of public acquisition of wetlands or easements to them as, of course, does the level of appropriated money set aside for this task.

Although some wetland acreage has been lost as a result of decisions rendered in litigation against these statutes, no statutes themselves have been overturned. The central judicial issue seems to revolve around the twin problems of what constitutes an unconstitutional taking of private property without compensation or due process of law, and what represents a fair share of the social burden which is to be placed on the back of the individual property owner? In Maine v. Johnson, the court found that too much sacrifice was being asked of one property owner in order to benefit all of the people of Maine. Hence, the judge recommended public acquisition of wetlands with the public tax money of all the people to accomplish protection, and permitted the private property owner to fill his wetlands for his own profit. However, in this case, the judge was careful to uphold the validity of the law and dismiss charges against its constitutionality. From a reading of judicial decisions in other cases, one can see that these two matters are problem focal points, as is the issue of saltmarsh ownership and extent of boundaries. It does appear from study of the recent volumes of literature written on the subject that the question of

ownership is more central to the issue in the South Atlantic states, while the questions of unconstitutional takings and appropriate responsibility for the social burden of protection is more at issue in the Northeast states.

Many methods are available to accomplish the ends of saltmarsh protection and preservation, from use of zoning and other police powers, preferential use-value tax assessment, and philanthropy, to regional planning, public purchase of easements and public acquisition in fee simple. Due to the unreliability of judicial decisions and lack of predictability of future zoning trends, the use of police power regulation cannot be depended upon to ensure marsh protection, and should only be looked upon as a holding action or delaying tactic until more permanent protection can be afforded. The preferential or use-value tax assessment method is best adapted to agricultural areas rather than marsh, as the laws are written, and, in any event, the technique has been ineffective to date where it has been applied. It does, however, have some limited potential in wetlands protection. Philanthropy is haphazard and, for obvious reasons, cannot be controlled or relied upon. Regional planning is a tool which tells us what we have and where we ought to be going, but is only a tool, not an end in itself. Public purchase of easements to accomplish the task of natural marsh preservation

can be a viable tool, especially in areas more remote from population centers where land values and pressure for land are lower. However, in more developed areas of the Northeast, the cost of easements or development rights is just as great as the cost in fee simple. Public acquisition in fee simple, then, is the one remaining tool, and the only vehicle of preservation which is fully effective. It, too, however, has the major disadvantage of excessive cost in many areas. On the other hand, current use of police power to require permits before carrying out wetlands alteration may reduce the acquisition cost to the point where it does, indeed, become feasible for the public sector to acquire the great bulk of wetlands acreage which supplies so much in social public value.

Conclusions

The writer concludes that these coastal saltmarsh environments described in this dissertation are sufficiently valuable to justify preservation, even at some acquisition cost, as well as the costs of alternatives foregone. There is no question that temporary protection may be given to wetlands by careful and persistent use of the police power via the requiring of state permits and public hearings before approval of alteration. Further, it is conceivable that public acquisition costs could be considerably reduced with such persistent use and strict enforcement of the police power. It will be increasingly

less worthwhile for private owners to convert their wetlands to more privately profitable uses. In the long run, then, wetlands will only be effectively protected and preserved by such public acquisition in fee simple.

There are some who argue that the social costs of saltmarsh preservation (that is, the loss of tax revenue and use for other purposes) are, in many or most cases, greater than the social values of preservation. While this may be true in a few instances at the present time (especially if one only considers monetary returns), the argument assumes that the property tax will continue in the future to be the basis of support for public education. The trend in the United States at the present time is clearly in the opposite direction, and thus a significant decrease in demand for revenue raised by property taxation is foreseen. This would inevitably bring social costs more in line with social revenue in those cases where a discrepancy exists, and thus weaken this argument against removing wetlands from the property tax rolls through public acquisition.

Unfortunately for the interests of wetlands preservation, as population growth and industrial development accelerate, the division of interests between the value to society and the value to the owner becomes an increasingly serious problem, and the answer is of course education and its known potential for influencing publicly

held social values. Unfortunately for wetland ecosystems, public recognition of their true social value is coming about only at the same time as demand for coastal land and water sites for housing subdivision and other uses are rising, as are the market values for these site uses as the supply dwindles. There is, then, an apparent threat that the race will be won by those who seek to alter and destroy rather than by those who seek to preserve these ecosystems. Ultimately, without acquisition of this resource or at least its ecological value, coupled with eternal vigilance, the coastal saltmarsh wetland ecosystems of the United States will be permanently lost. If the loss occurs, perhaps more important than the loss of the great variety of values cited in this dissertation will be the loss of the opportunity forevermore to study the ecologic process occuring in this complex environment. As Ian McHarg has said,

> . . . nature is the arena of life and . . . a modicum of knowledge of her processes is indispensable for survival and rather more for existence, health and delight. . . .[1]

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[1] Ian L. McHarg, Design With Nature (Garden City, New York: Natural History Press, 1969), p. 7.

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