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CASE STUDIES OF COASTAL MANAGEMENT

Experience from the United States

Coastal Resources Center, The University of Rhode Island

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Coastal Resources Center, The University of Rhode Island

CASE STUDIES ON COASTAL MANAGEMENT:

EXPERIENCE FROM THE UNITED STATES

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1991

Coastal Resources Center

The University of Rhode Island

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PREFACE

Coastal regions are home to three-quarters of the world's population. They support many of the world's most productive and biologically diverse ecosystems, produce most of the world's fish catch, and support significant portions of the world's agriculture, industry and tourism. The number and variety of demands placed on coastal resources create a complex and urgent need for integrated rather than sectorial resource management strategies.

Successful coastal management is issue driven and is achieved by resolving existing problems with a combination of science, policy, law making and administration. How programs evolve is highly dependent upon the social, political, cultural and economic circumstances in the country concerned, and thus each program is unique. However, the experience gained from the past successes and failures of others can be of great use to current practitioners.

Experience in coastal management in the United States now spans 20 years. There are many examples of both successes and failure in addressing coastal problems. It is our belief that there is much to be learned from this experience.

In an effort to make some of the US coastal management experience more accessible to others, National Oceanic and Atmospheric Administration (NOAA); the lead national agency for US coastal management, teamed up with the Agency for International Development (A.I.D.); the agency primarily responsible for US foreign assistance, and the University of Rhode Island (URI) Coastal Resources Center (CRC); an organization dedicated to the formulation of effective management strategies for coastal environments, worked together to prepare a set of case studies on two aspects of the US experience in Coastal Management. The two topics illustrated by the case studies are: approaches to program design and implementation, and management strategies for environmentally sensitive sites.

The purpose of this initial set of case studies is to test the hypothesis that a series of case studies focusing on selected topics of interest to coastal managers will be instructive, and give practitioners in other locations useful ideas about how they might address similar situations. The selection of case studies included in this volume was made by a Working Committee comprised of NOAA and CRC Coastal Management professionals. Initial draft case studies were presented and discussed at a lively authors' workshop, held at the University of Rhode Island in May of 1991. At this session, lessons were drawn from the cases and their commonalities and differences discussed.

We invite comments back from you our readers and hope these Case Studies prove useful to those tackling similar problems elsewhere in the world.

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PART I: INTRODUCTION

COASTAL MANAGEMENT IN THE UNITED STATES: THE CONTEXT FOR THE CASE STUDIES

Essential to understanding any experience is some knowledge of the physical, socio-economic and political context in which the events described have occurred. Important facts about the United States (US) and its coastal areas that shaped how coastal management evolved in this country include the following:

1. The US is a wealthy country with a per capita GNP of almost $17,000. It also has the highest per capita consumption of natural resources in the world.

2. The US coastline extends more than 95,000 miles and encompasses a diversity of habitats ranging from subtropical coral reefs to frozen reaches of the Arctic.

3. Seventy-five percent of the US population lives within 50 miles of the shore. For people in the US, the coast is a place to live, work and recreate. The US coastal population continues to increase and place ever growing stresses on coastal ecosystems.

4. The economic interests found in US coastal regions such as ports, energy production facilities and other industrial and commercial activities, exert great environmental, social and political pressures. The intensity, variety and diversity of interests results in occasional severe conflicts.

5. There are diverse and separate political jurisdictions and a wide variety of governance arrangements for managing and allocating coastal resources.

6. The US has a "federalist" political system. This means that individual states have considerable independence and authority in managing their natural resources. In some states, particularly those on the Atlantic Coast, municipal governments also have considerable authority and have traditionally had primary jurisdiction over land use decisions.

7. There would be strong political opposition to any large scale, centralized national effort to regulate development in the United States' coastal areas. A decentralized approach to coastal management was therefore adopted to provide a balance among national, state and local interests.

"Coastal management," began as a distinct endeavor in the US with the passage of the Coastal Zone Management Act (CZMA) in 1972. The CZMA was one of a number of environmental legislative initiatives, which also included the Clean Water Act, the National Environmental Policy Act, and the Fisheries Management and Conservation Act, that were passed by the US Congress in the early 1970s to protect and better manage the nation's environment and natural resources.

The CZMA was prompted by the recognition that environmental quality along many coastlines of the United States has been degraded; critical habitats, especially wetlands, have been lost at alarming rates; fisheries are declining; development of coastal areas is accelerating; and use conflicts are

increasing. The CZMA did not, however, attempt to resolve all these issues. The legislation is an attempt to bring order to the development process along the nation's shoreline, to avoid or minimize use conflicts, and to reduce losses in coastal environmental quality.

The CZMA sets forth four national coastal management policies:

- To preserve, protect, develop, and where possible, to restore or enhance the resources of the coastal zone of the United States.

- To encourage and assist the states to develop and implement coastal management programs that meet specified national standards.

- To encourage the preparation of "special area management plans" to protect significant natural resources, to ensure "reasonable coastal-dependent economic growth" and to provide "improved protection of life and property in hazardous areas and improved predictability in government decision making."

- To encourage the participation and cooperation of public, state and local governments, interstate and other regional agencies, and federal agencies in achieving the purposes of the CZMA.

To encourage states to participate in this voluntary program, the federal government offered both financial and policy incentives. Planning grants were given to states for up to three years to design Coastal Management Programs which help achieve the national policy objectives. Plans which met with federal approval were given additional funding for implementation. The policy incentive, "federal consistency" with approved state plans, was of equal or even greater importance than the grant funds in encouraging state participation in the National Coastal Management Program. Federal consistency means that the federal government is required to conduct their activities within a state's coastal zone in a manner consistent with the approved state program. This provision gives coastal states substantially more control over important national decisions such as offshore oil and gas development and licensing of power plants than they would have without an approved coastal management plan.

In order to gain national approval for their coastal management plans, states had to meet a number of procedural and substantive requirements set by the national government. State coastal plans were required to define the inland boundary of the coastal zone and to demonstrate they had the authorities necessary to implement the policies included in the plan. The states were required to have an open and participatory planning process, identify key interest groups, and actively seek their participation. States also had to work with national government agencies to define and provide for the "national interest" in their coastal zone. Substantively, states were required to give "adequate consideration" and formulate policies for such priority issues as:

- protection of natural resources;

- management of coastal development to minimize loss of life and property in hazardous areas;

- siting major industrial, commercial and energy facilities in the coastal zone; and

- public access to the shore.

As of 1991, 29 out of 35 eligible states participate in the National Coastal Management Program.

Because of consistent national requirements, the state coastal management programs that have emerged over the past 20 years share many common features. All have a designated coastal zone, permit systems for selected coastal developments, policies on shorefront development and all limit or prohibit the filling of coastal wetlands. The variation in how states have tailored these program components to the unique environmental and socio-political context of their state is both interesting and instructive. For example, state coastal zone inland boundaries vary from only one hundred feet landward of mean high water in sections of urban New Jersey to several hundred miles inland in rural Alaska. In North Carolina, managing coastal development in high hazard areas was the program's initial focus; in New Jersey, stopping the filling of wetlands was the priority issue. The diversity in each State's specific policy objectives and how these objectives were met reflects the diversity of environments, local governance arrangements and values found in the different coastal states.

The CZMA is administered at the national level by the National Oceanic & Atmospheric Administration's (NOAA) Office of Ocean and Coastal Resource Management (OCRM), which is part of the Department of Commerce. NOAA makes grants to states of federal funds and conducts biennial evaluations of state program performance. Congress has strengthened and expanded the US CZM program with amendments to the CZMA in 1980 and 1985. The Act was reauthorized and further strengthened in 1990.

When examining coastal management in the US, the following four points should be borne in mind:

1. **The CZMA attempts to achieve national policy objectives for coastal management through a voluntary partnership between federal and state levels of government.**

Because of both the physical and political diversity of the United States, the CZMA recognizes that if coastal management is to be effective, determining **how** national policy objectives are to be achieved must be left to each state. No new national regulatory agency is set up by the CZMA. On-the-ground coastal management, both planning and implementation, is carried out by each state and in some cases by local governments. The national role in coastal management is to set policy and determine standards that state programs must meet. The national government approves state plans and periodically evaluates state program performance against CZMA criteria. In approving state programs, the federal government ensures that the "national interest" in a state's coastal zone is adequately considered. Upon approval, the federal government is obligated to conduct its activities in a manner consistent with the coastal management program of the appropriate state.

2. **The CZMA attempts to balance competing interests in coastal areas.**

Because the CZMA has both protection and development clauses, coastal management programs must balance and accommodate competing interests such as protecting critical resources while ensuring "reasonable" economic development and growth. This means that coastal management in the US is about choices and the allocation of limited resources. Therefore, coastal programs must and do consider societal values as well as technical and scientific information in their planning and decision-making processes.

3. **Coastal management programs have been shaped by extensive public participation.**

The CZMA was, at the time of passage, unusually specific in its requirements for public participation in the coastal management process. The professional planners, lawyers, and scientists involved in coastal programs have grown to recognize the significance of this provision. The public participation requirements have often driven the planning process and set the stage for the bargaining and accommodation among competing uses that characterizes coastal zone management programs in the United States.

4. **Coastal management in the US is essentially an attempt to bring order to the development process and avoid unnecessary conflicts and losses in environmental quality.**

As a result of the CZMA and complimentary state and local initiatives, the pace of degradation of the the US coastal region appears to have slowed. There have also been some noteworthy cases of restoration of key areas and of conflict resolution. The CZMA and the resulting state programs have not, however, dealt directly with such key resource degradation issues as loss of coastal fisheries or declining water quality, nor have state coastal programs attempted to define sustainable levels of use within coastal regions.

THE CASE STUDIES

Approaches to Program Design and Implementation

A basic question for any new or evolving coastal management program is what its basic design strategy will be. Programs must answer questions such as:

- What are the problems that need solving in the coastal region?
- Will the coastal program attempt to be comprehensive or will it focus on a few issues or a limited geographic area?
- How will the planning process proceed?
- Who will make key decisions?
- What role will resource users have in planning and implementation?
- Will the program be primarily regulatory or will non-regulatory management techniques such as incentives, public education, land acquisition, and improved coordination play key roles?

Five case studies were selected to illustrate a variety of coastal management program design choices made in response to the US Coastal Zone Management Act. This topic was chosen as one that is particularly relevant to developing countries that are now attempting to design coastal management programs.

Many countries have strongly centralized governance systems and thus focus on national level coastal planning and implementation and lack experience in the delegation of responsibilities to local levels of government. The US coastal management experience included in the five selected case studies show different approaches to balancing planning and management responsibility among federal, state and local levels of government to achieve national policy objectives.

For example, in Alaska, when CZM was introduced, the state was in a period of rapid development. There was no local government in many rural areas, and no local voice in shaping how development would occur. Here the coastal program became committed to local self-determination and created local planning boards to formulate regional coastal management plans. These framework plans embraced local values and were designed to shape how development would proceed. In contrast, in New Jersey local municipalities have traditionally made all land use decisions. Such decisions had larger than local consequences, and alarming resource degradation was occurring along the coast. New Jersey's coastal program therefore provided the state with a major role in how development may or may not proceed in critical coastal habitats. This was achieved by introducing state permits for development in designated, narrowly-defined coastal areas. The North Carolina program has worked to balance state and local responsibilities. This program encourages local planning, but gives the state a major role in protecting critical coastal habitats and controlling specified forms of development.

The five program design case studies also illustrate differences in the focus of state coastal programs. None are comprehensive: all have made decisions about which issues to address in specific geographic locations. For example, in Rhode Island, an entire ecosystem is the focus for a special area management plan; in Alaska maintaining the fish and wildlife which support the subsistence lifestyle of rural Alaskans is central; and in North Carolina, controlling development in high hazard areas has been made a priority.

There is also diversity in how policy objectives are achieved. In America Samoa and New Jersey, coastal development permits are a central feature of these coastal programs. In the America Samoa case, the special challenge of attempting to institute such a permit system within a traditional culture is particularly interesting. In Rhode Island, North Carolina and Alaska, non-regulatory management measures such as education and increased coordination among levels and units of government play a larger role.

Finally, the practice of coastal management has demonstrated time and again that coastal programs cannot only address technical issues but must consider a society's values. For this reason, in three of the cases—Alaska, Rhode Island, and North Carolina—states chose to create Councils composed largely of citizens or representatives of local government, not technical experts, to make the Program's policy decisions.

Management Strategies for Environmentally Sensitive Sites

Managing development by directing it away from sensitive areas, minimizing environmental impacts and reducing conflicts among different uses has been a major feature of coastal management in the US. The four cases included in this section illustrate a variety of techniques that have been used to promote environmentally sound development. The cases all focus on tourism-related development. The tourism industry is experiencing explosive growth in many developing countries and depends in large part upon high quality habitats, good water quality and the protection of scenic and cultural

resources. Few locations, however, have been successful in managing tourism development so as to maintain these amenities.

In all the cases included in this volume, state coastal management has been only one of several programs used to manage development. Regulation through permit programs, prohibited and limited use areas, and zoning has been the primary management tool. In Hawaii, South Carolina and the Virgin Islands, authors report that stringent regulations have been most effective and accepted by the public when they have been applied to limited geographic areas that are recognized as critical or fragile. In Florida, comprehensive land use planning based on habitat protection is an innovative management technique.

Despite the need to rely on regulation, all authors also emphasize the importance of building a constituency and achieving adequate consensus that stringent regulation is required and ultimately benefits all parties. All the authors in this group also underscore the importance of government decisions in providing or withholding infrastructure as a key means for controlling demands to intensify development. In the Florida Keys, for example, the author concludes that infrastructure decisions will ultimately limit development more effectively than plans and regulations.

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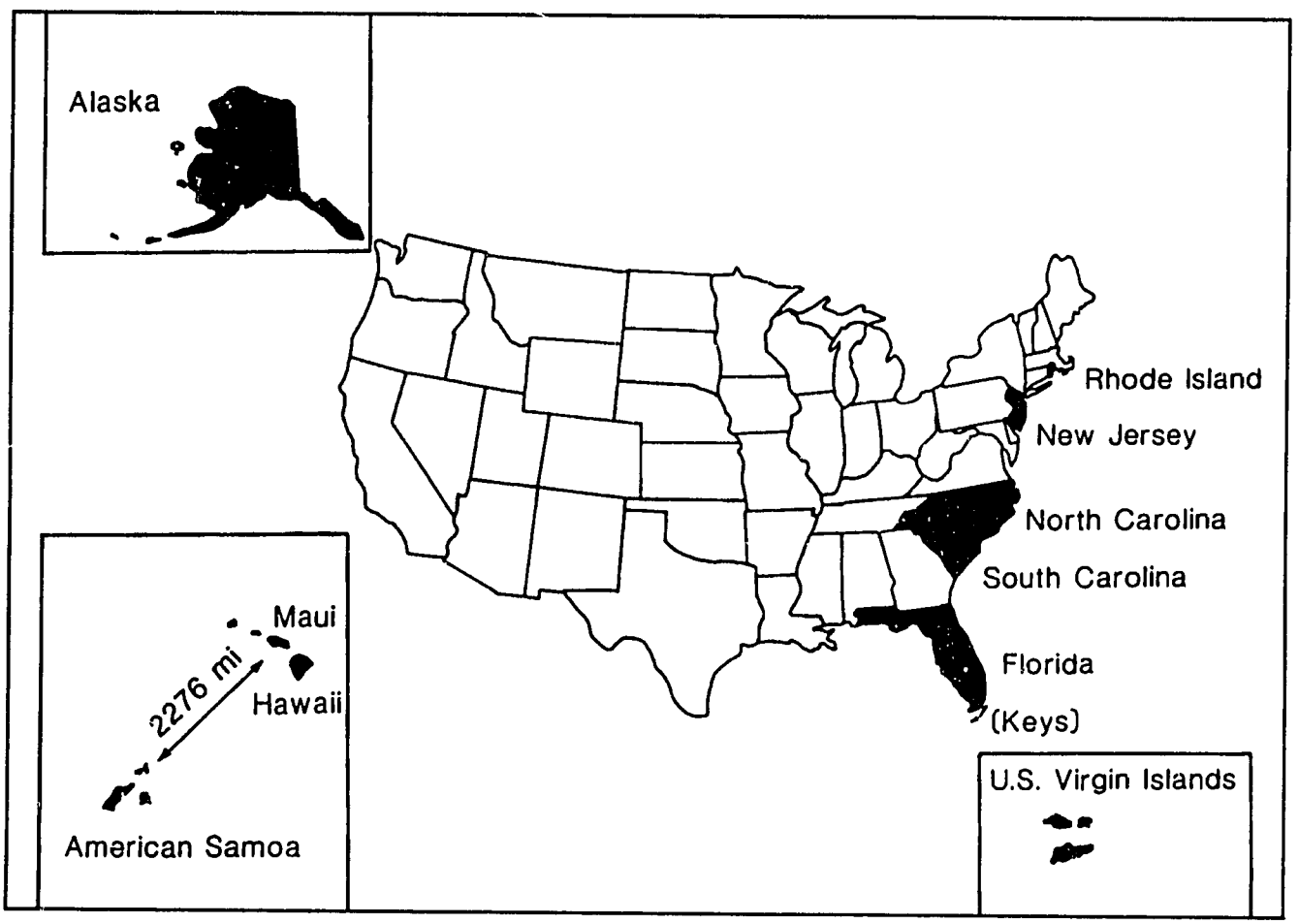
PART II: THE CASE STUDIES



U.S. STATES AND TERRITORIES SELECTED FOR CASE STUDIES

The Alaska Coastal Management Program

Involving Local People in Coastal Resources Management Decisions

Jan Caulfield

Alaska is a unique state; it is the largest but most sparsely populated state in the United States. It has a coastline of 33,000 miles, which is highly valued by Alaskans as having cultural, economic, recreational and spiritual significance. The majority of the total population of 550,000 live on or near the coastline, including many in remote, small villages. The populations of Alaska's coastal villages consist largely of Native Alaskans who have inhabited these areas for tens of thousands of years, and rely on the natural resources of the coastal area for their primary source of food and income. Major changes are occurring to these resources as a result of oil and gas development, development of wetlands and waterfront areas, and increasing recreational uses by non-residents.

In formulating a Coastal Management Program, Alaska has been successful in involving coastal residents in decisions about the use, development and protection of coastal resources. Local governmental units, created through the coastal program, are responsible for preparing management plans for the coastal areas in which they live—setting their own priorities and working with the state and federal governments to implement the plans. Local residents and government units have learned to effectively participate in a planning and decision-making process that balances their interests with those of the state and national government, private industry and special interest groups.

This case study focuses on one of Alaska's 32 coastal districts, the Bristol Bay Coastal Resource Service Area (CRSA). The case reviews how the Bristol Bay CRSA utilized the coastal management planning process to influence how development will proceed in their region. The Bristol Bay CRSA designed its plan to protect fish and wildlife habitat from incompatible resource development, to maintain the subsistence way of life in the region, and to resolve conflicts over use of a popular recreation area by local residents and new tourism businesses. Through planning and cooperation with the state and federal governments in plan implementation, the Bristol Bay CRSA has achieved many of its goals.

INTRODUCTION

Through examination of the Alaska Coastal Management Program, this case study explores the opportunities for coastal residents, communities and regions to participate in decisions about the use, development and protection of coastal resources. The study describes the features of Alaska's coastal program that involve local people in coastal resource decisions. It focuses on the Bristol Bay Coastal Resource Service Area, one of Alaska's 32 local coastal districts, and looks at the district's success in addressing local concerns by the following means:

- the development of a coastal management plan for the region
- preparation of a specific management plan for a heavily used recreational fishing and hunting area

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- cooperation with state and federal governments in implementation of the plans.

Finally, the study looks at Alaska's success in achieving strong local involvement in coastal decisions, and discusses some remaining challenges.

Alaska's oceans and coastal areas are vital places, rich in natural resources that provide food and jobs for local residents, they create economic opportunities for private industry, generate revenue for government, and supply energy and mineral resources that benefit the nation. The coasts are of cultural, recreational and spiritual value to Alaskans, including indigenous Native Alaskans who have inhabited and depended upon coastal areas for tens of thousands of years. Alaska's coastal waters, wetlands, and watersheds also nurture some of the most productive fishing stocks in the world, and provide habitat for thriving populations of marine mammals, waterfowl, caribou, and other animals. Daily decisions made by the state and federal governments regarding coastal development projects determine the fate of Alaska's 33,000-mile coastline. Questions regarding coastal development in Alaska touch on all aspects of resource use, environmental protection and public concern. For example:

- Where should offshore oil and gas exploration and development occur, and what should be done to protect marine mammals and valuable fisheries from oil spills, noise disturbance, and other impacts?

- Which wetland and waterfront areas in Alaska's villages and cities should be developed for community growth, and which protected from development?

- How can conflicts be resolved between coastal residents who have traditionally used fish and wildlife for subsistence, and non-residents whose use of coastal areas for recreational fishing and hunting is increasing?

The Alaska Coastal Management Act was enacted in 1977 by the state Legislature to ensure that as Alaska's coast is used and developed, its resources and values are conserved and protected.

This case study focuses on one of the three primary goals of Alaska's coastal program: involving local people in decisions about the use and protection of coastal resources. The Alaska Coastal Management Act recognizes that Alaskans want to have the maximum control over decisions affecting the coastal areas in which they live, and is structured to involve local people in these decisions.

BACKGROUND

Local involvement in coastal management can be most successful if local people are active in all aspects of the program: stating their goals and concerns at public meetings, writing plans, and putting their plans into action by working with others to make decisions about development projects and to resolve conflicts. The Legislature designed the following structure for Alaska's coastal program to ensure that this occurs.

Local Representation on Statewide Council

The Legislature established a 16-member Coastal Policy Council to oversee the state program. Nine of the Council members are locally-elected officials such as city mayors, appointed by the Governor to represent each of the state's nine coastal regions. Working with the seven state government representatives on the Council, the local representatives ensure that local concerns and issues are expressed, discussed and acted upon by the top policy-making body in the program.

Coastal Districts Plan for Local Areas

Alaska's program is designed to allow local coastal areas, called "coastal resource districts," to write plans that will guide coastal activities and development. Although the Coastal Policy Council defined an initial coastal zone boundary for the state and adopted general coastal development standards, these were interim rules. They were in-

PROFILE

Mandate for the Alaska Coastal Program
The three primary goals of the Alaska Coastal Management Act are:

- To balance natural resource protection and resource development throughout Alaska's coastal zone
- To involve Alaskans in decisions about the use and protection of their coastal resources
- To simplify the state permitting process for coastal development projects, and reduce the time it takes to obtain state government approval for a project

Geographic Scope
The Alaska Coastal Management Program covers the 33,000 mile coastline of the State of Alaska. The state's "coastal zone" extends seaward three miles offshore. The inland boundary of the coastal zone varies throughout the state, is set by the local planning entity, and extends inland to the extent necessary to manage development projects that are likely to impact Alaska's coastal resources. In some cases, the inland boundary extends more than 200 miles inland, along the courses of anadromous fish streams.

Program Structure
A 16 member Coastal Policy Council, consisting of local government representatives and state officials with representation from Alaska's nine coastal regions, oversees the Coastal Management Program. Thirty-two local coastal areas known as Coastal Resource Districts have responsibility to write and implement local plans, which must be approved by both the state Coastal Policy Council and the federal government. In four large rural coastal regions, in which no local level of government exists, Coastal Resource Service Areas have been created to involve local residents in coastal planning.

Approved local coastal management plans are implemented primarily through a "consistency review" process at the state level which ensures that government-sponsored and private coastal development projects that require state or federal permits, are in compliance with the policies of approved local coastal management plans.

tended to be replaced by more specific plans written at the local level.

In Alaska, 32 coastal resource districts have been formed to prepare and implement coastal management plans (Figure 1). Twenty-eight of the coastal districts are cities and boroughs (regional governments, called "counties" in most other states), which are organized local governments with land use powers, such as zoning and local permitting.

Four of Alaska's coastal districts are called "Coastal Resource Service Areas" (CRSAs). CRSAs are organized in large rural coastal regions of Alaska that are not represented by an organized local government[1]. These areas have no local government authorities that would allow them to regulate coastal development projects. The state Legislature created CRSAs to allow local residents in these areas to influence where and how coastal development projects occur, through participation

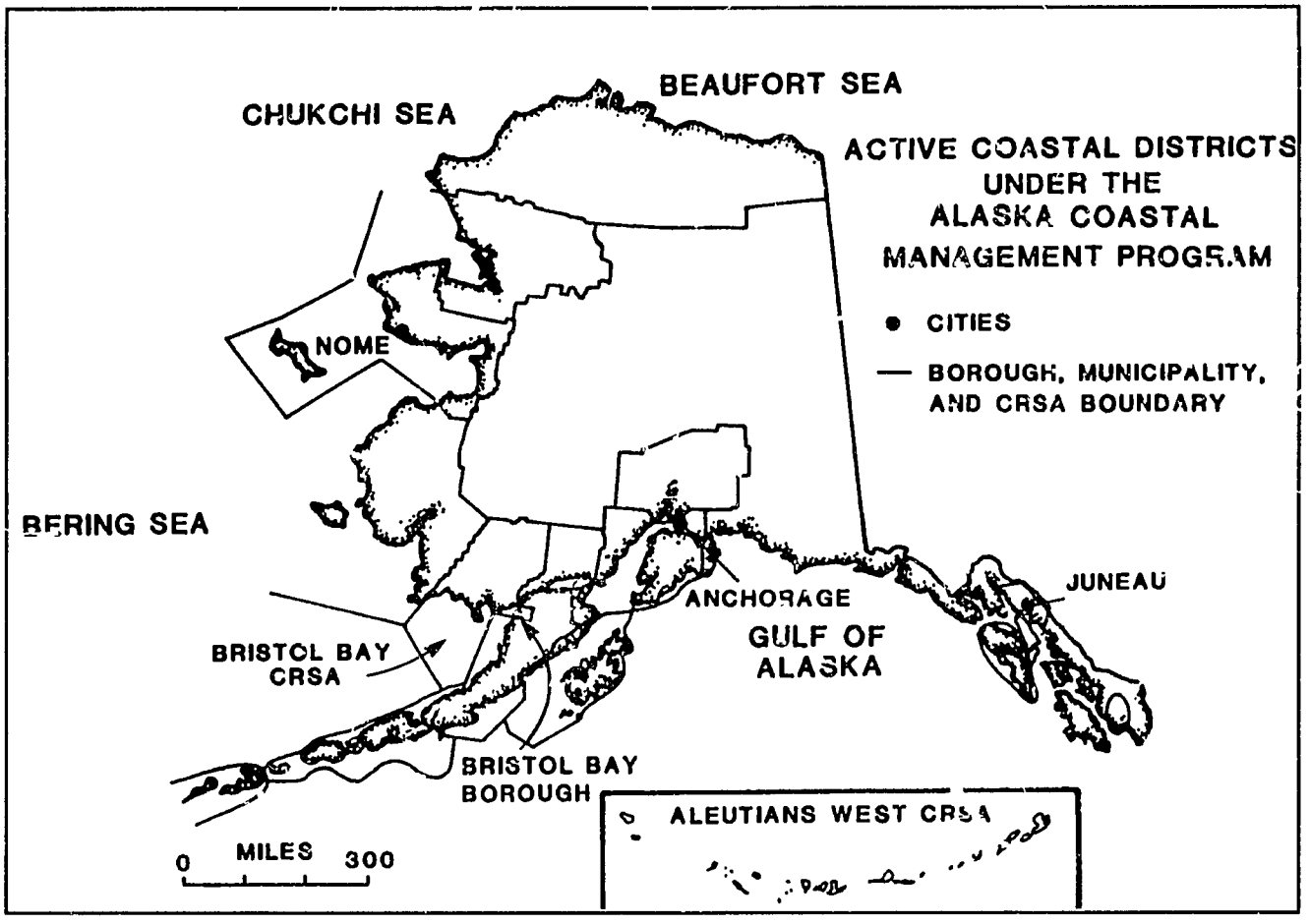

Figure 1. Alaska's Coastal Districts

in state and federal government permitting decisions.

Coastal resource districts write local management plans that:

- inventory resources in the region
- consider issues of concern to local residents
- define an appropriate coastal zone boundary
- adopt policies to guide coastal development decisions
- describe how the plan will be implemented.

Coastal districts may also write more specific management plans for areas with unique coastal values, or where there are particular conflicts over the use of the area. Local coastal management plans must be approved by the state Coastal Policy Council and the federal government. Once approved, the local plans have the force and effect of state and federal law.

Local Participation in Plan Implementation

Approved coastal district plans are implemented in a variety of ways. However, the primary way in which plans are implemented is through the "consistency review process" established in state and federal coastal management law[2]. Under the consistency review process, all government-sponsored and private development projects that may impact the coastal zone must be reviewed to make certain they comply with Alaska's coastal program before they receive state and federal permits or approvals to proceed. Projects are approved only if they are consistent with the policies of local coastal management plans.

Coastal districts have a strong role in this review process. The state agencies coordinating the reviews consider the coastal districts to be experts in applying the policies of their local management

plans. If conflicts arise during project reviews, coastal districts, government agencies and the project applicant meet to discuss ways to resolve the concerns. Ultimately, if a coastal district disagrees with the results of a project review, it can appeal the decision to higher levels in state government, the Governor, and the Coastal Policy Council.

Public Participation

To ensure that local management plans are supported by residents and respond to local concerns, Alaska's coastal districts closely involve the public during plan development and implementation. Coastal districts talk with local communities, Native Corporations[3], private industry, and other public interest groups. Districts use workshops, formal public hearings, questionnaires, newspaper and radio stories, and brochures or newsletters to educate the public and ask for public input.

Coastal District Funding

Finally, adequate and stable funding is needed for coastal districts to actively participate in coastal management. State and federal funds are provided to Alaska's coastal districts to allow them to pay one or two staff, prepare management plans, participate in the project review process, track important coastal issues, and educate the public about the plans. Over $1 million is distributed in grants to Alaska's coastal districts each year.

Although Alaska's coastal program is structured to favor local involvement, local views cannot solely control decisions on where and how coastal development will occur. There are often legitimate conflicts between the goals of local residents, and the state and federal agencies obliged to manage resources for the benefit of all members of the public, not just those in the local vicinity. Conflicting views on coastal management decisions may also be expressed by other affected parties, such as private industry, Native Corporations, or environmental organizations. Local coastal districts have the responsibility to balance their goals with the views and needs of these other parties.

The degree to which local concerns are met also depends on the willingness of the state and federal governments to work in good faith with local people to help them achieve their goals. The state and federal governments have a responsibility to help reconcile diverse interests fairly, by involving local people and other affected interests in discussions and negotiations to resolve disputes. Achieving the correct "balance of power" between local interests and those of the state and federal governments, and ensuring that private industry and other interest groups are also treated fairly, is a challenge both during the development and implementation of each local coastal management plan.

The opportunities for local people to address their concerns through Alaska's coastal program, as well as the challenges involved in resolving conflicts between local desires and other points of view, can be seen in the following case study.

CASE STUDY: The Bristol Bay Coastal Resource Service Area

The Bristol Bay CRSA is located in southwestern Alaska, north of the Aleutian Chain, bordering the productive coastal waters of Bristol Bay. The region includes 40,000 square miles of land, ranging from wet coastal lowlands to rugged volcanic mountain ranges, as well as the bay itself. Accessible to the rest of Alaska only by air or water, the region includes 29 different communities, populated by 7,000 people from four ethnic and linguistic groups: Eskimo, Aleut, Athapaskan Indians and Caucasians.

The state and federal governments own most of the land in the region. The largest private landowners are the village and regional Native Corporations. Only a very small proportion of the land is owned by private individuals. At the time the CRSA was formed, there was no organized local government representing the larger Bristol Bay area[4].

The Bristol Bay region is internationally recognized for its abundant fish and wildlife resources. Commercial fishing is the region's economic main-

stay, providing 45% of all jobs in the cash economy. The region supports the largest salmon fishery in the world. In 1990, Bristol Bay's commercial fishermen were paid approximately $200 million for their salmon catch. The bountiful salmon, herring, shellfish and bottom fish stocks of the bay and rivers, along with the abundant wildlife, also support a thriving subsistence economy. Government is the second largest cash employer in the region, followed by a growing tourism industry.

CHRONOLOGY OF MAJOR EVENTS

1972	United States Congress adopts the federal Coastal Zone Management Act
1977	Alaska State Legislature adopts the Alaska Coastal Management Act
1978	Alaska Coastal Policy Council adopts initial coastal zone boundaries for the State of Alaska and general regulations with which coastal development projects must comply
1979	Alaska Coastal Management Program is approved by the federal government. Following federal approval, local coastal communities and regions in Alaska begin to organize as "coastal districts" and prepare specific management plans for coastal resources within their districts
1981	Bristol Bay Coastal Resource Service Area (CRSA) organizes as a coastal district, by public election
1982	Bristol Bay CRSA elects a seven-member Board to represent the district during coastal management planning and implementation
1985	Bristol Bay CRSA Coastal Management Program is approved by the state Coastal Policy Council
1987	Bristol Bay CRSA program is approved by the federal government. The CRSA begins development of the Nushagak & Mulchatna Rivers Recreation Management Plan for a heavily-used coastal recreation area
1990	Recreation management plan is approved by the state Coastal Policy Council and the federal government
1991	Bristol Bay CRSA continues to implement both approved plans, primarily through reviewing coastal development projects that require state or federal government permits for consistency with the plans

The CRSA Coastal Management Plan

Local residents voted to form the Bristol Bay CRSA in October 1981, and held another election to choose a seven-member CRSA Board in January 1982. Over the next three years, the CRSA Board and two staff planners worked to inform the public of the planning process, discover what the public's concerns were, consult with private industry and Native Corporations with interests in the region, inventory coastal resources, and write a management plan that would receive state and federal approval.

The CRSA's staff were "planners", rather than professional scientists trained in the technical aspects of oceanography or marine biology. As planners, the staff were skilled in research and writing, organizing information, conducting productive meetings, and communicating effectively with the public and government agencies. The staff used paid consultants and government agencies to obtain the specific technical and scientific expertise that was needed to prepare the plan.

While the Bristol Bay CRSA was planning for the coastal zone, others were planning for major oil and gas lease sales in the federal waters of the bay outside the state limit. In 1986, nine private companies paid $95 million to the federal government in exchange for the right to explore for oil on Outer Continental Shelf (OCS) Lease Sale 92 in Bristol Bay[5]. Additional OCS lease sales were scheduled for coming years. Although the State of Alaska had deferred oil leasing in state waters within three miles of the shore because of its concern for the bay's valuable fisheries, the state was leasing land on shore for oil exploration.

Oil and gas exploration was not the only development issue facing the region. Other on-going or potential development activities included placer and hard rock mining, sand and gravel extraction, construction of new transportation and energy transmission corridors, commercial fish processing, settlement of wilderness areas by new residents, and increasing use of remote areas for commercial lodges and other recreation facilities.

Local residents were concerned with the possible impacts of these new developments on the rich fisheries and wildlife of the region. If not properly conducted, resource development could result in oil and fuel spills, toxic waste contamination, noise and disturbance, shoreline and wetland alteration, water withdrawal, and pollution of salmon streams and marine waters. Activities that might interfere with residents' traditional subsistence and recreational uses of fish and wildlife also concerned the public.

The primary goal of the CRSA management plan was to ensure that the fish and wildlife upon which residents depend would be protected from harm, while allowing for compatible resource use and development[6]. The goal was stated as follows:

> The fish and wildlife of the Bristol Bay region form the basis of the economy, whether used for commercial, subsistence or recreational purposes. These populations depend upon adequate amounts of natural habitat for their health and survival. Development activities create competing demands for this habitat which could lead to reduced populations. The goal of the Bristol Bay CRSA coastal management plan is to maintain and enhance the natural productivity of fish and wildlife populations and habitats. The objective of the plan is to ensure that development activity occurs in a manner that has no, or minimal, impact on important fish and wildlife populations.

The CRSA began to achieve its goals by defining a new coastal zone boundary that included considerably more area than the interim boundary set by the Coastal Policy Council. Coastal districts are allowed to redefine the interim coastal zone boundary to include areas where development activities may have a significant impact on marine coastal waters and on the fish and wildlife that depend upon coastal waters, such as marine mammals and anadromous fish[7]. In Bristol Bay, the interim boundary included marine waters within three miles of shore (the limit of the state's jurisdiction), and all lands and waters below 200 feet in elevation throughout most of the region[8].

The new coastal zone boundary extended inland to a distance over 200 miles from the shoreline, along the courses of all anadromous fish streams and their tributaries, which are the lifelines of the region's cash and subsistence economies. The boundary also included a corridor of land one mile wide on each side of anadromous fish streams and 200 feet wide on each side of their tributaries, to ensure that activities near these important waters would be subject to the coastal management plan.

The CRSA Board drafted 52 management policies to regulate private, state and federal projects that are located within the coastal zone boundary, or that may affect coastal resources within the boundary. The policies covered a wide range of uses and activities in the region, including: waterfront development, oil and gas, mining, recreation, transportation and utilities, seafood processing, subsistence, habitat protection, air and water quality, geophysical hazards, and historical/archaeological resources. Rather than establishing very explicit siting or design criteria, the policies were written as "performance standards" to give the project applicant the flexibility to design a development project that meets the intent of the policy. For example:

> **Subsistence**: Maintenance of subsistence use will be given the highest priority when approving proposed land uses in [subsistence use] areas. Before a potentially conflicting activity may be authorized, an analysis of the possible adverse impacts upon subsistence use must be conducted and appropriate safeguards ... must be provided.
>
> **Habitats**: Maintenance and enhancement of fisheries will be given the highest priority when evaluating projects which may impact fish spawning, migration, rearing, and overwintering areas. Shorelines that have banks, beaches, and beds critical to

fish populations will be maintained in a productive natural condition.

Water Quality: No petroleum products or toxic substances will be stored in such form or manner that they could contaminate waterbodies, including groundwater. Measures to prevent and cleanup spills of petroleum or toxic materials will be incorporated into the design and operation of all storage facilities.

When the CRSA coastal management plan was submitted to the state Coastal Policy Council for review and approval, comments on the plan were received from state and federal agencies, private industry, Native Corporations, environmental organizations, commercial fishing groups, and members of the public. Although many of the comments suggested only minor changes to technical information or the wording of policies, some significant conflicts did emerge. Private companies interested in developing the region's oil, gas and other resources, and several state and federal agencies, objected that the new coastal zone boundary included too much area and extended too far inland. They were also concerned that the policies regulating oil and gas development would unnecessarily restrict the oil and gas industry's planned activities. The CRSA, and other parties interested in protecting the bay's fisheries from possible development impacts, argued that the boundary and policies were warranted given the value of the fisheries.

The state Coastal Policy Council's staff moderated a series of informal meetings between the CRSA, state government agencies, and private interest groups to attempt to reach agreement on the plan. The CRSA agreed to make changes, both minor and substantive, to the plan's policies in order to address public comments. However, the Council determined that the extremely high value of the Bristol Bay fisheries warranted the protection provided by the extensive coastal zone boundary proposed by the CRSA Board. When the plan was approved by the Coastal Policy Council in February 1985, the coastal zone boundary was approved without change.

Although many of their concerns had been addressed through changes in policy language, some representatives of private industry were not satisfied with the result of the state Coastal Policy Council vote, and asked the federal government to require additional changes to the plan. During the federal review of the plan, debate again raged over the extent of the coastal zone boundary, and also focused on three policies that regulated oil and gas activity. The first policy prohibited the use of explosives for in-water seismic testing, and required the use of other technology that would be harmless to fish and wildlife. The second required that oil produced offshore be transported to shore via pipeline, rather than stored offshore. The third required that oil pipelines crossing fish streams be designed to minimize damage from oil spills.

The federal approval process, normally concluded within four weeks, took two years to complete. The federal government prepared a detailed report, analyzing the effects of the expanded coastal zone boundary and the three policies on the national interest in production of oil and gas to satisfy the country's energy needs. To obtain federal approval, it was necessary to change the three policies relating to oil exploration and development — the first to remove the prohibition on the use of explosives for in-water seismic exploration, and the others to allow for a case-by-case consideration of costs and benefits when decisions are made about offshore oil storage and oil pipeline design. The federal government eventually concurred with the state's decision on the coastal zone boundary, and no changes to the new boundary were required.

The resolution of these disputes between the CRSA Board, the state and federal governments, and the public constituents they represented, required many meetings, conference calls, exchanges of letters, and the assistance of Alaska's Congressional delegation. It was a lengthy, difficult and contentious process. At times, the CRSA Board and the state Coastal Policy Council openly questioned the fed-

eral government's commitment to fairly addressing the concerns of local people. However, all parties were eventually able to reach agreement on acceptable policy language. When the plan received federal approval in February 1987, two years to the day after its state approval, it represented a consensus of these parties.

The Nushagak & Mulchatna Rivers Recreation Management Plan

After completing the regional management plan, the Bristol Bay CRSA tackled a local controversial issue — the use of the Nushagak and Mulchatna river drainages and their fish and wildlife resources, by a growing tourism industry. Use of the area by visitors from outside the Bristol Bay region for sport fishing, hunting and recreational boating had increased dramatically in recent years. The demand for sites for tourism facilities (such as lodges, airstrips, docks and fishing camps) raised local concern about possible infringement on traditional uses of the area and its resources by local residents, as well as the ability of the area's fish and wildlife to support more recreation use.

A survey of commercial tourism businesses conducted by the CRSA in 1986 showed the potential for conflict. Between 1982 and 1986, average sport fishing effort by both local and visiting fishermen increased by 85% over the previous five-year average, with intensive fishing each year from June to September. Sport hunting of moose and caribou had also increased dramatically. Sixty percent of the tourism businesses in the region (recreation guides, air carriers and lodges), had opened for business within the previous ten years. Most clients using these services were not local residents, but were from other places in Alaska or from outside the state.

The CRSA Board wanted to prepare a plan that would accommodate new commercial recreation users, while ensuring that traditional use would not be displaced from areas used intensively by local people for fishing, hunting and recreation. Since the State of Alaska owns and manages 85% of the lands within Nushagak and Mulchatna river drainages, the CRSA joined with the state to accomplish their planning goals. In the Fall of 1987, the CRSA Board signed a cooperative agreement with the state departments of Natural Resources (manages state land) and Fish and Game (manages fish and wildlife) to develop a recreation management plan.

The plan addressed some very sensitive issues: public access, the quality of each individual's recreational experience, and the feeling of "ownership" held by long-time users of the area. Traditional recreation users wanted to ensure that the quality of their experience and their success in hunting and fishing would not be diminished. New visitors from outside the region, and entrepreneurs with tourism businesses, insisted on fair treatment and equal access to the area and use of its resources.

The CRSA and state agency planning team went to great lengths to involve all affected parties. An advisory board was established, including representatives of environmental organizations, sport fishing and hunting groups, Native Corporations, tourism businesses, and federal agencies. Workshops, public service announcements, and a series of planning team newsletters were used to provide information on the plan. Public input was received through the advisory group, public meetings, informal conversations and phone calls, and a detailed workbook asking for public responses to specific management alternatives being considered by the planning team. The planning team also developed attractive information displays that combined written text with maps and photographs. The displays were placed in airports to educate visitors about the region, its recreational values, and the recreation management plan.

Over a three-year period, the planning team wrote a detailed recreation management plan for all state lands and waters within the planning area[9]. The plan accomplished the following:

1. Designated 25 management units for primitive, semi-primitive or semi-developed use experiences. In primitive areas, visitors would see little or no evidence of human use, while in semi-developed areas, visitors might see evidence of heavier use. For each designation, the

plan specified what types of facilities could be developed. For example, permanent facilities (such as lodges and airstrips) were prohibited within primitive and semi-primitive units, but could be allowed within semi-developed units under certain circumstances. The plan also included general guidelines for the siting and operation of recreation facilities.

2. Designated 49 "public use sites" that are important for public access, camping, hunting, fishing, or other recreation or public use. Public use sites will remain open for use by all members of the public. Permanent and temporary facilities were prohibited at these sites.

3. Recommended:
- continued cooperation to work on remaining issues, such as the allocation of fish and wildlife among users, and managing the number of people using the area for recreation
- establishing agreements with federal and Native Corporation landowners to encourage compatible management of their lands
- increased enforcement of regulations that protect fish, wildlife, and environmental quality
- additional public education
- removal of existing trespass structures.

The recreation management plan was approved by the state Coastal Policy Council and the federal government as an amendment to the Bristol Bay CRSA plan in 1990. Only minor changes to the plan were necessary to address public comments received during the state Council's review. The recreation management plan was also adopted by the state Department of Natural Resources as an amendment to its land management plan.

Coastal Management Plan Implementation

Because it has no local government powers of its own, the Bristol Bay CRSA implements its plans through the coastal project review process coordinated by the state. The CRSA Board is asked to review and comment on an average of 35 coastal development projects each year, ranging from small projects such as construction of temporary recreation camps, to major development questions such as the federal government's plans for further oil and gas leasing in federal waters near Bristol Bay. In each case, the CRSA asks affected cities and villages for their comments and reviews the project for compliance with the policies of its approved management plans. The CRSA provides its comments to the state agency coordinating the review, and meets with agencies and other parties to discuss and resolve any conflicts that arise. A typical coastal project review, which was not controversial, is described below.

In February 1991, the state Department of Natural Resources asked the CRSA for comments on a proposal to construct a temporary camp for a commercial sport fishing business on the Middle Nushagak River. The project developer, a fishing guide, had applied to the state for permission to locate the camp on state land. The proposed facilities were modest: a 12 by 25 foot tent, smaller tent for equipment storage, temporary boat dock and pit latrine. The camp was located next to an important king salmon spawning area, and offered excellent sport fishing for salmon and other fish.

The CRSA staff contacted the traditional village councils and village Native Corporations of four nearby communities. Staff also reviewed the proposal for compliance with the Nushagak and Mulchatna recreation management plan. The proposed camp site was located within a management unit designated as "semi-primitive." The plan allowed the temporary camp at the proposed location, provided it was sited and developed to minimize evidence of human use.

The CRSA approved of the project, but suggested some changes to ensure the camp would have minimal impact on fish, wildlife and other recreation users. The CRSA suggested that:
- the camp be located out of view from the main river channel, with its facilities placed close together to minimize disturbance of the natural area
- public access for other recreational users be

allowed

- fuel be stored away from the river and waste and wastewater disposed of properly
- any cultural or historical resources discovered on the site be left undisturbed.

These requirements will be included as part of the state land use permit issued for the project.

Through project reviews such as this, the Bristol Bay CRSA is able to put its coastal management plans into action and achieve its original planning goals. As it gains experience through implementation of the plans, or as new coastal issues arise in the district, the plans can be amended.

CONCLUSIONS

Alaska's coastal program has been successful in involving local coastal residents in decisions about the use and protection of coastal resources. Conducting coastal management planning at the local level, rather than the state level, has been the primary reason for this success. Although not all of Alaska's local coastal districts are as active as the Bristol Bay CRSA, each has benefited from the opportunity provided by the Alaska coastal program to be involved in coastal resource decisions.

Since 1979, 30 local coastal management plans have been completed. Alaska has learned that the planning process takes time. The state Legislature originally set a deadline of 30 months for completion of all local coastal management plans. The process has taken over 12 years. Local coastal districts that have written plans recently have completed their plans in less time (now averaging approximately two years), since they have used the earlier plans as examples, have received more training in coastal management planning from the state government, and have benefitted from the knowledge of state government staff and private consultants that are now experienced in the coastal management planning process.

Although the planning process has been time-consuming, the policies of the local coastal management plans, written by local people and approved by the Coastal Policy Council and the federal government, are now the basis for coastal resource decisions in most of Alaska. Districts have used these plans to participate in state-coordinated reviews of a wide range of proposed coastal development projects. The involvement of coastal districts in meetings to reach consensus on disputed development projects has been successful, and relatively few decisions have been elevated to a higher level of state government for reconsideration[10], or appealed to the Coastal Policy Council for formal dispute resolution[11]. This has benefited project developers, since local concerns are resolved through negotiation, rather than through time-consuming administrative appeals and court disputes.

Each coastal district plan accomplishes something different, depending upon the needs and interests of people in the area. Plans for rural areas have often taken the approach used by Bristol Bay, and emphasized protection of fish and wildlife and subsistence activities. Coastal plans for Alaska's urban areas have often focused on streamlining government approvals for waterfront and wetland development projects to encourage community growth and economic opportunity. Coastal districts have also completed special management plans and projects related to specific local concerns, including floodplain management and drainage control, port and harbor development, protection of watersheds for city drinking water supplies, enhancement of coastal public access, and prevention of marine debris.

As Alaska's coastal program moves from plan development to implementation, there are challenges ahead. First, the program must maintain its commitment to resolving local concerns, and continue to find the proper balance of power between local, state, federal and non-government interests in coastal management. There has been a recent tendency in Alaska to view the state government administration's decisions as paramount in the program. Legislation introduced by the state administration in 1990 would take away the Coastal

Policy Council's role in hearing appeals of state government decisions on development projects. While this legislation has not been adopted by the state Legislature, it signals the state government's interest in gaining more control over development decisions. This trend should be reversed by strengthening the Council's role in establishing coastal management policy for Alaska, and retaining their role in resolving disputes over the state's coastal development decisions.

Second, state government agencies should recognize the contributions that local coastal districts could make in monitoring development projects for compliance with environmental regulations. Although this has been discussed by Alaska's coastal program managers in recent years, no real progress has been made toward establishing a cooperative relationship between agencies and districts for project monitoring. The state should work with coastal districts to determine how they can assist with monitoring efforts, and provide them with necessary funding and training.

Finally, the state should take steps to increase the awareness of the general public — the "person on the street" — of Alaska's coastal program and the opportunities it offers to local people. Although support for the program is strong among the local coastal districts, the general public has little knowledge of the program. As pressure to reduce government spending builds in Alaska, grassroots public support will be needed to ensure that funding is available for plan implementation and new initiatives to address emerging coastal issues. The public's recognition of the opportunity Alaska's coastal program provides for local involvement in coastal resource decisions will be critical to maintaining the program.

LESSONS LEARNED

- Local involvement in coastal resource decisions can be successfully achieved by preparing coastal management plans at a local, rather than state government, level. Local management plans can be used to influence where and how coastal development projects occur, and ensure that projects are compatible with the views of local residents regarding how their coastal areas should be used and protected.

- Involving local people in coastal management planning takes time and money. The amount of time and money that must be invested to produce local plans can be reduced by: (1) providing suitable examples of successful plans for local planners to use, (2) providing training for local planning staff, and (3) relying on state government agencies and private consultants that are experienced in coastal management planning.

- Coastal management laws should establish a structure that specifically provides for local involvement, through (1) local participation on a coastal policy-making body, (2) local responsibility for plan preparation, (3) a strong role for locals in plan implementation, and (4) strong public participation requirements.

- Local people must have access to adequate funding, during plan development and after the plan is approved, to ensure that they can fully participate in coastal management decisions.

- There may be legitimate conflicts between the goals of local residents, the state and federal government agencies, and non-government interests, such as private industry. Local coastal districts have the responsibility to balance their goals with the views and needs of these other parties. Likewise, the degree to which local concerns are met depends on the willingness of the state and federal governments to work in good faith with local people to help them achieve their goals, through negotiation with all affected parties.

Notes

1. Two rural regions that originally organized as CRSAs, later voted to become organized boroughs and assume full local government powers and responsibilities. These include the Northwest Arctic Borough and the Aleutians East Borough.

2. In addition to participation in the "consistency review" process described here, cities and boroughs may implement their

coastal management plans using local government powers such as local permitting, zoning, capital improvement projects, or purchase of coastal lands and waters.

3. Regional and village native Alaskan Corporations were formed with the passage of the Alaska Native Claims Settlement Act of 1971. The Corporations are major landowners in the State of Alaska.

4. The Bristol Bay Borough, a small borough located within the region, is an incorporated local government with its own approved coastal management plan. In April 1989, another part of the Bristol Bay region voted to incorporate as the Lake and Peninsula Borough. The newly-formed borough will also prepare its own management plan for the area within its jurisdiction.

5. OCS Lease Sale 92 was the subject of litigation by the State of Alaska and other affected parties. In October 1989, the United States Congress placed a moratorium on oil and gas exploration activities in Bristol Bay, which has been extended through September 30, 1991.

6. Other goals and objectives of the plan related to the wide variety of issues in the region, including subsistence, oil and gas, mining, transportation, residential settlement, historical and archaeological resources, and recreation.

7. "Anadromous fish" are fish that live in the sea, but ascend rivers from the sea to spawn.

8. On the south side of the Alaska Peninsula, the interim coastal zone boundary included lands and waters below 1000 feet in elevation.

9. Although the plan applies only to state lands and waters, the planning team hoped that other major landowners (primarily the federal government and the Native Corporations) would consider its intent while managing their lands.

10. From July 1, 1989 to June 30, 1990 the Office of the Governor coordinated the review of 450 coastal development projects. Local coastal districts were given the opportunity to participate in each of those reviews. Of the 450 projects, only seven were elevated to a higher level in the state government for reconsideration.

11. Since 1979, the Coastal Policy Council has received only five appeals of coastal development project decisions, four filed by members of the public and one filed by a local coastal district. The four appeals filed by the public were each withdrawn or inactivated following meetings attended by the Coastal Policy Council and moderated by the Office of the Governor. The appeal filed by a coastal district (the Cenaliulriit CRSA in the Yukon-Kuskokwim area) concerned a state offshore mining lease sale. After hearing the CRSA's concerns, the Coastal Policy Council denied the appeal. The Council determined that the state government had followed correct procedures when holding the lease sale and had properly considered the policies of the CRSA's approved coastal management program. The CRSA is pursuing the case in state court.

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The Coastal Management Program in North Carolina

Establishing a Process for Managing Development in Hazard Areas and Preparing Coastal Land Use Plans

David Owens

North Carolina has a coastline of barrier islands facing the Atlantic and an extensive inland coastal area of shallow estuaries and wetlands. The last 40 years have witnessed an acceleration of urban development along the barrier islands, while the rest of the coastal area remains largely rural in character.

The North Carolina coastal program established standards for development in high hazard areas and helped develop local comprehensive land use plans for all coastal communities. This case study examines the process through which a coastal program was developed in North Carolina. It discusses how local governments and affected parties and interest groups were actively involved in the state-mandated program. The case looks at when and why the North Carolina Coastal Program has been successful.

The author concludes that active involvement of local governments and affected parties in all stages of program development, from issue definition to evaluation, makes an important contribution to program effectiveness and was politically necessary. Use of a fair and open decision-making process, an active public education and involvement program, multiple management tools, and commitment of adequate time to develop and refine program policies were also critical aspects of program success. Finally, he concludes that a focus on using the coastal management program to produce results rather than plans or documents, and having capable program leaders, were also of vital importance.

INTRODUCTION

As North Carolina developed its coastal management program, it was confronted with the challenge of designing a program that would address key state and national management concerns in a context where there was a strong tradition of local government autonomy and private landowner independence. To have a successful program it was vital to develop regional consensus that resource management was necessary and that a state-local partnership was essential.

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Setting for Coastal Management

The coastal area of North Carolina (Figure 1) consists of two subareas with distinctive environmental, economic and social settings. The inland portion of the coastal area is a region of broad, shallow estuaries and extensive wetlands, with small towns and widespread rural areas. Primary land uses in this area are agriculture and forestry. Many sections have high unemployment and low wages, and the social and political structure has been relatively stable for generations.

The barrier island portion of the coastal area is different. Here change has been rapid. Over the past forty years there has been an acceleration of urban development, and there are now substantial

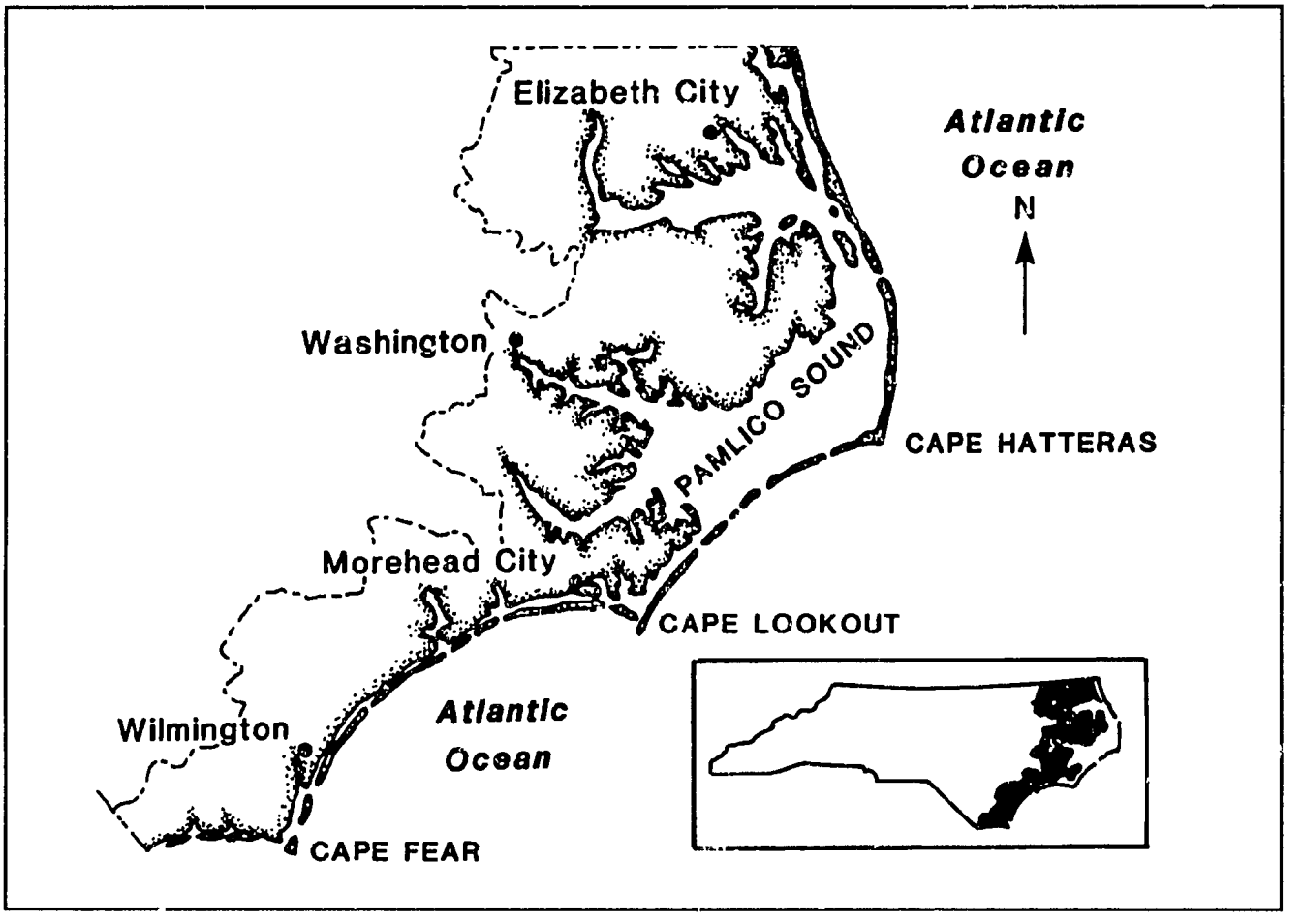


Figure 1. North Carolina's Coastal Area

tourism and recreational developments along the barrier islands. In this part of the coast, land values are very high and there have been large short term profits from land development. Increasing numbers of retirees and permanent service workers are bringing additional change. As a result of these changes, the social and cultural setting on the islands has been substantially altered.

A decline in coastal water quality and fishery productivity, combined with a sense that the barrier islands were being "overdeveloped," were the principal factors motivating state interest in coastal management. Prior to the late 1960's, virtually all land use and development decisions in coastal areas, as elsewhere in North Carolina, were left solely in the hands of individual landowners. Only a few of the small towns had local land use regulations; state and national regulations were minimal.

BACKGROUND

Development of a coastal management program

The state's first step in developing a coastal management program was to adopt special-purpose legislation to address the most pressing and visible problems of coastal development. In 1969 laws were adopted to halt the destruction of salt marshes through dredging and filling and to require coastal counties to regulate alteration of frontal sand dunes along the oceanfront. These laws demonstrated to local governments and landowners that the state was serious about coastal management and would take steps to address the matter, but would also involve local governments in implementation where possible. The knowledge that something was going to be done to address these questions convinced local people to actively participate in the design and implementation of a more comprehensive program when that offer was made in the early 1970's.

PROFILE

Mandate for Program

The primary goals of the North Carolina Coastal Area Management Act are:

- to provide a management system capable of preserving and managing the natural ecological conditions
- to ensure the development or preservation of the land and water resources in a manner consistent with ecological considerations
- to ensure the orderly and balanced use and preservation of coastal resources
- to establish policies, guidelines, and standards for the protection, preservation, and conservation of natural resources; economic development; recreation; transportation; and historic, cultural, and scientific aspects of the coastal area

Geographic Scope

The geographic scope of the program is set by law. The "coastal area" for planning purposes was defined as those counties with land bordering either the Atlantic Ocean, a coastal estuary, or waters subject to tidal influence. The law listed the types of critical environmental areas that could be subject to the regulatory program, but left some discretion as to which areas were actually designated.

Program Structure

The North Carolina Coastal Area Management Act established a citizen Coastal Resources Commission to develop coastal policies and state guidelines for mandated local plans. Local land use plans were required to be prepared in accordance with the state guidelines within a strict time limit. The Act also required critical environmental areas to be designated and that standards for development in those areas be established and enforced through a new state-level permit program. The Coastal Resources Commission also developed management strategies which include regulation, education, land acquisition and public investment for key coastal issues such as development in high hazard areas.

The requirement for this more comprehensive approach was set by the 1974 adoption of the Coastal Area Management Act (CAMA). This law established a comprehensive regional resource management program for the state's twenty county coastal area.

A key initial issue in program design was assignment of authority for making major decisions. Two key questions were presented. The first was the degree to which decisions would be made at the state as opposed to the local level. The second was how much power to place in the hands of professional staff.

The initial proposal was to place decision-making power at the state level and in the hands of the professional staff. This proved politically unacceptable to the affected local governments. It was also opposed by private property owners and the development community, both of whom felt they would have more influence if the decisions were made locally by political rather than technical personnel. After considerable debate a compromise decision was reached. The decision was made to share power between the state and local governments and to use a citizen commission rather than a professional staff for major policy decisions.

Program policy decisions are made by a citizen Coastal Resources Commission (CRC) appointed by the governor. CRC membership is not a full-time job; commission members all have other jobs, mostly in the private sector. The members volunteer their time for commission meetings, which usually last two days and are held at six to eight week intervals.

The commission has fifteen members and all but two must be residents of the coastal area. The governor's appointments are made from nominations submitted by local governments. The law requires that a wide variety of real estate, agriculture, forestry, local government, and financing interests be represented on the commission. The coastal legislation would not have been approved by the legislature without this mandated active involvement of local governments and coastal citizens in the operation of the program.

There are several implications of this choice. First, it emphasizes that the design of a coastal management program must consider political, cultural, social, and economic factors. It cannot be considered on technical or ecological concerns alone. Second, it proved to be important to actively involve those most affected by coastal management directly in the design of the management system. Third, and perhaps most important, the choice pushed the coastal management program towards consensus building as the model for decision-making. It developed that many of the substantive program decisions that were eventually made were more environmentally sensitive, had more land owner and affected party support, and had far greater public understanding and backing than any set of technical directives issued by state bureaucrats could have secured.

Overview of the program

The coastal management program that has been developed as a result of the CAMA, integrates planning, regulatory, land acquisition, policy development, and public education components.

The mandatory land use planning provision of CAMA required all coastal counties to adopt comprehensive land use plans in accordance with standards adopted by the Coastal Resources Commission. The state standards define the issues that must be addressed and the procedures to be followed, but leave substantive policy decisions to the local governments. Plans must be updated every five years. The state spends about $250,000 per year on land use plans.

The regulatory provisions apply to all of the state's coastal waters and wetlands and to about three percent of the most critical land area in the coastal area. These regulated areas include oceanfront areas subject to erosion, storm flooding, and inlet movement, estuarine and public trust waters, coastal wetlands, a buffer strip around coastal waters, several small surface watersheds and public well fields, and a key archaeological site. Any development in these areas requires a permit and must conform both to state standards and to any applicable provisions in an approved local land use plan. Actual permit administration is handled by the state for major developments, and by local governments for smaller development projects. The state processes between 250 and 400 major development applications per year, and local permit officers process 1,000 minor development permits annually. Permit processing time averages 75 days for major projects and 20 days for minor projects. Another 1,000 simpler projects per year receive an expedited permit review that takes only a few days.

Land acquisition is used as a coastal management tool to secure beach access and protect particularly important natural areas. The beach access program focuses on securing pedestrian access to beaches, with the provision of parking and restrooms also addressed in some sites. With natural areas, the state buys the land for the reserve sites and maintains the land in a undeveloped state for research, education and low-intensity recreational use.

A further major program function is that of policy development and coordination. Although many key policy issues are dealt with directly in regula-

tory provisions and land use planning standards, others result in adoption of general policy statements, legislative recommendations, and suggestions for action by other state and federal agencies. Issues the state has addressed to date have included such diverse topics as beach access, erosion, floating homes, peat mining, coastal water quality, mitigation, post-storm planning, and maritime forest protection.

Public education initiatives have also been important. Handbooks have been prepared for local governments, developers, and the general public to explain major program components. Workshops, newsletters, and public meetings are also extensively used.

CHRONOLOGY OF MAJOR EVENTS

General:

1974	Coastal Area Management Act adopted
1978	Supreme Court upholds the CAMA as constitutional

Hazard area development standards:

1977	Initial permit standards developed
1978	Permit program initiated
1979	Minimum oceanfront setback adopted
1981	Limited non-permanent structures allowed in part of setback
1983	Setback doubled for large structures
1983	Post storm land use plans mandated
1985	Shoreline hardening structures banned

Land use planning:

1974	Original planning guidelines adopted
1975	Deadline for production of original plans
1978	Guidelines revised to add policy focus
1980	Deadline for first plan updates

CASE STUDY: Development in Oceanfront Hazard Areas and Land Use Planning

Examples of collaborative process

Two work areas will be discussed in detail to illustrate how a collaborative decision-making process has been implemented. The first is the effort to manage development in oceanfront hazard areas; the second is the effort to bring modern, effective land use planning to the rural coastal area.

Oceanfront development management

Developing a reasonable management plan for oceanfront development was the focus of the North Carolina coastal management program's efforts from 1978 to 1985.

North Carolina's 320-mile ocean coastline is subject to the natural forces typical on barrier islands. Hurricanes strike the state's coast once every ten years, on average. Winter storms cause similar devastation. Inlets form and migrate. Most of the coast suffers from long term erosion, with two feet per year being typical and substantial areas having an erosion rate of six feet per year or higher. This dynamic natural system has faced increasing development pressure. The barrier island beach communities now predominantly consist of single-family cottages and small motels, with increasing pressure for high-rise buildings and relatively dense development along the oceanfront.

There were several reasons that establishing standards for development in coastal high hazard areas was a key concern. The high public cost of improper development, the loss of access to the beach, the aesthetic impact of high-density oceanfront development, and the results of efforts to stabilize the shoreline were of substantial concern to the state. The state's sandy ocean beaches, traditionally uncluttered and freely available to the public, are "the coast" to many of the state's citizens. To them, keeping the beaches from being despoiled is the reason for the coastal program's existence.

The oceanfront development standards that were adopted by CRC address several key factors, including the location of new development, the types of erosion protection efforts that can be undertaken by upland property owners, the density of development in inlet areas, construction standards, the protection of existing beach accesses, and notice of coastal hazards to builders.

The adoption and implementation of a minimum setback for new oceanfront development illustrates the collaborative decision-making process.

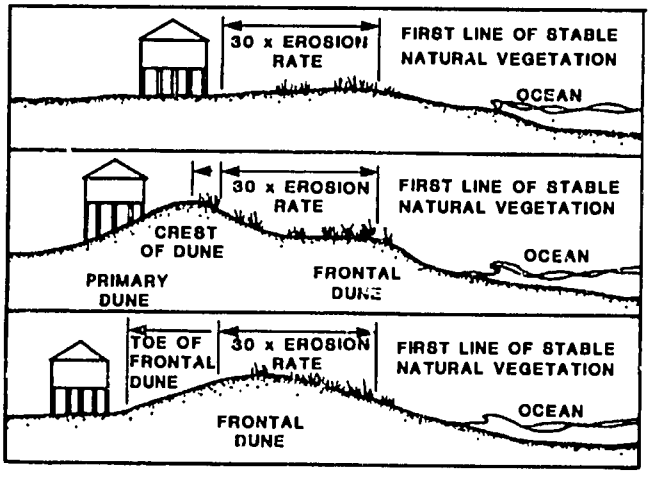
The CRC spent substantial time considering what the public interest in this subject was—why government should get involved at all. They concluded that a statewide minimum oceanfront setback was necessary to minimize loss of life and property, reduce public costs from poorly sited development, protect future public use of the beach, protect natural dunes, provide a natural buffer area for beach movement, preserve aesthetic values, and offer some protection for unwary land purchasers. They decided local government action alone would not be sufficient for three main reasons: there was a need to assure a minimum level of protection for state-owned beaches; complex technical and legal issues were involved that individual local governments did not have the capability to address; and small municipalities competing for quality tourism developments were in a difficult position to take independent action on setback requirements.

So the CRC embarked on a highly publicized effort to establish a reasonable and workable setback rule. It attempted to formulate precisely the management objectives of a setback rule, to develop a better understanding of the natural forces and development pressures affecting the immediate oceanfront, and to examine fully the technical and legal aspects of various alternative setback rules. It is important that this entire process took place in a very open, public setting. All meetings and presentations were held in coastal locations and were open to the public. Interested citizens were allowed to attend, and ask questions of the technical experts, staff and commission members. Substantial press coverage of the discussions greatly aided in public education and understanding of the issue and choices facing the commission.

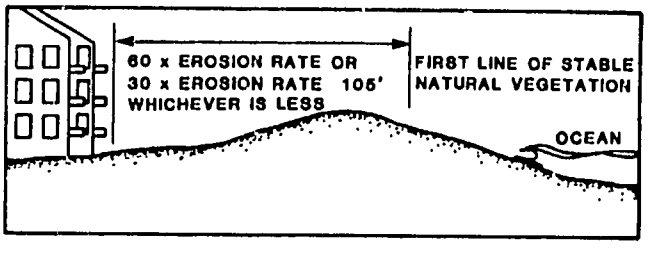
The result was the adoption of a rule in 1979 that established a four-part minimum oceanfront setback requirement. The rule, illustrated by Figure 2, required all new development to be the furthest landward of

- a distance equal to thirty times the long-term annual erosion rate, measured from the vegetation line;
- the crest of the "primary dune" (defined as the first dune with an elevation to the 100-year storm level plus six feet);
- the landward toe of the "frontal dune" (defined as the first dune with substantial protective value); and
- sixty feet landward of the vegetation line.

Even though this rule was developed through a very public process, strong opposition did not arise during consideration of the rule. In the year following its adoption, however, the rule's effect became



(A)(B)(C). The different minimum oceanfront setbacks required when building small structures.



The minimum setback required when building large structures on the oceanfront.

Figure 2. Setback Requirement

apparent to coastal real estate agents and property owners, especially those with interests in some 800 parcels of land that could not be developed under the setback standard. The intense public debate and political pressure generated by this concern led the commission to reexamine its stand on a minimum oceanfront setback. The CRC commissioned an independent evaluation of the financial effects of their rule and conducted extensive public discussion and dialogue with developers, landowners, and local governments.

The reevaluation led to two changes in the setback rule in 1981. First, an exemption to the setback was adopted to allow very low-intensity uses of the area between the vegetation line and setback line, such as campgrounds, small gazebos, and unpaved parking lots. A second exemption provided limited "grandfathering" of lots subdivided before the setback's original effective date. It allowed single-family residences to be located in front of the erosion-rate setback, provided they met the sixty-foot minimum and dune setback provisions and more stringent construction standards. This exemption still left some 500 lots unbuildable.

Even with these changes, the CRC continued to reevaluate the effectiveness of the setback rule over the next two years. Experience with the original setback, especially given the rapidly escalating demand for high-density development, convinced the CRC that the setback was inadequate for large structures. The physical bulk and frequent multiple ownership of large structures makes relocation, the preferred method of dealing with erosion problems, considerably more difficult as well as increasing potential loss of life, property, and public resources. So after very active and public deliberation, in 1983 the minimum erosion rate portion of the setback rule was doubled for large structures.

This action again caused a great deal of controversy. But because the commission had taken time to involve the public in developing its rules and had based the action on a clear, well-understood rationale, there was strong support for the rule.

A second example of collaborative decision-making for development in hazard areas involved setting standards for oceanfront erosion control efforts. The minimum oceanfront setback prevents most immediate problems with new development. However, given extensive existing development and pervasive continuing erosion hundreds of existing structures are or will soon be in danger of falling in the ocean. Traditional responses to this problem; bulkheads for individual homes and seawalls for entire communities, can destroy the public beach, can increase erosion for neighbors, and are very costly. The alternative of abandoning large private investments in beachfront development was considered politically infeasible. Therefore the CRC was faced with the difficult tasks of finding an appropriate balance between these public and private interests, developing the necessary public and political consensus for implementation, and fashioning an effective set of implementing management tools.

The same general collaborative process that was successfully used for the development of the setback rule was used to develop a rule for erosion control structures. The CRC started by establishing a special task force made up of state, local, and federal officials to develop recommendations. This formalized the informal intergovernmental working relationships that had been established earlier. All of the task force's meetings were open to the public and were held on the Outer Banks, the area suffering the greatest immediate erosion problems. The task force concluded that the state should take a policy stand against attempts to permanently stabilize the shoreline, but should allow temporary efforts to deal with erosion problems, such as beach nourishment and low, temporary sandbag bulkheads. The CRC subsequently adopted these recommendations in 1985.

The CRC is now reexamining its total ban on shoreline hardening structures. Given changes in CRC appointments, new members are serving who had not participated in the earlier education and policy development process. The federal government, through the U.S. Army Corps of Engineers

(who have a responsibility to regulate any structures or alteration in navigable waters), several local governments, and a modest number of landowners have urged that greater flexibility be allowed so that some erosion control structures could be allowed. The matter is still under discussion and reevaluation.

As with the setback, the process used to develop the regulations proved to be critical to success. This meant paying careful attention to the purposes to be addressed, developing a thorough understanding of the natural dynamics of the shoreline and effects of development, considering a range of options for meeting the objectives, developing a broad understanding of the problems, and securing a consensus for action among both state and local officials.

It is important to note that in addition to these two regulatory initiatives, the state also was using a number of nonregulatory techniques to manage oceanfront development in North Carolina. Use of these measures not only served to more effectively address the issues of development in hazard areas, they also significantly improved the political acceptability of the overall program.

These nonregulatory initiatives included the requirement, as of 1983, that local land use plans include a post-storm policy section to address prestorm mitigation program, evacuation plans, and post-storm reconstruction policies. The state's beach access law, adopted in 1981 at the height of the setback rule controversy, mandated that a priority for acquisition be given to access lands that were unsuitable for permanent substantial structures. This legislative recognition that some oceanfront property is unsuitable for development provided additional legal and political support for the setback concept, although in practice very few acquisitions were made under that mandate. However, acquisition of large parcels through the estuarine sanctuary, wildlife refuge, and parks programs has been a vital element in resolving key individual controversies. Public investment policies likewise have been incorporated into the management program. New growth-inducing public investments, such as water and sewer lines, must be located outside hazard areas. The national flood insurance program has been revised to allow insurance payments to be used for the relocation of endangered structures prior to storm damage rather than after such an event.

Comprehensive land use planning

Before the CAMA instituted mandatory local land use planning, most of the rural counties and small municipalities in coastal North Carolina had no comprehensive land use plans or regulations. Much of the early opposition by landowners and coastal local governments to the idea of coastal management was based on the premise that coastal local governments were being singled out unfairly to institute the unpopular practice of determining limits to what private property owners could do with their land.

Yet comprehensive local land use planning was made one of the cornerstones of the program. The legislature concluded that, whereas the state regulatory program could directly protect the most sensitive lands and waters, planning at a local level was the best method for addressing long-term general development issues such as density of development, the character of coastal communities, and other traditional land use concerns.

The process for plan development was that the CRC set standards for the plan, local governments then did the technical studies and public discussion required and adopted the plans, which were reviewed and approved by the CRC. As with the oceanfront standards, the commission took great care to discuss the proposed standards with local governments prior to adopting them.

The land use planning standards that were adopted reflect this collaborative effort. The CRC set mostly procedural standards, such as the extent of public participation required, the kind of analysis required, and what issues had to be addressed. The choice of what policy to adopt for each issue was left to local elected officials.

The land use plans are put into effect in several fashions. At the local level, they are increasingly used by elected officials as guides to local decision-making, although it must be noted that the quality of individual plans still varies significantly. The plans provide guidance on broad policy questions, such as the formulation of regulatory ordinances and public investment programs, as well as on individual projects. Citizens have come to view the process of updating and amending the plans as a means to elevate community discussion of particularly important issues and reach community consensus. At the state level, the plans' policies are mandatory standards to be considered for coastal management permits. Moreover, all state agency decisions, particularly public investment decisions, must be consistent with approved plans. Since the plans are an official part of the state's coastal program, they also constrain federal agency decisions through the consistency provisions of the federal Coastal Zone Management Act. These factors, over the course of years, have led local officials and citizens to take the plans more seriously.

CONCLUSIONS

Coastal management in North Carolina has matched a coordinated management system with a complex natural system. Many critical coastal resources are being preserved, protected, and reasonably managed to the long-term benefit of both public and private interests.

The intergovernmental partnership for management has been important. National interests are being served, from the protection of habitat critical for interstate fisheries to the protection of beaches serving national tourism. Yet these coastal management issues require complex policy decisions that cannot be reduced to uniform national technical standards. A successful coastal management system must remain sensitive to local needs and desires for the future, incorporating the balance necessary to resolve equitably the conflicts between competing legitimate interests. This balance can only be fairly achieved by remaining readily accessible to the people of the coastal area, a factor critical in the long-term survival and effectiveness of the management program. No single level of government has adequate knowledge and authority to successfully design and implement a coastal management program, thus necessitating a working partnership.

It is also essential to have those most directly affected participate directly in program decisions. The concept of a citizen commission making key policy decision rather than the professional bureaucracy was initially considered a major weakness of the North Carolina program. But having local opinion leaders thoroughly consider an issue, debate alternatives, discuss it with their neighbors, and come to a consensus on the best course of action, can contribute greatly to the wise resolution of the many difficult issues involved in coastal management.

Still, it is also critical to note that participation alone is inadequate. It is vital to secure the involvement of citizens with integrity, devotion, skill and a commitment to building consensus and serving the overall public good. There is also a dilemma posed by the active involvement of those most directly affected, be they development, fishing, conservation, or other interests. There is a tendency for each group to become narrow advocates of their particular point of view and to see coastal management merely as the referee between competing interests. Effective coastal management must go beyond this referee role to affirmative promotion of the public interest.

It is important that the process used to reach coastal management decisions be fair and open. The broad public perception in North Carolina that balanced, fair decisions were generally reached was at least in part based on confidence that a fair process was used. This builds public knowledge of and support for the program. This is essential if the program is to serve the broader public interest rather than only the interests of the politically powerful, or those with the greatest economic stake in the outcomes. It is not necessary that a highly formalized process be used. In fact, in North Carolina while a deliber-

ate, rational decision-making model was employed, it was very important that it was conducted relatively informally in order to be accessible to citizens. People did not have to hire lawyers, engineers or scientists to participate. They could come to meetings, listen, learn and offer their opinions directly. These decisions did not turn into a battle of experts. This kind of informal, collaborative decision-making is increasingly difficult to secure in North Carolina, as coastal management has become increasingly adversarial. The adversarial process may well better serve the interests of narrow special interests, but at the expense of collaboration and the overall public interest.

Another consideration is the importance of focus. Even a strong coastal management program can take on only a limited number of difficult and controversial issues at any one time. Staff and budget limitations, the limited ability to focus popular attention, and the necessity of avoiding the creation of a critical coalition of opponents all dictate the careful selection of key targets for action. The strategy for building a program in North Carolina was to select highly visible and important topics, such as hazard area standards and land use planning, and do an excellent job on them, thereby building a record of accomplishment and program credibility that could be carried forward to new issues.

Coastal management should also be primarily concerned with results. A plan in and of itself is not the goal of coastal management. Improved management of coastal resources is the goal, which requires an on-going management process. This on-going effort requires substantial policy and political leadership to be sustained. A key task of coastal management is to identify individuals with vision and leadership at all governmental levels and secure their active participation in the program.

Another important consideration is the benefit of using a variety of tools for addressing coastal management issues. Regulations, land acquisition, tax policy, and education have all been vitally important in North Carolina. The coordinated use of these tools is more effective in accomplishing management objectives than any one tool alone. This also builds political and public support for the program. It is especially important that coastal management not be viewed strictly as a regulatory program, a task which is seldom politically popular, as almost all constituencies will believe the regulators are either doing too much or not enough.

North Carolina's coastal management program successfully used a consensus building, collaborative approach to address several important and difficult issues. Success, however, has been difficult to sustain, especially where the management needs are less clear and the solutions more complex. A concerted effort to protect and improve coastal water quality has been underway for six years and is still incomplete. Addressing the tremendous environmental and cultural pressures generated by rapidly increasing levels of high-density resort development is barely underway. Still, a process for effective resolution of these issues has been established and is available to address such issues as the state has the will and leadership to confront.

LESSONS LEARNED

There are several lessons from this experience in managing oceanfront development.

First is the critical importance of involving all affected parties in the decision-making process. It is important that this be done at all stages of policy development — defining the problem to be addressed, selecting a course of action, and evaluating the effectiveness of the actions taken. For example, when adopting the oceanfront setback standard, the program's citizen decision-makers spent many hours debating what public purposes the rule should address, carefully questioning technical experts as to the accuracy and reliability of their data, learning the legal implications of the alternatives, and considering the economic and social consequences of their action. As a result, they were well prepared to deal with the intense pressures generated by their decision. Also, since

these decisions were made as the result of very open public discussion with full opportunity for both formal and informal participation by those affected, there was greater public acceptance of the decision.

A second lesson is the value of flexibility on means. On the setback issue, when opposition was expressed, the CRC was prepared to thoughtfully reevaluate the effects of their decision and to seriously consider other alternatives for achieving their policy objectives. This reasonable approach was important in maintaining the commission's credibility and political support.

A third lesson is that complex and controversial issues such as these require considerable time and resources to resolve. High financial stakes, strong emotions, and difficult technical and legal issues are involved. Five years were devoted to studies, deliberation, action, evaluation, and revision of the hazard area standard. Steadiness of purpose, flexibility as to means, commitment to action, and perseverance are essential attributes to policy makers during this process.

Fourth, public education and consensus-building are essential. Establishing broad public understanding of the need for action and of the rationale for the choices made is critical in creating a political environment in which difficult choices can be made and implemented. While it is critical that those most directly affected have a strong role in these policy choices, it is important to recognize that others are also affected and the broader public interests must be addressed. Public education and discussion help assure that these broader, more long-term concerns are addressed.

Several lessons can be learned from North Carolina's experience with land use planning. The first is that effective land use planning in largely rural areas is a labor-intensive, evolutionary process. Many local elected officials previously made decisions based on who was involved and the circumstances at the time of decision. Landowners feared government intervention in previously private decisions. Increasing the level of understanding of planning purposes, procedures, and even terminology takes time and a great deal of discussion. As each locality has invested the time it takes to accomplish this (rather than relying on a standardized plan hurriedly prepared by an itinerant professional planner), each generation of plans has been used increasingly as an effective management tool.

A second key lesson is that the character of the plan and of the planning process must be closely related to the character of the individual community undertaking the planning. In rural areas with modest development levels, meetings and discussions about community water supply, the appearance of the shopping district, the availability of park space, or housing rehabilitation in a deteriorating neighborhood are more productive investments of planning resources than developing computerized mapping or high-tech performance standards. Technical data on topics from soil types to economic projections are helpful and necessary, but the planning must maintain a scale that its principal users, particularly local officials and citizens, understand and can use in day-to-day operations.

A third lesson is that planning works best where there is something to plan, such as where there are development pressures and sensitive resources and the resultant questions of balance and community direction. In North Carolina, one of the key roles of the planners has been to raise community awareness of the benefits of planning by clearly showing the links between development and its long-term effects.

A fourth lesson is the importance of actively involving the public in the planning process. Although plans must be technically accurate and legally defensible, from the outset an emphasis has been placed on making them "people plans" rather than "planner plans." That has required an emphasis on participation and policy rather than just studies and technical data. This emphasis has served to significantly increase public rights in coastal waters, wetlands, and beaches, the effects of devel-

opment, and the role of good planning in managing that development. Consequently it has led to broad popular and political support for planning and CAMA and has greatly increased acceptance of land use planning as a legitimate function of government.

Note

Portions of this case study were previously published in the Journal of the American Planning Association.

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New Jersey's Strong State Coastal Regulation

Threats, Incentives, Loopholes, and Coastal Program Design, 1970-1991

David N. Kinsey

Although the most densely populated state in the nation, New Jersey has miles of sandy beaches and protected bays and estuaries which support major tourism and commercial fishing industries. Residential property along this coastline is enormously valuable. Other parts of the coast, along river and bay fronts, were developed for heavy industry 75 years ago, but are now often severely deteriorated or underutilized. There are intense pressures on New Jersey's coastal area as competing interests have tried to find a balance between further development and the preservation of the environment. The state has a history of powerful, special interest groups with political influence making concensus building difficult.

This case study describes how the New Jersey coastal program has developed in stages over a period of 20 years and analyses three successful and two unsuccessful attempts to influence coastal program design.

The State of New Jersey instituted direct state regulation of coastal development during the decade of the 1970's and has continued to rely on this approach to coastal management throughout the 1980's and now into the 1990's. Resource management issues evolved over this 20 year period, beginning with preserving wetlands and protecting resort and rural coastal regions from industrial development, before moving on to comprehensive coastal planning and management, urban waterfront planning and regulation, and dune protection.

The case concludes that the New Jersey CZM program has been most successful in managing coastal development; it has been less successful in protecting critical coastal resources. The political and economic influence of coastal property owners, developers, and local governments have repeatedly combined to inhibit efforts to integrate state coastal policies into municipal land use decision-making in all of New Jersey's diverse coastal regions.

INTRODUCTION

Deciding which levels of government should protect and manage coastal resources, and how governmental agencies should relate to each other, is a basic task for designers of coastal programs. The State of New Jersey has opted, since the 1970's, to rely heavily on regulation by a strong state agency to control coastal development. Why did New Jersey choose and maintain this approach?

Threats to natural coastal resources from development, as well as the incentives of federal funds and influence over federal coastal decisions prompted the State of New Jersey to design, implement, and

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refine its coastal program over the course of two decades. Initial threats in the 1970's included rampant dredging and filling of coastal wetlands, as well as proposals for deepwater oil ports, refineries, and offshore oil exploration. The federal Coastal Zone Management Act of 1972 provided funds to design the program as well as the major incentive for New Jersey to extend its coastal program to the state's urban waterfronts. Continued dune destruction, overdevelopment, and nonpoint pollution of bay and ocean waters threatened the coast in the late 1980's.

This case study examines how these threats and incentives influenced the design of New Jersey's coastal program, specifically the choice of the strong state regulatory approach. Throughout 1970-1991, program design has been a dynamic process in New Jersey. As the program has matured, new threats have become politically important, and the influence of different actors and interests has risen or fallen. The fundamental decision to rely on state coastal regulation has not yet been modified. The political pragmatism and economic realities to be examined in this case study will explain why the strong state regulation approach, even with its loopholes, has been retained, despite periodic debates on the advantages of involving other levels and agencies of government more directly in coastal management.

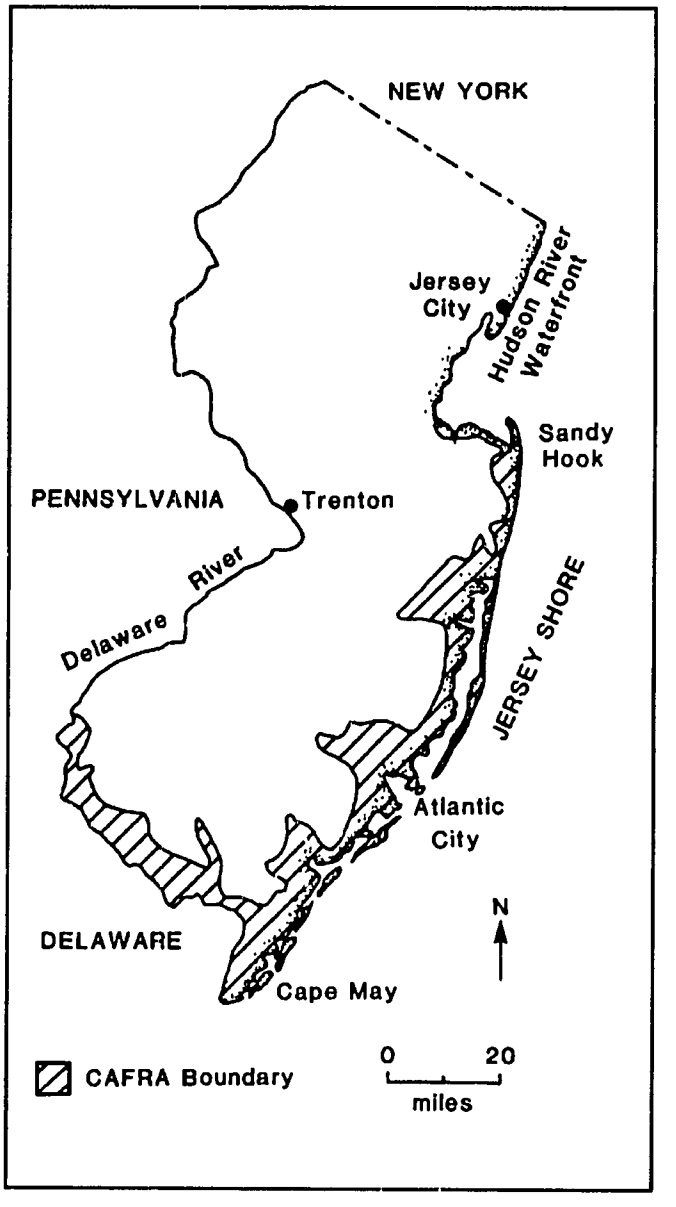

Figure 1. New Jersey coastal zone boundary

BACKGROUND

To understand these coastal program design issues, an environmental-political portrait of New Jersey must first be outlined.

Located on the East Coast of North America, between and part of the metropolitan regions centered on New York City and Philadelphia, New Jersey has a land area of 7,468 square miles (19,342 km^2). The state had a 1990 population of 7,730,188 people, with the highest state population density in the United States, i.e., 1,035 people per square mile (400 people per km^2). While primarily a state of older, growing, and new suburbs, almost one-half of New Jersey is forest land. Sandy beaches and developed barrier islands at the Jersey Shore face the Atlantic Ocean for 127 miles (204 km), backed by bays and tidal rivers with vast wetlands (see Figure 1). Built-up waterfronts, ports, and refineries in northeastern New Jersey and along the Delaware River contrast with summer resorts, such as Atlantic City, and suburbs at the Shore. Northeastern New Jersey is densely populated, while South Jersey and the northwestern part of the state are more rural.

Before 1969, New Jersey's 567 municipalities held exclusive control over land use decision-making. Twenty-one counties, an intermediate level of gov-

PROFILE

Mandate for the New Jersey Coastal Program

The Coastal Management Program has a mandate to protect natural resources, manage coastal resources, consider economic interests of coastal residents, and protect public health and safety.

Geographic Scope

The boundary of New Jersey's Coastal Program and the scope of regulatory jurisdiction varies by region. All tidal, bay, and ocean waters of the state, and a strip of uplands between 100' (30 m) to 500'(152 m) inland of the mean high water line along more urban, built-up tidal waterways. Elsewhere included in the coastal zone the upland coastal boundary extends at least one mile (1.6 km) and up to 20 miles (32 km) inland of the ocean, to encompass about 20% of New Jersey's land area.

Program Structure

The New Jersey Coastal Management Program is administered by the State Department of Environmental Protection, Division of Coastal Resources. Division responsibilities include:

- Coastal planning, policy development, and advocacy
- Regulation of new development through coastal construction permits
- Managing State-owned tidelands real estate
- Engineering (shore protection, dredging, and navigation)
- Monitoring and enforcing regulatory and tidelands laws
- Promoting sound coastal development and protection, through grants to local governments and special studies
- Marine law enforcement, through the Marine Police (transferred to the State Police in 1981)
- Protecting freshwater wetlands, regulating stream encroachments, mapping flood hazard areas, and supervising dam safety statewide (since 1987)

ernment, exercise only advisory roles in regional planning, and merely regulate drainage and development along county roads. Over the past two decades, however, state legislation has entrusted a cabinet-level agency, the New Jersey Department of Environmental Protection (NJDEP) and several state commissions with responsibility for regional and site-specific land use planning and regulation. To protect wetlands, flood plains, an historic canal park, coastal and forest regions, reservoir watersheds, and aquifer recharge areas, these laws created a strong role for state government in land use policy, in the name of environmental protection. Four different governors from two different political parties have wielded great influence in proposing and enacting these laws.

Seven major actors have been involved in coastal program design in New Jersey:

- the governor
- the state coastal agency, i.e. the Division of Coastal Resources in the NJDEP
- the state legislature
- state courts
- local governments (municipal and county)
- private economic interests (home builders, real estate brokers, banks, and property owners)
- environmental interest groups

Consensus does not come easily among these players. The actions, as well as inaction, of some actors

have prompted others to make coastal protection initiatives. Players hold sharply different views on the importance of natural coastal resources. Trusting relationships have never existed among all participants in coastal program design in New Jersey. For example, environmental interest groups generally distrust local governments and private economic interests, which they view as pro-development. Finally, the relative interest, influence, and importance of some participants in coastal issues has fluctuated over these two decades.

CHRONOLOGY OF MAJOR EVENTS

1970	State Coastal Wetlands Act enacted
1972	Federal Coastal Zone Management Act enacted
1973	State Coastal Area Facility Review Act (CAFRA) enacted
1978	New Jersey Coastal Management Program, Bay and Ocean Shore Segment approved by federal government
1980	State Dune and Shorefront Protection Act proposed State Attorney General's Opinion allowed expansion of Waterfront Development Law Jurisdiction Statewide New Jersey Coastal Management Program approved
1987	New Jersey Coastal Commission proposed by Governor (not approved)
1988	Emergency rules to protect Shore and revise thresholds on state coastal agency's jurisdiction adopted by NJDEP
1990	NJDEP emergency rules invalidated by State Courts

CASE STUDY: Two Decades of Evolution in State Coastal Regulation

New Jersey's present system of managing coastal resources, largely but far from exclusively through state agency coastal construction permits, has evolved over two decades, with several spurts of program design initiatives and legislative battles. New Jersey developed and obtained federal approval for its coastal program under the federal Coastal Zone Management Act during 1974-1980, and then continued to refine the program and undergo periodic federal program evaluations. This case study analyzes three successful and two unsuccessful spurts of coastal program design.[1]

While the regulatory component of New Jersey's coastal program is emphasized, it should not be forgotten that other important coastal resource and statewide water resource management functions are carried out by the agency known since 1979 as the Division of Coastal Resources.

Protecting Coastal Wetlands, 1970-1973

During the 1960's, home builders, with the approval of local governments, dredged and filled about 1,500 acres (607 ha) of coastal wetlands each year at the edges of the bays of the Jersey Shore, in order to develop summer, retirement, and year-round houses.[2] Three factors combined to lead the Governor and State Legislature to enact New Jersey's Coastal Wetlands Act[3] in 1970

- growing awareness of the public benefits of wetlands protection
- the model of other Northeastern states which had passed coastal wetlands laws in the 1960's
- and the fervor of environmental protection launched by the first Earth Day in April 1970.

The law assigned NJDEP, not local governments, the responsibility of implementing this new program to regulate, and essentially prohibit, proposed development of wetlands through a new state permit process. NJDEP and its predecessor agencies had some experience in managing and regulating coastal resources. For example, the agency had sold and leased state-owned tidelands real estate for more than a century and had administered a permit program for docks, piers, bulkheads, dredging and other development in navigable waters for decades, since passage of the 1914 Waterfront Development Law.[4]

To protect the interests of property owners and to assist NJDEP in administering the new wetlands permit program, the law required the state coastal agency to map about 300,000 acres (121,380 ha) of

coastal wetlands, notify each property owner that wetlands were to be strictly regulated, and hold public hearings in each county before adopting the maps and beginning to implement this new program. The law exempted two areas of wetlands in urban-industrial northeastern New Jersey: along all tidal rivers and bays and in a 19,730 acre (7,983 ha) region regulated by a then recently-established state-level regional development agency.[5] While NJDEP embarked on costly, time-consuming, and detailed (scale of 1:2,400 or 1"=200') wetlands mapping, developers continued filling wetlands, sometimes literally until the hour this wetlands protection program took effect. After full implementation in 1973, following tempestuous public hearings with outraged property owners, the annual rate of wetlands filling plummeted to less than one acre (0.4 ha) by 1979.

Protecting the Shore from Industrial Development, 1972-1973

Before the state coastal agency could implement fully the Coastal Wetlands Act, state legislators proposed in 1972 a new, more comprehensive coastal regulatory program to protect the Shore, bays, and Delaware River coastal regions from energy and industrial development. Targeted at threats to the environment and coastal resort economy posed by proposals for deepwater ports for importing foreign oil, new petrochemical facilities, and onshore facilities for offshore oil exploration, this legislation proposed to exclude heavy industry from the residential-resort Jersey Shore fronting the Atlantic Ocean, its back bay shores, and the rural, undeveloped edges of the Delaware Bay. This initiative also proposed a new state coastal permit program for industrial development along the 115 mile (184 km) long tidal portion of the Delaware River, up to the state capitol at Trenton.

Two additional concerns prompted this proposal: (a) the time required to map and make effective the Coastal Wetlands Act of 1970 and (b) extensive development of summer and retirement homes at the Shore. The proposed inland coastal boundary was set at the 10 foot (3 meter) contour interval above sea level in the coastal plain, in order to include and protect promptly most coastal wetlands. The legislators intended this boundary to plug the procedural loophole in the Coastal Wetlands Act that had allowed wetlands filling to continue while NJDEP undertook the mapping required by the law.

NJDEP staff scientists and lawyers reviewed the legislators' proposal and developed a counter-proposal which focused the legislative debate. The state coastal agency proposed a landward boundary further inland, to protect uplands adjacent to tidal waterbodies, soils with physical limitations for development, and water quality in densely populated areas. Rather than prohibit industrial land uses, NJDEP proposed a coastal permit program using performance standards to regulate a detailed list of industrial, energy, and other types of facilities. The list included residential developments of 25 units or more, roads, and public facilities such as wastewater treatment plants, but did not include commercial development.

Local governments and private economic interests opposed the legislation. Environmental groups supported it. Amendments narrowed its geographic jurisdiction to the Jersey Shore and back bays, Raritan Bay, Delaware Bay, and their tidal tributaries and adjacent uplands, a "coastal area" of 1,376 square miles (3,563 km2), about 20% of New Jersey's land area. Passage of the federal Coastal Zone Management Act in late 1972 gave further impetus to this state-level proposal, which called for completion of a state coastal management strategy within four years. The federal law provided a national framework and funds for assisting the development of state coastal management programs. The last minute intervention by a candidate for governor saved the coastal proposal from further crippling amendments.

The Coastal Area Facility Review Act was then enacted in 1973.[6] The law specifically stated that this new state coastal permit program, entrusted to NJDEP, was to supplement existing municipal land use planning, zoning, and regulation. Devel-

opers of regulated facilities in the coastal area would need approvals from both local government and the state coastal agency.

Protecting Beaches and Dunes, 1979-1980

In 1988 the federal government approved New Jersey's coastal program for the first segment of its coastal zone, the "coastal area" under CAFRA. The program included myriad detailed policies, from beach erosion to power plants, from white cedar stands to hotel-casinos, to guide NJDEP's coastal permit decisions. Yet the program had insufficient regulatory jurisdiction to protect beaches and dunes from inappropriate development, due to the thresholds under CAFRA that allowed residential development of 24 or fewer dwelling units and commercial development of 299 or fewer parking spaces[7] without a state coastal permit. These thresholds had become significant loopholes.

Despite these gaps in the regulatory system, the federal government decided that the state's legal authority under CAFRA, coupled with the Coastal Wetlands Act, Waterfront Development Law and laws on tidelands real estate and coastal engineering, provided a sufficiently strong mandate for direct state agency involvement in the key decisions affecting the coastal region. This pragmatic approach, the only feasible option under New Jersey law at the time, recognized the political impossibility of either amending CAFRA to plug the loopholes or passing new legislation delegating coastal decision-making to local governments with guidance and oversight from the state. The national economic recession of the mid-1970's had arrived just as NJDEP began implementing the CAFRA permit program. Regulatory delays on coastal permits had outraged homebuilders, while some local governments had complained that the state coastal agency usurped their land use powers. In that political-economic climate, NJDEP decided that seeking expanded jurisdiction through new legislation would have been futile.

In 1979, the state coastal agency proposed and the Governor announced an initiative to seek legislation to protect dunes, in effect to lower CAFRA's 25 unit regulatory threshold and protect the few remaining oceanfront dunes from even single family development. The Governor then deferred this initiative for a year, as protection of a vast forest region had higher priority on his political agenda and that of legislative leaders and statewide environmental groups.[8]

One year later, NJDEP drafted, and with the Governor's tacit support, a non-coastal legislator introduced the proposed Dune and Shorefront Protection Act.[9] This initiative proposed a new state coastal permit for construction, reconstruction, or expansion of structures in beaches, dunes, and a "shorefront area" extending inland to the first paved road parallel to the ocean, to allow for the natural movement landward of wind-blown sand dunes. While the bill proposed additional state coastal regulation, it also authorized NJDEP to delegate implementation and enforcement to municipalities that adopted dune and shorefront protection ordinances acceptable to NJDEP.

Prompted in part by the increased likelihood of major losses of life and property damage along the coast from flooding and storm surges due to dune destruction, the state coastal agency drafted this legislation with the advice of scientists and the support of environmental groups. NJDEP estimated that at most 200 undeveloped building lots remained along the 127 mile (204 km) oceanfront. However, the politically fatal flaw in the bill became its provision that would prohibit rebuilding structures more than 50% damaged by coastal storms. Seven hundred oceanfront and barrier island property owners, rallied by local governments, banks, builders, building contractors, real estate interests and an astute international public relations firm, packed the second and final legislative hearing on the bill.

Land values along the ocean are staggering. For example, average real estate values on one 23 mile (37 km) long developed barrier island, Long Beach Island, are nine times that of average real estate values in New Jersey. Oceanfront land values are

even higher, with the land often worth more than even expensive oceanfront houses. Repeated bitter complaints about the bill's threat to property values and near unanimous opposition at the hearing combined to force its sponsor to withdraw the bill. Environmental groups stayed silent in face of the overwhelming opposition.

Regulating Urban Waterfronts, 1980

To complete the statewide coastal program under federal law, New Jersey had to demonstrate coastal control over land uses along tidal waterfronts outside of the "coastal area" defined by the State Legislature in CAFRA in 1973. Tackling this challenge at the same time as its ill-fated dune bill initiative, the state coastal agency had to accomplish this legal-political task without new state legislation.

Reinterpretation of the agency's jurisdiction under the 1914 Waterfront Development Law provided the key that opened the program of regulating urban waterfronts, mainly areas along the Hudson River across from Manhattan and along the Delaware River in southwestern New Jersey. Unregulated waterfront development had prompted passage of this law, to increase the competitiveness of New Jersey municipalities which vied with New York City, for port and harbor development in the era before municipal zoning and land use regulation. For 64 years NJDEP and its predecessor agencies had interpreted this law as applying only to activities at or below the mean high water line. The term "waterfront" had been viewed simply as "water."

A formal opinion of the state's attorney general authorized the state coastal agency to define, by rule, the term "waterfront" to include a narrow strip of uplands. As the federal government had previously approved a narrow upland coastal boundary around San Francisco Bay in California, NJDEP followed that precedent and established the landward limit of the waterfront by rule at a minimum of 100 feet and a maximum of 500 feet of uplands, outside of the "coastal area." A committee of the State Legislature summoned the state coastal agency to explain this approach to expanded state jurisdiction without explicit legislative authorization, and accepted the agency's justification. Riverfront industries and private sector groups opposed the reinterpretation. The state builders association challenged the rules, but a state appeals court upheld NJDEP's initiative.[10]

Successful adoption of this expanded state coastal permit jurisdiction in 1980 completed the legal authority needed to meet the federal standards for coastal program approval. This enabled New Jersey to invoke the "federal consistency" provisions of the federal Coastal Zone Management Act. This meant that the state had more influence in dealings with federal agencies on their activities in or affecting the coastal zone, particularly offshore oil exploration that threatened the state's marine fishing industry. This approval also enabled New Jersey to continue to receive vital federal funds to implement, enforce, monitor, and refine its program, conduct special studies, and review comprehensively and revise its substantive policies in 1986 and 1990.

The new urban waterfront regulatory authority provided other benefits, too. First, it plugged a loophole in wetlands jurisdiction by bringing an additional 3,800 acres of tidal wetlands in northeastern New Jersey under a state coastal permit program. Second, it enabled the state coastal agency to advocate and insist on public access to the waterfront as a condition of permits. Numerous large and small residential and office development proposals to redevelop dilapidated piers, abandoned railroad yards, and obsolete industrial buildings along the Hudson River proliferated during the real estate boom of the 1980's. All along the state's tidal riverfronts NJDEP promoted waterfront walkways and required public visual and physical access, relying on its legal authority under the reinterpreted 1914 Waterfront Development Law. Local governments even adopted the compelling vision of NJDEP's plan for a walkway along the Hudson River in municipal land use plans and ordinances, although no law linked these state and local plans. The national Trust for Public Land

helped create the Hudson River Waterfront Conservancy, to develop a high quality, standard-setting walkway at the missing links between privately-developed segments of the walkway.

Protecting the Shore and Ocean Water Quality, 1987-1991

Mysterious deaths of dolphins in the Atlantic Ocean and forced closings of ocean summer resort beaches due to polluted ocean waters in the mid-1980's signaled a coastal and political crisis in New Jersey, where tourism is one of the state's largest industries. Local governments at the Shore complained about water quality, inadequate shore protection funds and programs, and ocean disposal of wastes. Builders and local governments decried the dual control over land use decisions by municipalities and the state coastal agency as duplicative, confusing, and frustrating.

Environmental groups protested the impact of nonpoint sources of water pollution, the lack of a land use management plan for the coast, locally-approved luxury cabanas built at hazardous seawall locations,[11] blocked public access for fishing and swimming, and the adverse cumulative impact of extensive coastal construction built below the residential and commercial development thresholds of the Coastal Area Facility Review Act and its rules. So pervasive were 24 unit projects, one unit below the threshold, that observers quipped that future archaeologists would suggest that 24 units had been the ideal building type.

Many actors agreed that issues with regional impacts, important to the Shore environment and economy, such as transportation, stormwater control, land use, were regulated not on a regional basis, but instead from a narrower, municipal perspective. Many actors also agreed that more funds were needed to protect and manage the Shore.

To address these problems, [12] the Governor proposed a powerful new Clean Ocean Authority in early 1987. After his staff and senior NJDEP staff met local leaders from every one of the 48 ocean-front municipalities, the Governor revised and renamed his proposal in mid-1987, calling for the State Legislature to establish a new and powerful New Jersey Coastal Commission.[13] Coastal legislators then introduced a bill, drafted by the Governor's office and environmental groups, that assigned broad coastal planning, regulatory, intergovernmental, land acquisition, advocacy, and financial powers to the proposed new regional commission and appropriated $20 million for its operation.[14] The geographic scope for the new agency was to be the same "coastal area" as defined by the State Legislature fourteen years earlier in the CAFRA law. The bill proposed to transfer the state coastal agency staff, funds, and files concerning the "coastal area" to the new commission.

The bill proposed three new thresholds for coastal construction permits, to modify the thresholds under CAFRA. First, a coastal permit was to be required for any residential, commercial, or other type of structure on an undeveloped lot fronting on the ocean, bay, or river shores, with the exception of public facilities for shore protection, transportation, or beach uses. Second, any proposal to develop three or more dwelling units and 10 or more parking spaces within 1,000 feet (305 m) of the ocean, tidal rivers, or tidal bays would require a coastal permit. Third, the bill proposed relaxed regulation beyond the 1,000 feet (305 m) coastal strip in regions designated for growth, with a higher threshold of 75 units before a coastal permit would be required.

To promote intergovernmental consistency, the bill required state, regional, county, and municipal government agencies to comply with the coastal management plan to be prepared by the new coastal commission. This provision would dramatically restructure the relationships between agencies and levels of government, and eventually shift away from direct state regulation as the approach to coastal control.

The State Legislature slowly considered this complicated, almost radical initiative in 1987-1988, as its proponents refined their proposal, with the assistance of environmental groups and state coastal

agency staff.[15] Homebuilders, local governments, and some coastal legislators reacted warily to the Governor's ambitious proposal. Frustrated that the proposal was stalled in the Legislature, the Governor invoked emergency powers in late 1988, declaring that the "coastal area" faced "imminent peril" because the CAFRA thresholds allowed one-half of coastal development to proceed without adequate safeguards, and directed the state coastal agency to adopt emergency rules to plug the loopholes. Acting again under the 1914 Waterfront Development Law, NJDEP interpreted by rule the term "waterfront," within the "coastal area," to extend inland from beaches, dunes, wetlands, and water areas at least 100 feet (30 m) or, if farther, as far inland as the first residential, commercial, or industrial land use with a building.

The Governor anticipated that the emergency rules would create public pressure for the Legislature to enact his Coastal Commission proposal, a technique that had been successfully used twice in the previous ten years.[16] Instead, outraged property owners and developers successfully challenged this upland regulatory initiative in state courts. The state coastal agency attempted to modify its new regulations to comply with an appeals court's rulings, by limiting the upland to a maximum of 1,000 feet (305 m) from the most inland beach, dune, or wetlands, but the State Supreme Court invalidated the new upland jurisdiction in 1990.[17] The Court declared that the expanded jurisdiction, intended primarily to protect the coastal environment, exceeded the underlying purpose of the Waterfront Development Law, which was to regulate commerce along the waterfront itself, not areas 1,000 feet or more from the water.

NJDEP responded to the court decision, with the support of a new governor, by adopting revised rules, changing the maximum upland boundary to 500 feet (154 m) from the most inland oceanfront beach or dune. Again property owners successfully challenged this refinement. An appeals court again invalidated the NJDEP rules in late 1990 as exceeding the agency's legal authority under the Waterfront Development Law.[18]

Instead of appealing this legal setback, the state coastal agency, legislators, and environmental groups developed and advocated new coastal legislation in 1991. Although scaled-down from the Coastal Commission proposal, the latest initiative still proposed ambitiously to amend the Coastal Area Facility Review Act, plug its loopholes, revise its thresholds, mandate a detailed coastal management land use plan, and require other local, regional, and state agencies to conform with this plan. The explicit intent of the new bill was to protect the coastal environment; the bill proposed to delete from existing law favorable references to economic growth.[19] Homebuilders opposed this comprehensive legislative approach, fearing that the purpose of the coastal plan would be limiting growth, rather than protecting the environment. Environmental groups offered only weak political support, viewing the proposal as not strong enough to protect the coastal environment.

The governor, beleaguered with a tax revolt and a State Legislature anxious about reelection, did not actively support this legislation. As a result, a stalemate persisted among the principal actors involved in coastal program design, as over-development and inappropriate development at the Jersey Shore belied the myth that CAFRA protected the coast.[20]

CONCLUSIONS

New Jersey has succeeded in managing its coast, but failed at protecting its coast. The distinction between management and protection is real. Coastal management includes promoting needed coastal development at the right locations. Management means striking balances between competing objectives. Protection means protecting all fragile and sensitive natural resources that merit protection. The thresholds that became loopholes under CAFRA and the lack of integrated state-local coastal decision-making explain this mixed record of success and failure.

Compared with the condition of its coastal regions and waterfronts in the 1960's, New Jersey has made staggering progress in protecting coastal resources and promoting environmentally-responsible coastal development. For example, destruction of certain natural resources has been halted, particularly wetlands. Public access to beaches and waterfronts has increased dramatically. Explosive development took place in the Atlantic City region, spurred on by new casinos, while New Jersey's edge of the Hudson River became a focal point of urban revitalization, both without harming the coastal environment. Coastal high-rise construction continued, but at locations that did not abuse scenic vistas, cast shadows on beaches, or overwhelm neighborhoods. NJDEP easily achieved the original goal of CAFRA, to protect the coast from extensive energy industrial development, as few applications for such facilities were ever even submitted. NJDEP also upgraded its monitoring and enforcement functions at several field locations, once federal funds were available to cover the statewide coastal zone.

The $24 million investment in federal coastal management funds in New Jersey since 1974 has been indispensable to the achievement of these results. The state's 1973 CAFRA law had included only a paltry $100,000 appropriation to carry out its ambitious regulatory and planning mandate. A peak of about $1 million per year in coastal permit application fees paid by developers reimbursed the cost of most, but not all of the NJDEP staff that review those projects. This federal financial incentive served its purpose effectively, and enabled the state to hire a diverse planning, regulatory, and enforcement staff, conduct special studies, and share about 10% of its funds with local governments for coastal projects. Good coastal management requires funds. Federal funds have made the difference in New Jersey between good coastal management with a vision and mere regulation of some coastal development.

The issue of coastal nonpoint pollution highlights the mixed record of the New Jersey program.[21] This type of water pollution, largely from stormwater runoff, is increasingly a concern throughout the United States, not just in New Jersey. Indeed, the federal Coastal Zone Management Act Amendments of 1990 require coastal states to develop a Coastal Nonpoint Pollution Control Program. In New Jersey, large residential projects approved with CAFRA permits that require "best management practices" to control stormwater quality and quantity have no demonstrable adverse impacts on water quality, even on nearby sensitive shellfish areas.[22] By contrast, smaller projects that escape state coastal regulation often discharge polluted stormwaters to coastal waters and rely on subsurface disposal of wastewater, using individual septic systems rather than sewers. While the state coastal agency regulates only about one-half of new development in the coastal area, existing developed areas and farming practices generate significant polluted stormwaters that adversely affect coastal water quality without any state or local regulation or remedial action.

Despite the commitment to strong state coastal regulation, closer links have been forged between the state coastal agency and local governments. NJDEP used federal coastal funds to help local governments develop numerous boat ramps, fishing piers, waterfront walkway plans, and public access projects. State courts have required and supported municipal efforts to recognize statewide coastal policies on beach access[23] and marinas.[24] The state and local governments have systematically invested increased shore protection funds in beachfilling, dune creation, and related projects following priorities established in the state coastal agency's 1981 Shore Protection Master Plan.

Yet the political influence of the local governments and the private sector, protecting the important economic interests of oceanfront and coastal property owners along the Jersey Shore, has proven to be decisive in thwarting efforts to regulate development strictly at naturally hazardous locations along the ocean and bays. Dunes remain vulnerable to developer destruction with local government acquiescence. While the state coastal agency has undertaken extensive scientific studies and public

education on shoreline change, beach-dune profiles, and storm hazard reduction strategies, the Jersey Shore remains vulnerable to a catastrophic coastal storm.[25]

In developing New Jersey's federally-approved coastal management program, the state coastal agency successfully involved diverse interests to shape the management strategy and its policies during 1975-1980.[26] This base of involvement did not lead, however, to a legislative expansion of coastal jurisdiction and a reordering of state-local coastal relationships, despite initiatives by three successive governors from two different political parties, the state coastal agency, and legislators in the 1980's and early 1990's.

No consensus coalesced in New Jersey on further protecting the Jersey Shore through mid-1991 due to three factors: first, the enormous economic stake of coastal property owners and developers in maintaining the status quo; second, a continuing lack of a constituency for comprehensive, balanced coastal management and protection; and third, the lack of astute, passionate state-level political leadership committed to long-term coastal protection. Governors and legislators in the late 1980's and early 1990's tinkered with regulatory thresholds instead of first building coalitions to support improved protection for coastal beaches, dunes, erosion hazards areas, and critical wildlife habitat. Well-known loopholes remain which weaken but do not fatally flaw the effectiveness of New Jersey's coastal program. Built pragmatically on a base of existing laws in the late 1970's, this coastal program is likely to continue to use strong state coastal regulation as its strategy throughout the 1990's.

LESSONS LEARNED

These two decades of New Jersey experience suggest five lessons for would be coastal managers and other players in the game of coastal program design:

- Take advantage of threats and incentives to increase the management and protection of coastal resources
- Act pragmatically in the political context
- Recognize and identify economic interests and their power
- Act with a long-term perspective
- Be patient

Notes and References

1 See also David N. Kinsey, "Lessons Learned from the New Jersey Coastal Management Program," Journal of the American Planning Association, Vol. 51, No. 3, Summer 1985, pp. 330-336, and David N. Kinsey, "CZM from the State Perspective: The New Jersey Experience," Natural Resource Journal, Vol. 25, January 1985, pp. 73-102.

2 On wetlands in New Jersey, see Ralph W. Tiner, Jr., Wetlands of New Jersey, National Wetlands Inventory (Newton Corner, MA: U.S. Fish and Wildlife Service, 1985).

3 New Jersey Statutes Annotated 13:9A-1 to -10.

4 New Jersey Statutes Annotated 12:5-3.

5 Hackensack Meadowlands Development Commission established in 1969. See New Jersey Statutes Annotated 12:17-1 to -67.1.

6 New Jersey Statutes Annotated 13:19-1 to -21.

7 The state coastal agency created this threshold by regulation, by limiting the statutory definition of "road" construction to roads more than 1,200 feet in length and large parking lots with 300 spaces or more. See New Jersey Administrative Code 7:7-2.1(b)1.

8 The Pinelands Protection Act, New Jersey Statutes Annotated 13:18A-1 to -29, was enacted in 1979. See Beryl Robichaud Collins and Emily W.B. Russell, editors, Protecting the New Jersey Pinelands (New Brunswick, NJ: Rutgers University Press, 1988). UNESCO designated the 1,719 square mile (4,452 km^2) "Pinelands area" and its surrounding federally-defined Pinelands National Reserve as a world Biosphere Reserve in 1988.

9 N.J. General Assembly, A-1825, 1980.

10 New Jersey Builders Association v. New Jersey, Superior Court of New Jersey, Appellate Division, Docket No. A-984-80-T1, November 30, 1982; unreported.

11 The state coastal agency had attempted to regulate under CAFRA a beachfront, motel-like bathhouse project of 130 cabanas, but was rebuffed by the New Jersey Supreme Court as it had not adopted a rule defining "dwelling units" to include cabanas, DEP v. Stavola, 103 N.J. 425 (1986). NJDEP then amended its rules to capture projects of 25 or more cabanas.

12 For an independent analysis of these problems, see Erlind Villamore, "Coastal Disturbances, Learning from CAFRA's Mistakes," New Jersey Reporter, November 1987, pp.20-25.

13 Thomas J. Kean, Governor, State of New Jersey, "A Proposal for the Coast: The New Jersey Coastal Commission," July 1987.

14 N.J. General Assembly, A-4437, "New Jersey Coastal Commission Act," 1987.

15 N.J. General Assembly, Assembly Committee Substitute for A-122, 1988.

16 Governor Byrne had used an executive order to establish strict interim regulations and pressure the Legislature to enact the Pinelands Protection Act in 1979. Governor Kean had used a similar approach to prod enactment of the Freshwater Wetlands Protection Act in 1987, New Jersey Statutes Annotated, 13:9B-1 to -30.

17 Last Chance Development Partnership v. Kean, 119 N.J. 425 (1990).

18 Long Beach Township Oceanfront Property Owners Association v. NJDEP, 245 N.J. Super 143 (App. Div., 1990).

19 N.J. Senate, Senate Committee Substitute for Senate Nos. 2849 and 2821, adopted by the State Senate Land Use Management and Regional Affairs Committee, May 13, 1991.

20 See William J. Watson and Michael Diamond, "Assault on the Shore: The Myth of Coastal Protection," The Press, Atlantic City, N.J., February 17, 1991, pp. A17-A20, and Peter Kerr, "Lasissez-Faire Legacy on Jersey Shore: How Not to Do It," The New York Times, May 8, 1991, p. B-1.

21 See Cahill Associates, Stormwater Management in the Coastal Zone of New Jersey, report prepared for the New Jersey Department of Environmental Protection, Division of Coastal Resources, Trenton, New Jersey, April 1989.

22 See Tavit O. Najarian et al., "Development Impacts on Water Quality: A Case Study," Journal of Water Resources Planning and Management, Vol. 112, No. 1, January 1986, pp. 20-35.

23 Lusardi v. Curtis Point Property Owners Association, 95 N.J. 306 (1981).

24 Anfuso v. Seeley, 243 N.J. Super. 349 (App. Div., 1990).

25 See Karl F. Nordstrom, et al., Living with the New Jersey Shore (Durham, NC: Duke University Press, 1986).

26 See David N. Kinsey, "Organizing a Public Participation Program: Lessons Learned from the Development of New Jersey's Coastal Management Program," Coastal Zone Management Journal, Vol. 8, No. 1, 1980, pp. 85-101.

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The American Samoa Coastal Management Program

Land and Water Resource Management Within a Traditional Leadership and Communal Land Tenure System

Lelei Peau

American Samoa consists of a group of seven islands situated in the South Pacific, 2,400 miles south of Hawaii. American Samoa's traditional values and environment have been dramatically affected by change over the last 20 years. An alarming population growth, associated with increased demands for energy, consumer goods and housing, has led to an acute shortage of land and coastal resources which traditional management and stewardship practices have not been able to resolve.

American Samoa's Coastal Management Program was intended to address local needs for improved coastal management, while at the same time meeting U. S. program standards. The American Samoa Coastal Program has emphasized the regulation of coastal deveopment. After eleven years, environmental awareness is increasing, but only limited progress in resource management has been achieved.

This case study describes the process through which a coastal program has been introduced into a socio-cultural environment which is now based on a mixture of traditional and borrowed values, and the challenges of making a regulatory program effective in this cultural context. The case focuses on the development and implementation of an inter-agency decision-making mechanism, known as the Project Notification and Review System.

INTRODUCTION

American Samoa, the only United States Territory south of the equator, is a group of seven islands with a total land area of 76 square miles and a combined population of 47,000 people. The largest island in American Samoa is Tutuila, approximately 54 square miles in area with 95% of the Territory's population. The small islands to the east include Manua Ofu, Olosega, Ta'u, and Rose Island (an uninhabited coral atoll and National Wildlife Refuge). Swains Island, a privately owned coral atoll, lies approximately 225 miles to the north (Figure 1).

American Samoa maintains close ties to its traditional leadership system, the basis for which is the extended family's chief, or "matai". A family matai is traditionally the steward of land and water resources claimed under the ownership of his/her title. A matai decides which lands will be used by each household within the extended family, or "aiga". Prior to the beginning of this century, the surrounding coral reefs and submerged lands were also claimed under matai ownership and given proper stewardship accordingly.

The impact of European contact on resource management in Samoa was felt through the gradual shift which occurred from a subsistence to a cash economy. In 1900, the U.S. reached agreement with Germany and Great Britain that its own colonial administration would be limited to the eastern

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portion of the Samoan archipelago, later to become known as American Samoa. Today, differences between the politically distinct Samoas (i.e. Western and American Samoa) are evident in all aspects of their development, and especially so in the type and degree of environmental degradation and administrative/social responses to such emerging problems. Nevertheless, both countries have succeeded in legally precluding the alienation of land by non-Samoans.

BACKGROUND

The American Samoa Government is established based on an American-styled system with three branches. The Executive Branch is headed by an elected Governor. A bicameral Legislature, the Fono, has law-making authority under the Territorial Constitution. Members of the House of Representatives are elected for two year terms and may include residents of all social strata. Senators are registered chiefs who are selected by County Councils for four-year terms. The judicial branch includes a High Court and five District Courts. Samoan remains the vernacular language of American Samoa, although the official language of government business is English.

The environmental problems which American Samoa experiences today are exacerbated by a high population growth rate and a growing dependence on commodity and petroleum product imports. With only 54 square miles of land and the majority of the population on Tutuila, the Territory's 3.7% population growth rate is indeed alarming. While detailed data are unavailable, some sources estimate that the groundwater supplied government drinking water system is now operating at close to 85% of sustainable capacity.[1] Although this is not meant to suggest that drinking water will be the primary limiting factor for future development, it is illustrative of the struggle that infrastructure planners have in keeping up with the accelerated pace of development and infrastructure demand.

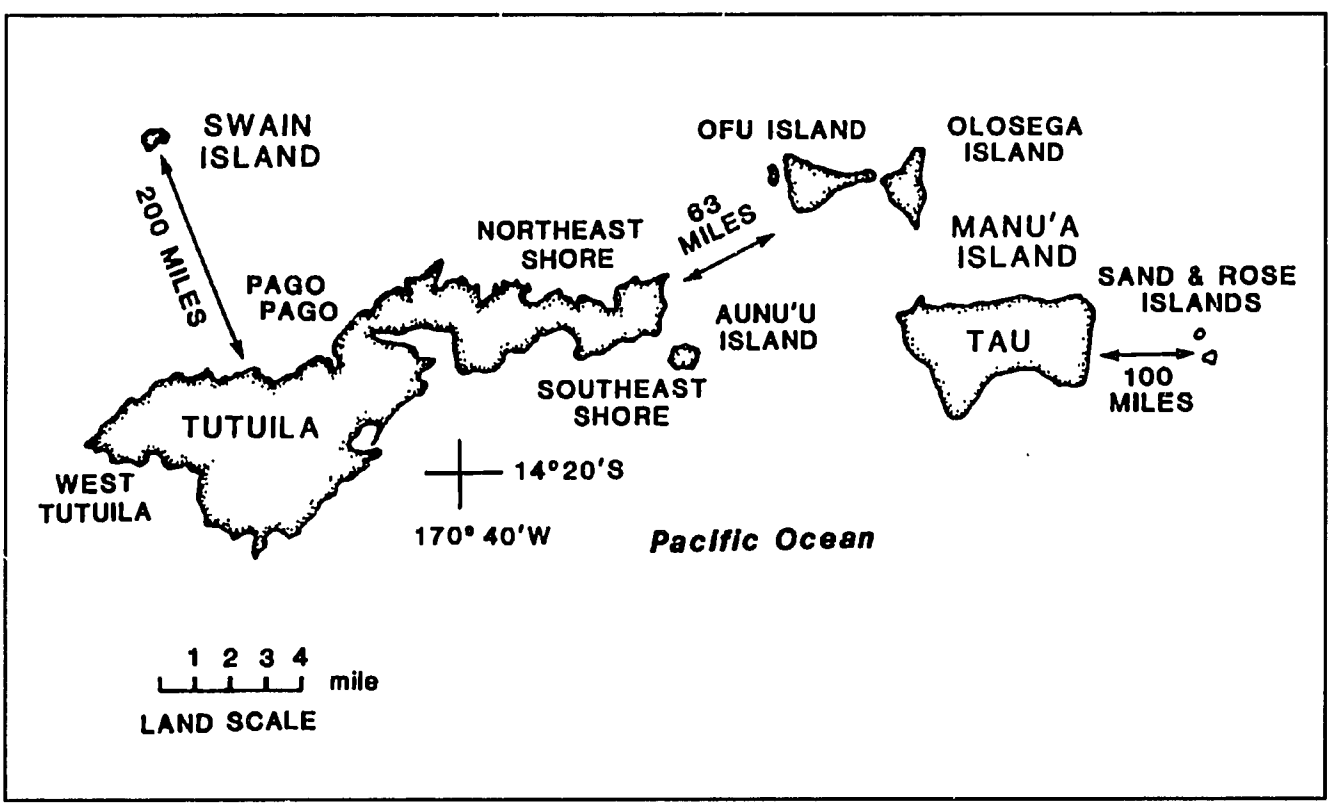

Figure 1. American Samoa

PROFILE

Mandate for Coastal Program
In 1980 the American Samoa Coastal Management Program (ASCMP) was established by law. The purpose of the Program is to provide effective resource management by protecting, maintaining, restoring and enhancing the resources of the coastal zone. ASCMP, from the very beginning, has been a fully federally funded program.

Geographic Scope
The entire islands of Tutuila and Aunn'u, the Manu'a Islands, Rose Island, Swains Island, and all coastal waters and submerged lands for a distance of three nautical miles seaward in all directions are designated as the coastal zone management area of American Samoa and subject to the coastal zone management policies of the Territory. In addition Special Management Areas have been established for Pago Pago Harbor and Pola Lagoon.

Management Procedures/Techniques
American Samoa has an American-style state agency structure, including numerous single purpose agencies. Since establishment of the ASCMP, a land use permit is necessary for all uses, developments, or activities which impact the American Samoa coastal zone. The Economic Development Planning Office (EDPO) is vested with exclusive authority to designate uses subject to management. EDPO also approves, approves with condition, or disapproves in a timely manner all land use permit applications.

The Project Notification and Review System is an interagency consultation process designed to assist the regulatory agencies to better coordinate land use decisions.

Of great concern and cause for increasing social tension is the growing shortage of land available for human use. Tutuila's steep topography limits human settlements to a narrow coastal strip, with the exception of a broad, ancient lava flow known as the Tafuna plain, to which the focus of new residential and industrial/commercial activity has recently shifted. Land prices have risen to as much as $20,000 per 1/4 acre and legal battles over land ownership are all too common.

And so, as American Samoa begins now to look ahead to the 21st century, its residents cannot deny visible evidence of a breakdown of its traditional leadership and land tenure system. The accumulation of private wealth, the increased incidence of transfering land registration from "communal" to "privately held", and leased government property are all evidence of the breakdown. Meanwhile, the current generation of elder matai — whose own upbringing is deeply rooted in traditional custom and from a time generally free of environmental concerns - is struggling to maintain tradition and family autonomy from seemingly overwhelming government regulatory controls.

Current wisdom of developing country resource management would give strong support to efforts to reestablish local responsibility for resource management. Indeed such efforts are continually undertaken in American Samoa within the limitation imposed by insufficient human and financial resources presently experienced by most resource agencies. The reality however is that traditional stewardship of land and water has not kept pace with accelerated change and its associated influx of potentially more destructive products and technologies. Simply put, even if traditional self-man-

agement mechanisms were now in place at the local, village level, the traditional leadership system has not evolved to concern itself with issues of island-wide, longer-term significance.

CASE STUDY: Coastal Resource Management within a traditional land tenure system

It was within this setting that the American Samoa Coastal Management Program (ASCMP) was established in 1980. Like most, if not all resource management programs in the Territory, ASCMP from the very beginning has been a fully federally funded program. Despite the lack of local contribution to the program's funding, significant effort was invested in securing the understanding and support from traditional and elected leaders for the program's policies and objectives. Indeed, the decision to authorize the ASCMP by Executive Order, was strictly a local, voluntary one undertaken after considerable public participation in the planning process. The program's jurisdictional area was established to include all lands in the Territory and coastal waters seaward to the three mile territorial sea limit.

CHRONOLOGY OF MAJOR EVENTS

1980	American Samoa Coastal Management Program (ASCMP) established by Executive Order
1987	ASCMP legislation submitted to the Fono. ASCMP hosted the Annual Pacific CZM Conference in Pago Pago
1988	ASCMP legislation resubmitted Executive Order (3-80) amended with new Stop Order Authority Project Notification and Review System Introduced
1990	ASCMP established under statute

Although ASCMP's original planning documents outlined a process whereby village participation in land use decisions would be achieved through the establishment of decentralized "Village CZM Programs", this strategy was never implemented. This would be a monumental if questionable task, given the staffing and organizational history of the program. Furthermore, the policies and regulations that were adopted to model the ASCMP are of generally "stateside" methodology; many were not applicable to the Samoan land tenure system. Much work was needed to establish policies that would be acceptable to the local people, while conforming to federal program guidelines.

Nevertheless, ASCMP managed to make significant progress in raising general environmental awareness during its initial seven years. This was accomplished through public education efforts focused on people of all ages. Limited progress was made, however, toward its primary goal of providing effective land and water resource management for the Territory, or in gaining substantial public support for the program's regulatory mechanisms.

Such limited progress was perhaps due in part to the aforementioned ingrained cultural oppositions to external intervention in the dispensation of native lands. They were also due in part to the ineffectiveness and inefficiency of a land use permit review process that had two principle shortcomings:

- favoritism: permits were predominantly issued on a "who you know" basis, undermining regulations and policies.

- another layer of bureaucracy, requiring more paper work and running around.

The Project Notification and Review System

The ASCMP was in operation for eight years when, in 1988, it initiated the establishment of a coordinated, interagency decision-making process for the review of land use permit applications. The new initiative, known as the Project Notification and Review System (PNRS), was adapted for local needs from similar permit systems in use elsewhere in the insular Pacific. Three principle features of the PNRS were advocated by the ASCMP staff as the system's major benefits:

- **timely** review of land use permit applications by providing coordination on all aspects of regulatory requirements of the various resource management agencies represented on an interagency PNRS Committee.

- more **meaningful** environmental review of development proposals by bringing together the collective experience of some 7 or 8 professionals, rather than a single person as was previously the case.

- a reduction in expense for the public by requiring early review of a project proposal at the conceptual site planning stage, rather than at the stage when building blueprints were already approved by the Department of Public Works. This would eliminate expensive modifications to architectural plans, or in the event of project denial, eliminate the expense for such plans entirely.

The PNRS was ready for implementation by mid-1988. Three goals of the implementation strategy were identified:

- inform the public that land use permit applications would be received at the Economic Development Planning Office (rather than at the Department of Public Works), and that only a vicinity map/site plan, and an application fully describing the proposal would be required at the application stage.

- educate the directors and technical personnel from the various participating agencies about their new roles in the PNRS review process.

- draft revisions to the program - including a new stop order provision - through amendment to the Executive Order which had established the ASCMP in 1980.

The basis for the PNRS is that: "All persons, both private citizens and American Samoa Government (ASG) representatives, proposing to build or modify a structure, or to conduct any activity which affects, or may affect, the natural, cultural, or historic resources of the Territory, must apply for a land-use permit. Depending upon the type and nature of the structure or activity, a dredging, filling, or excavation clearance, zoning variance, building permit, and/or business license may also be required. Other Federal requirements may also apply."2

Since 1988, ASCMP has worked to establish a coordinated system of land use review, which involves several American Samoa governmental agencies, each with its own technical expertise and authority over various economic, social and environmental planning concerns. Although responsibility for the program and the permitting system rests with the entire government, ASCMP has been assigned the responsibility of overall program development, administration, and coordination.

The strength of ASCMP is thus derived from the coordinated contributions of individual government agencies whose operations and technical expertise form the backbone of the Territory's permitting system. The new Project Notification Review System was established as "one-stop shopping" for all permits. The Coastal Management Program, under the umbrella of the Economic Development Planning Office (EDPO), was designated as the lead coordinating entity for the PNRS.

The Implementation Strategy

As a first step, a briefing was conducted for the Governor in August of 1988 on the proposed PNRS, to gain support for the revised permit process, but also to have the Governor initiate a cabinet (director) level briefing and training workshop. As the Governor had little knowledge of the goals and objectives of resource management planning, ASCMP provided him with a report and followed with a lengthy presentation on the significance of making changes in permit processing procedures.

As a result of the Governor's briefing, the Executive Order was amended giving ASCMP the authority to implement the revised PNRS. The ASCMP was authorized to issue stop orders, rather than continue to rely on Public Works/Building

Branch for that matter. Stop order authority was necessary to strengthen the enforcement capability and to have better control over proposed developments.

A three-day workshop for government personnel explained the permitting system, and set November 22, 1988, as a start date for the revised PNRS. All department heads were invited to a morning session opened with welcoming remarks by the Governor. The following two and a half days were geared toward technical matters involving the various PNRS review agencies.

Prior to the workshop, and as a critical part of the program, a consolidated land use/building permit application was developed. The two-step process —land use and building permit—requires only one application form, which is available along with instructions at the EDPO. The land use permit is obtained from EDPO/ASCMP, while the building permit is obtained from the Department of Public Works/Building Branch. The building permit is only granted after the land use permit is issued by EDPO/ASCMP.

Another step in the process is the distinction between minor and major cases. A "minor project" is one that is determined to have a minimal impact on the island's land and water resources, and is not located on or adjacent to a steep slope, a wetland area, or floodplain zone. Most minor projects are reviewed as a routine function of the PNRS, and require less than the ten allowable working days to issue a land use permit, provided there are no environmental or land use planning concerns. [3]

On the other hand, a "major project" is one that is determined to have significant potential impact on the coastal zone. An "impact" can result from increased discharge of pollutants or sediments to ground or surface waters, or from an overtaxing burden on existing infrastructure. Major projects require additional review and comment by government departments having their own particular authority over planning and environmental concerns. Major projects generally require less than the allowable thirty working days to issue a land use permit.[4]

ASCMP established a Permit Information Section with staff trained to assist applicants to determine which permits (local or federal), licenses, or variances are needed for a particular project. The ASCMP staff coordinates an interagency review of any proposed project for adherence to coastal management policies and applicable local programs, plans, and policies. In this way, the coordinated review process saves time and money, and provides an earlier indication to the public of whether or not permits can be issued.

The Early Months

During the early months of the revised PNRS, there was significant interest at the director level in the process, indicated by their regular attendance at meetings. Much of the early debate and discussion took place on policy issues, a predictable result of the limited knowledge and experience with the new process.

Several ASCMP polices had been established eight years earlier and were as yet only vaguely understood. In addition, many new laws and regulations were approved subsequent to the initial program, causing some confusion to the PNRS Committee members. Only after months of meeting and arguments were the PNRS policies solidly formed and applied with some consistency. A legal counsel was hired to assist the PNRS on legal matters involved with its decision-making.

Although the various media were used to inform the public on the revised PNRS, neither the change in procedures, nor the title "Project Notification Review System" were readily understood. Some applicants were still going to Public Works for a land use/building permit application for up to a year following the changes. Furthermore, because of the previously discussed communal land tenure system, these revisions to the permit process were an opportunity for the public to open old questions about the involvement of government in approving development on communal land. The term "PNRS"

had no easy translation into Samoan, and so entered common use without much meaning to the common citizen; even worse, its meaningless acronym perhaps signified bureaucracy.

These changes resulted in chaos among government agencies as well, and prompted additional public and government workshops to explain the new system in more detail. A brochure was developed in both languages on the revised PNRS. Additional in-house training was conducted to educate the staff on the type of information required on the land use permit application.

The Administration Changeover

Four months after the revised PNRS was implemented, a new administration was sworn in. As a result, a new EDPO director was appointed, a new ASCMP manager was transferred from within the department, and a new PNRS Coordinator was appointed. The outcome was that some of the key players were people who either failed to see a need for resource management, or were sufficiently close to the politics of the new administration to be able to give full support for regulations that were not always in the best interests of the PNRS. The new PNRS coordinator was a matai, a titled chief, who viewed the land use permit process unfavorably and had little experience or understanding of planning concepts. His decisions were based on his own traditional beliefs and did not conform with the spirit of the coordinated, interagency review of the PNRS. The integrity of the ASCMP was brought into question, as decisions were made against the program's policies to accommodate the needs of certain powerful individuals. This conflict was eventually seen to be unresolvable, and a decision was finally made to bring in a replacement.

Meanwhile... Development Does Not Wait

In the meantime, development did not wait for government to get its act together. Much effort and commitment was required to improve the public image of ASCMP and the PNRS. Additional pressure was placed on the program when, in February 1990, Cyclone Ofa struck the Territory and resulted in major destruction to the islands. A critical decision was made to require all reconstruction to undergo the permit review process.

A positive message had to be made to the public. That message was that the PNRS is designed to reduce risk from future disasters. Once again, workshops were held after Cyclone Ofa to explain to the public the environmental review process that takes place in the PNRS.

Because of the tremendous increase in applications due to rebuilding after Cyclone Ofa, two temporary application centers were established in the outlying districts of Tutuila. This minimized the travel and other time delays to the applicant during the initial critical months of reconstruction. Surprisingly, the public proved to be receptive to the need for a permit that would ensure that their homes were constructed with respect to regulations which portrayed public safety as a priority.

This positive image was later used by EDPO/ASCMP staff to lobby the American Samoa Legislature (Fono) to pass the "Coastal Management Act of 1990", giving enabling statutory authority to the ASCMP for the first time in its ten year history.

Getting Back On Track

For a brief period after the passage of the new law, the ASCMP image was again on a positive track. The hiring of a new PNRS Coordinator to replace the political appointee proved however to be a new test for the ASCMP and the land use permit system, as the new incumbent was inexperienced with permitting systems, and lacked the general understanding of and commitment to resource management and planning needs. With no clear direction as to the importance of consistent application of environmental laws and regulations, staff morale was unfavorably affected.

The situation was essentially a repeat of what took place earlier during the change of administration. Politics became a growing force and influence in some of the major permit decisions. The media was not standing idle, however, and several obvious political scandals were brought to public knowl-

edge. The ASCMP had entered into a new era of public suspicion of its overall intent and honesty, which will take time to overcome.

Life is not as perfect as one may expect in the tropical South Pacific. While ASCMP is trying to sort out its priorities, development continues to take its course. In addition, the program has a major responsibility: to continue to educate the public on the importance of proper management in a highly vulnerable, tropical island environment.

CONCLUSIONS

The introduction of an effective coastal management program has presented a major challenge. The flexibility of the CZMA has permitted American Samoa to develop its own program but the need to accommodate a rapid population increase within a mixture of traditional and borrowed cultures, has proved to be extremely difficult. Early intentions to design a program that paralleled the traditional village council process, were never carried out. The program that was developed was successful in raising environmental awareness, but has made little progress towards effective land and water resource management, due to cultural opposition and the weaknesses of the land use permit review process.

The Project Notification and Review System was designed to assist the regulatory agencies to better coordinate land use decisions. The goal of the mechanism is to issue land use permit decisions that are consistent with each agency's rules and regulations. Despite a number of personnel and management constraints that have plagued the system since its inception in 1988, the PNRS has greatly increased the interagency communication and coordination in the environmental review of development proposals in the Territory. The event of getting staff together from eight different agencies on a bi-monthly basis has greatly increased the awareness and public acceptance of the need for resource management in the small islands of American Samoa.

Effective management of the PNRS requires the support and clear direction from higher authorities, as well as the competent skill of a dedicated PNRS Coordinator. The support from all government agencies as instructed under statute still remains to be seen. The enforcement of specific regulations pertaining to each agency's responsibilities still needs to be improved through commitment and action taken in the field.

A new generation of Samoans has emerged and is frustrated with the local politics. Violations are now made public through the use of the media. Resource management is quickly becoming a public issue, and the PNRS a decision-making body that will undergo increased public scrutiny for consistency in its decisions.

LESSONS LEARNED

The ASCMP has come a long way and has learned many lessons during its first 11 years. Following are some of the lessons learned as we have progressed with coastal management planning in an island setting:

- In order to make coastal management procedures like the PNRS more relevant and easily understood to traditional societies speaking another language, use simpler terminology that can be easily translated. Information and workshops in the local language can help facilitate public support for new management strategies.

- Administration is the critical test of sustainability for any management program. Inadequate staffing or training for proper (i.e. meaningful) information management is a perpetual handicap and source of "organizational anxiety".

- A committee review and decision-making process can be highly effective in reducing favoritism, nepotism, and/or political persuasion. It will take strong leadership to entirely remove these destructive elements.

- Devise a strategy whereby the goals, objectives, and methodology of resource management

are presented to the public and key decision makers on a continuing basis. Political administrations changes (every four years in the U.S. system) requires that new leadership be educated.

- Start early to identify the political and individual personalities that will be necessary for publicly stated support and commitment for resource management and its policies. These efforts must include traditional leaders.

- A record of the committee's proceedings and rationale for its decisions is essential for creating the foundation for continued, internally consistent decision-making. Consistency is perhaps the most critical element of all for building the long-term basis for public support and commitment to resource management.

- Central to all components of a well-functioning system are individuals, each with their own unique set of personal, social, and professional needs. Human resource development should be given at least equal attention as that given to goal setting and program development.

- Take advantage of every opportunity to gain further support of the CZM program by identifying it with issues that are directly relevant to the public, such as public safety.

Notes

1. M. Dworsky, ASPA Water Division, personal communication, 1991.
2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management, American Samoa Coastal Management Program and Final Environmental Impact Statement.
3. Economic Development Planning Office, American Samoa Government. Land and Water Resource Management in American Samoa. The PNRS: A User's Guide. 1989.
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For provision of further information and key references contact:
Economic Development Planning Office
Pago Pago,
American Samoa 96799

A Management Plan for a Coastal Ecosystem:

Rhode Island's Salt Pond Region

By Stephen Olsen and Virginia Lee

This case study describes the process of formulating a management plan for a coastal ecosystem comprising six coastal lagoons and their 82.4 km^2 watershed in southern Rhode Island. The principal issues—deteriorating water quality, rapid sedimentation, overfishing, increased vulnerability to hurricane damage and mounting user conflicts—are all closely interrelated and driven by rapid residential development in the watershed. The complexity of the resource management issues is matched by the complexity of governmental authority fragmented among agencies of municipal, state and federal government. The plan required four years of scientific research to estimate the causes, linkages and significance of selected expressions of loss in environmental quality and two years of collaborative planning and negotiation with many agencies of government. During the six years following its formal adoption as an element of the Rhode Island Coastal Management Program, the plan has achieved many of its objectives but has not halted the gradual erosion of environmental quality in this beautiful and productive coastal region.

INTRODUCTION

Since the Rhode Island Coastal Management Program began in 1971, concern that the environmental quality of the salt pond region is rapidly eroding has been a major concern, both locally and for officials of state government. A process of rapidly intensifying use was spurred in the 1950s by the construction of highways that have made the region ever more accessible to commuters and a booming national economy. The number of houses in the watersheds of the six lagoons selected as the focus for the management plan increased threefold between 1950 and 1980 from 1,775 to 5,570 units (Figure 1). Under state and municipal land use control regulations in force in 1984, there was a potential for three times more houses and seven times more residents being crowded into this small area. During summer months an additional 165,000 tourists pour into the south shore on a peak day. This burgeoning population and increasing competition among often incompatible activities threatens to overwhelm the capacity of the salt ponds to absorb wastes, provide shelter for boats and vessels, produce seafood and maintain the scenic qualities that attract residents and tourists and underpin the exceptionally high value of the land. Large areas of the salt ponds are poorly flushed, which makes them valuable as fish and shellfish nurseries but also particularly susceptible to eutrophication and bacterial contamination. Their ecology can be drastically changed by such alterations as stabilizing the inlets that connect them to the ocean, dredging channels, and altering the quality and quantity of freshwater inflow.

BACKGROUND

Rhode Island is the smallest of the 48 contiguous states and one of the most densely populated. It lies between New York City and Boston and is thus a part of the northeast coastal megalopolis that stretches over some 130,000 km^2 across ten states. Until the mid 1970s, Rhode Island's population was concentrated in the northern part of the state around Providence, the capital city and the south-

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ern part of the state was rural and heavily wooded. Since then, a boom in residential development has decentralized the state's growing population.

A string of sandy barrier beaches and scenically beautiful coastal lagoons (known locally as "salt ponds") that have been extremely bountiful in fish, shellfish, and waterfowl, stretch along the Atlantic coast (Figure 2). This are is the center for lucrative summer tourism and contains a large proportion of the state's most valuable residential property (Table 1). The state's biggest commercial fishing port is at the mouth of Point Judith Pond.

In the late 1970s, residents of the region were galvanized by the possible siting of a nuclear power plant on excess Navy property on the shores of Ninigret Pond. In a series of public hearings that accompanied the adoption of the statewide coastal management plan, local residents forcefully requested that government pay greater attention to the region, align contradictory policies and manage environmental changes in the region more effectively, so that the quality of life and the economy of the area could be sustained.

Number of houses in pond watersheds 1939-1988

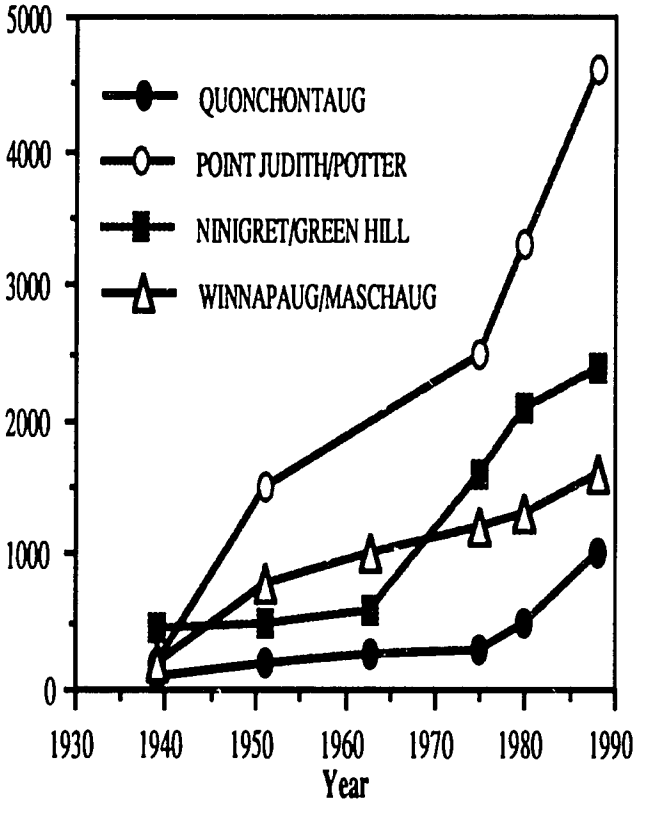

Figure 1. Trends in Housing Development.

Table 1. Selected characteristics of the lagoons and their watersheds.

Area of Land and Land Use in 1981	82.4 km^2
Developed	27%
Undeveloped	73%
Conservation	12%
Area of the six lagoons	17 km^2
Housing units in watersheds, 1980	5,570
Projected at saturation	12,400
Boats at marinas, 1981	1,274
Boats at private docks, 1981	1,432
Fishing vessels home ported at Galilee	160
Estimated freshwater inflow to lagoons 64.2 x $10^3 m^3/yr$	
Groundwater	51%
Streams[1]	34%
Precipitation	12%
Surface Runoff	3%
Estimated finfish harvest 1979[2]	51,000 kg
Estimated shellfish harvest (meats) 1979[2]	5,200 kg
Estimated bay scallop harvest (meats) 1979[2]	80,000 kg

[1]Some 57 percent of the total stream flow enters the head of one of the six lagoons (Pt. Judith).
[2]Landings in all coastal pond fisheries are highly variable. In 1978, the bay scallop catch was approximately 160,000 kg while in 1980 it was less than 3,000 kg. American eel landings declined from 30,000 kg in 1979 to approximately 1,000 kg in 1982.

From Olsen, 1984.

The Deterioration of Environmental Quality

The evidence of deteriorating environmental quality can be summarized as follows:

- Fish and shellfish stocks have declined drastically (Crawford, 1984, 1985).

- Stabilized inlets are causing rapid siltation in the lagoons: shoaling inlets no longer provide boats with safe access to the ocean and are changing water circulation patterns (Boothroyd 1988, Isaji et al, 1985).

- Water pollution is becoming more severe and widespread: bacterial contamination threatens to close shellfishing grounds and eutrophic conditions are degrading fishing habitats and the quality of the lagoons for swimming and boating (Nixon 1982; Harlin and Thorne-Miller 1981; Lee and Olsen 1985).

- Unmanaged growth threatens to overwhelm the ecosystem's capacity to assimilate waste and sustain potable drinking water; the farmland and woodland that give the area much of its character, beauty and sense of community are being lost.

- Building continues in highly hazardous coastal flood zones where property destruction and loss of life have been severe in past hurricanes (Miller, 1975).

- User conflicts are accelerating: competition between aquaculture, recreational and commercial fisheries, residents and commercial interests are mounting as the number of people using the lagoons and their environs increases.

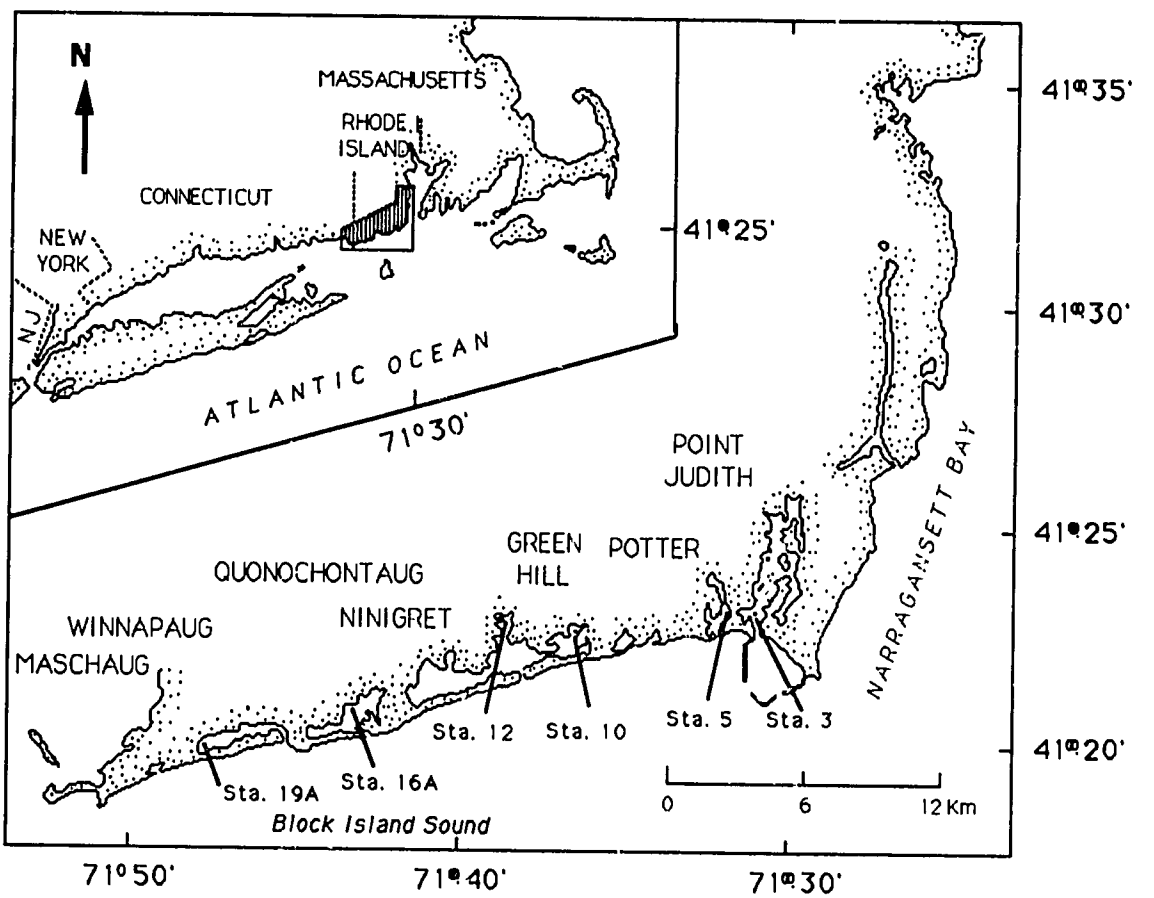

Figure 2. The Salt Ponds Region.

Overlying these specific concerns was a belief among the public that government had not been responsive. Agency decision-making was viewed as cumbersome, contradictory, time consuming, and ineffectual. What appeared to be most urgently required for the salt pond region was a comprehensive management strategy or plan that would provide a common basis for policy and permit deci-

PROFILE

Mandate for Coastal Management

The Coastal Resources Management Act enacted by the Rhode Island legislature in 1971 states that:

"...it shall be the policy of this state to preserve, protect, develop and where possible restore coastal resources for this and succeeding generations...through comprehensive, long-range planning and management designed to produce the maximum benefit for society and that the preservation and restoration of ecological systems shall be the primary guiding principal by which alteration of coastal resources will be measured, judged and regulated."

The legislation created a seventeen-member Coastal Resources Management Council (CRMC) representing various elements of state and municipal government and provided it with authority to (a) coordinate federal, state and local actions in the coastal region, (b) undertake the required long-term planning, and (c) regulate specified areas and activities through a permit program.

Geographic Scope

The CRMC has authority over any alteration within (a) the three-mile territorial sea, but excluding fisheries; (b) a zone extending inland 200 feet from the shoreward boundary of coastal features (e.g., cliffs, beaches, coastal wetlands) and (c) specified actions (e.g., sewage treatment facilities, petroleum processing) wherever they may occur within the state if they are found to pose a reasonable probability of damage to the environment of the coastal region.

Management Procedures

- From 1971 through 1985, planning and policy development for the CRMC was carried out, through annual contracts, by the Coastal Resources Center at The University of Rhode Island. Starting in 1986, the CRMC retained an executive director and its own policy, planning and permit staff.

- The permit program consumes the majority of the time of the CRMC and its staff. Approximately 800 permits are processed each year. The permit process is governed by the 1983 statewide Coastal Resources Management Program, a document that sets forth CRMC policies, procedures and regulations and by a series of more detailed Special Area Management (SAM) Plans. The SAM Plans provide the CRMC with permit authority over larger areas of land than the 200 ft. permit capture zone.

- The CRMC relies largely upon the Department of Environmental Management to enforce its regulations.

sions by municipal, state and federal agencies.

The Rhode Island Coastal Management Program

Rhode Island has been one of the pioneers in coastal management in the United States. A year before passage of federal legislation, in 1971, the Rhode Island General Assembly enacted ambitious legislation that created a 17-member Coastal Resources Management Council (CRMC) and granted it broad powers (see Profile Box). An initial comprehensive management program was adopted by the CRMC in 1975, but proved to be too cumbersome for the routine permit applications that came before the CRMC during a protracted boom in residential development. In 1980, the CRMC and the URI Coastal Resources Center agreed to work together on a new response to the legislative mandate to "plan for the preservation and restoration of ecological systems" and to redesign of the supporting regulatory program. The 1980 strategy to revise the state's coastal program had two mutually-supporting elements:

- The regulatory procedures and standards for routine permit applications would be simplified and the CRMC's objectives for balancing among competing interests would be made explicit by zoning the shoreline and all state waters. The activities to be encouraged, considered, or prohibited would be specified within each zone. The revised regulatory program was formally adopted in 1983 and continues today as the basis for all CRMC permit decisions.

- Recognizing that the permit program is by nature responsive and cannot address the root causes of the complex set of problems that result in environmental degradation and conflict in some areas, the second element of the strategy was a set of "Special Area Management Plans" that would analyze problems and their causes in priority geographically-defined areas and present a comprehensive strategy for their resolution.

The area most urgently requiring a Special Area Management Plan was the Salt Pond Region. Since there was little information of a scientific nature on the resources and condition of the lagoons, the CRC worked with an interdisciplinary team of research scientists to prepare an ambitious research program. Federal grants from the Sea Grant Program and the CRMC's federal funds for planning and policy development, supplemented by small grants from other governmental agencies and municipalities, provided the resources for a six-year research and planning process.

CHRONOLOGY OF MAJOR EVENTS

GENERAL:

1971	Rhode Island Coastal Resources Management Council created by state legislature
1972	Federal CZM Act enacted
1975	State Coastal Zone Management Plan adopted by CRMC
1978	RI CRMP approved in conformance with national CZM Act
1983	RI CRMP revised

SALT POND REGION:

1975	Public hearings for adoption of RICRMP highlighted problems of the Salt Pond Region
1979	Ecological history conducted
1980-84	Multidisciplinary research project published
1983-84	Salt Ponds Advisory Committee meetings
1984	Special Area Management Plan for the Salt Pond Region adopted by CRMP
1985	Amendments to the plan
1985-90	Further amendments in response to lessons of implementation

CASE STUDY: A Coastal Ecosystem Management Plan

Estimating the Causes, Linkages and Significance of Priority Problems

Ecological History. If it is to succeed and be sustained, any resource management strategy requires the active support of major segments of the

concerned public. In the year before funds for the research phase were secured, the Coastal Resources Center commissioned Dr. Scott Nixon and his associate, Virginia Lee, to prepare an ecological history that traced the changing relationship of man with the coastal lagoons. This proved to be an excellent means for involving the public at the outset of the planning process. The complaints heard at public meetings suggested that the condition of the ponds had been significantly different within living memory. Although there was very little formal scientific data, old records, fishing logs, and interviews with "old timers" who had fished the salt ponds or farmed adjacent lands, were examined and integrated in a booklet entitled *The Elusive Compromise, Rhode Island's Coastal Ponds and Their People* (Lee 1980). It became a local best seller. It presented a convincing and appealing picture of a time when the salt ponds were in balance with their human users. Many of the stories of large and productive oyster beds, abundant harvests of a variety of fish and shellfish, and rapid changes in the salinity regimes brought by the construction of permanent stabilized inlets, were verified and documented. This was a vindication for the "old timers" who felt that for once they had been carefully listened to and their vast knowledge and insight into these systems recognized. The story made for good newspaper articles and provided the research team with an appreciation for the changing character of the place. Most important of all, the ecological history identified the salient issues that a research and management strategy would need to address.

Once the major contributors to declining environmental quality had been defined, research priorities had to be selected. This was a complex task, that was led by Dr. Scott Nixon. The traditional "ecological characterization" was avoided. Instead, research was carefully focused on improving our understanding of a few key ecosystem processes. The perceptions of declining environmental quality were simplified to three principal research topics: declining water quality, sedimentation and overfishing, each of which required a number of research tasks.

Water quality problems proved to be the best integrator among all the problems affecting the region. The water quality problems in the salt pond region range from bacterial contamination, that had already closed areas of the lagoons to shellfishing, to contamination of drinking water supplies and symptoms of eutrophication.

A year of monitoring coliform levels (Nixon 1982) in the lagoons demonstrated that the concentrations of these bacteria had increased markedly since samples had been analyzed by the state some years before. Review of studies conducted elsewhere in the United States on the sources of bacterial contamination and the distribution of areas of high concentration in the lagoons led to the conclusion that the sources were surface runoff from densely developed residential areas, particularly older communities where on-site sewage disposal systems were failing.

Concern for eutrophication called for a major effort to develop nutrient input budgets for the lagoons. This work has shown that by far the largest nitrogen loading to the lagoons was the nitrate in groundwater. A synthesis of the research on nutrient sources in the salt pond region combined with research conducted elsewhere, particularly on Long Island, New York (Koppleman, 1978), led to the conclusion that residential development, specifically on-site sewage disposal and fertilizers, was the principal source of this anthropogenically derived nitrogen. Field experiments (Harlin and Thorne-Miller, 1981) demonstrated that additions of nitrogen in the form of nitrate and ammonia trigger massive blooms of nuisance algae (*Enteromorpha* spp., *Ulva* spp.) that is all too apparent in several salt ponds during the summer months. An analysis of existing municipal zoning plans and ordinances that determine the density and distribution of development had shown that the development process was less than half complete and that under existing regulations the numbers of houses in the watersheds of the lagoons could be expected to double and the resident population to increase fourfold. Additional deterioration is un-

avoidable. For instance, the research on the enrichment of groundwater with nitrate raised the additional issue of the potability of drinking water supplies. In the United States the limit for potable water is 10 mg/L of nitrate nitrogen. This level has already been attained in some areas of the Salt Pond Region, and such concentrations are expected to extend over much larger areas at saturation development.

A common response to problems such as these is to build, at great expense, public water supply and sewage systems. A small public water supply system already exists to service older communities where wells are contaminated by bacteria. A regionwide water system, however, will pose the enormous problems of securing an adequate source of unpolluted supply and in altering freshwater inputs to the individual salt ponds. A public sewer system will effectively eliminate major sources of nitrate and bacteria to groundwater. However, experience in neighboring states has shown that such services encourage dense development. A large number of users is needed to defray the costs of building and maintaining such services and as the area becomes increasingly urban in character the nutrients and bacteria carried by surface runoff become more significant. The likely end result would be eutrophic salt ponds with large areas closed by bacterial contamination—a similar condition to that produced by smaller populations without these amenities. A better strategy is, if possible, to reduce the ultimate density of development and to implement a variety of measures to reduce the flow of nutrients and bacteria into both groundwater and the lagoons.

Fisheries. The implications of water pollution on fisheries are enormous. State law requires that areas be closed to shellfishing when coliform bacteria concentrations attain prescribed levels. The studies suggested that if the development trends were to continue unchecked, areas that still support intensive shellfishing would eventually have to be closed. In certain coves, episodes of low oxygen limit the few remaining oyster populations to near surface waters. This has greatly reduced the potential for what appeared in the 1970s to be a promising small-scale oyster aquaculture industry. Eutrophic conditions also are increasing areas of soft, highly organic bottom sediments that are virtually devoid of shellfish. These areas were formerly productive sandy bottoms. The effects of eutrophication on finfish stocks are less obvious but may be equally significant. Localized fish kills that may be attributed to low oxygen and high temperatures are known to occur and, if they become more common and widespread, could have a significant impact on the juvenile flounder that are abundant in the lagoons during the summer.

One of the biggest threats of increasing water pollution to fisheries, however, is indirect. If the lagoons become more polluted by high levels of bacterial contamination and eutrophic waters, there will be mounting pressure to increase water circulation and flushing. This could be readily accomplished by dredging out channels and inlets and by cutting new connections between adjoining lagoons and to the ocean. Research relating the hydrography of the salt ponds to their value for fisheries showed, however, that such modifications have profound implications on the conservative qualities of the lagoons as nursery areas for finfish and can have major impacts on the productivity of shellfish stocks as well. Such modifications would also in many instances accelerate the already severe problem of rapid siltation of the lagoons by sand carried in the inlets by fast-flowing tidal currents. Thus, eutrophication, bacterial contamination and strategies to address their water quality problems have major implications for fisheries management.

Declines in habitat quality, however, are only one reason for the remarkable decline in the fisheries of the salt ponds in this century. Equally important is the chronic overfishing by commercial and recreational fishermen. The research has demonstrated that undersized shellfish dominate in beds accessible to fishermen. In the Ninigret and Point Judith lagoons it is typical for 50 percent of the quahogs (*Mercenaria mercenaria*), 75 percent of the soft-shelled clams (*Mya arenaria*) and 90 percent of the

oysters (*Crassostrea virginica*) to be undersized. While commercial fishermen will stop fishing when the catch-per-unit of efforts become too low to be economically attractive, recreational fishermen will continue to work areas where hours of digging yield only a handful of undersized shellfish. The planning team became convinced that in the context of a free and common fishery, regulations alone will not solve overfishing. The fisheries of the lagoons are too small to warrant the enforcement effort that would be needed if existing regulations were to be strictly applied. The research also demonstrated that the fisheries of the lagoons change rapidly from one year to another and that effective management must be founded on a sustained and attentive monitoring program. If management is to be effective, the responses to new problems and opportunities must be rapid and based on good information.

Sedimentation. Reports dating back to the last century document that it has long been believed that greater water exchange between the lagoons and the ocean will enhance fisheries, promote the use of lagoons as safe anchorages and flush out pollutants. However, that permanent artificially stabilized breachways connecting the lagoons to the ocean have caused a rapid increase in sedimentation, altered the bottom habitat for fisheries, made boating hazardous and did not solve the pollution problem. Detailed studies (Boothroyd, 1981) of Ninigret Pond have demonstrated that the permanent breachway built in 1952 more than doubled the annual rate of sedimentation on the tidal delta from 2,000 m^3 to 5,000 m^3. The accelerated rate of sedimentation, if unchecked, will result in the lagoon being cut in two by a sand flat within thirty years. Similar problems are associated with the breachways of all the salt ponds. The only exception is in Point Judith Pond. Because the fishing port of Galilee is just inside the breachway, the harbor is kept functional by the U.S. Army Corps by dredging out some 10,000 m^3 of tidal delta sediment approximately every five years (Friedrich 1988). Using the hydrodynamic computer model (Isaji et al, 1985) the ramifications of making further large-scale changes to the hydraulics of Point Judith salt pond were assessed. Dredging other areas of this pond would provide for more "boat habitat," and perhaps temporarily improve water quality in some areas, but only at the cost of increased sedimentation and the likelihood of adverse impacts on fisheries habitats and undesirable degradation of conservative mixing patterns critical for the successful larval development of commercially important species.

The Negotiation Process

There were two distinct forms of negotiation and collaborative thinking required to formulate the plan. The first was internal, among those concerned with the policy and planning implications of the work and the researchers. The second was the more formal and structured process of negotiation among public interest groups and among governmental agencies.

Collaborative Research. During 1980 through 1983, it was no simple matter to create and maintain the sense of a collaborative effort among the many principal researchers. It was also a major challenge to keep track of the research findings and the initial interpretations thereof, and apply them to the management questions as the components of a management strategy gradually evolved. An important technique for building a common sense of purpose was a series of annual reviews, at which all major participants in the endeavor were required to spend a full two to three days to review the research findings and brainstorm on their possible implications and interrelationships. The major management questions, including what modifications to recommend for the breachways, what to conclude from the shellfish surveys, and how to reduce nutrient inputs, served as reference points for the discussions. Many of the ideas that later became central to the management strategy first emerged in these sessions. The need for a considerable number of mid-course corrections in the research priorities also surfaced and were incorporated into the research plans of the investigators. Collaborative field studies and interpretation of research results

for management strategies also helped build an appreciation for the many interrelationships among the research findings.

Efforts to involve interested citizens into the process of research and understanding issues within the ponds were highly successful. This was organized around the concept of "pond watchers." These were citizens who lived near the ponds and who had expressed an interest in the project and offered to help, at earlier meetings or workshops. A number of principal investigators used pond watcher observations in their research results, most notably the work on waterfowl, water quality, and documenting the magnitude of the recreational fishing catch. Such detailed coverage would have been prohibitively expensive to obtain in any other way and extremely important data were produced. The pond watcher program had many other benefits in that it provided a core of citizens to serve as a conduit for information and ideas within their communities and provide the participants with a sense of ownership of the overall effort. The key to adoption of any new management strategy was to engender a philosophy of stewardship amongst the citizenry. The overall effort could only succeed if the citizenry itself was committed and were active participants in the entire research management planning process.

Involvement of Municipal Officials. Another major challenge was to convince municipal officials that they did have the power and the ability to influence how the land was developed. The means of achieving this was by organizing dinner seminars and inviting members of the town councils, the planning boards, and the zoning boards of all three towns. By bringing them together, they could get to know one another and learn the commonalties of their problems and experience. As a result, a critical mass of the local officials were convinced that problems could indeed be overcome and that exciting new approaches to old problems were being successfully tested elsewhere. They helped create a sense of common purpose and trust.

The Process of Drafting the Management Strategy

The Coastal Resources Management Council assembled an advisory committee that included municipal officials, representatives of major interest groups (fishermen, environmentalists, development interests), representatives of the Department of Environmental Management, and members of the CRMC. This group worked intensively over two periods in 1983 and 1984. The first round focused upon detailed syntheses of research findings on each of the major topics to be addressed by the plan. The second round of the Committee's deliberations focused on what to do, rather than the analysis of the problems and their implications. It had emerged from the first round of meetings that "non-regulatory initiatives" would be fully as important as the more traditional rules and regulations of permitting agencies and much time was given to shaping actions that could be carried out on a voluntary basis.

Once the draft plan had been approved in principle by the Committee, it was released to the press and again became the subject of another set of in-depth and supportive newspaper articles. At the same time, the Plan was presented at a series of public workshops, which built further support. The Plan was then subject to the formal hearing process required by the Rhode Island Administrative Procedures Act. This is an often contentious and awkward process that does not easily promote negotiation among parties in conflict. It is a testament to the enormous amount of work that preceded the formal hearing process that all conflicts had been worked out well in advance and the formal hearing consisted almost entirely of strong statements in support of the strategy from a broad cross-section of government officials at both the municipal, state and federal level, and many citizens. The Plan was formally adopted by the Management Council in November 1984, approximately one year after formal adoption of the new statewide regulatory coastal program.

A major challenge posed to those attempting to structure an integrated management plan, that once formally adopted would have the force of law, was the fragmentation among governmental authority and land ownership. While the lagoons, and their associated beaches, wetlands, fisheries, waterfowl and even the state-owned fishing port are all common property resources over which governmental authorities are well established, 88 percent of the watershed is privately owned and here the authorities of government are less strong. Privately owned land is owned by thousands of individuals the great majority of which own a single house lot. For those owning the non-public portion of the undeveloped land that comprised 73 percent of the watershed in 1984, the value of their land is directly proportional to the number of house lots into which it can be subdivided.

Municipal governments control the density and type of development for the "health, safety and general welfare" of the resident population through zoning ordinances that regulate the size of individual lots and set performance standards on how they may be developed. Changing existing zoning to reduce the number of buildable lots in an area is an undertaking with major political implications. The strategy, therefore, was to achieve sufficient consensus among all parties as to the nature of the problems and to then define common management objectives. Both governmental agencies and the public must thoroughly understand the nature of the problems and alternative courses of action before any attempt is made to mount a politically charged new initiative. Therefore adopted a flexible, iterative approach was adopted where research results and their interpretation were examined and discussed by major stakeholders over a protracted period. Instead of a massive report, discussion of individual topics through a newsletter, newspaper articles and public presentations.

The Plan that was adopted in late 1984 contains the following major features:

Problems	Actions Taken Through The Plan
1. A sequential permit process involving several municipal and state regulatory agencies results in inefficiency, unnecessary expense and an unsatisfactory planning and negotiation process.	Coordinated permit review whereby major enivronmental issues posed by a development proposal are identified at the outset and the information and analysis requirements of local and state governmental agencies are shared.
2. Non-regulatory resource management initiatives are uncoordinated and ad hoc in nature.	Form an Action Committee chaired by the CRMC that includes municipal and state agencies to identify annual priorities and coordinate non-regulatory initiatives.
3. The potential number of houses and resident population in the watershed must be reduced to reduce nutrient and bacterial loading, to protect the qualities of the region and to forestall the eventual need for sewering and expanding public water systems.	Three of the four municipalities have amended their land use zoning plans to increase lot sizes in critical areas (from 1/4-acre lots to 3 and 5-acre lots).
4. (a) Salt pond water quality threatened by increasing bacterial contamination and eutrophication. (b) Public water supplies (groundwater) threatened by excessive nitrate loadings from on-site sewage disposal and fertilizers.	• For pre-existing development: upgrade and maintain sewage disposal systems, reduce sources of runoff so there are no direct discharges to the ponds. • For new development: decrease the density of development by increasing the lot sizes and in specificed areas require construction setback and undisturbed buffer zones. • Severely limit extensions to public water and sewer systems where these would encourage high density residential or commercial development. • Strong public education and incentive programs. • Promote research and implementation of denitrification technology. • Establish wastewater management districts for non-sewered areas.

5. Stablized inlets have brought increased sedimentation, destroyed brackish water fisheries and reduced nursery habitats.	• Strictly limit further dredging. • Detailed regulations for the maintenance of catchment basins in each inlet. • Proposals for tide gates where appropriate.
6. Chronic overfishing and habitat degradation have severely reduced fin and shellfish populations: once important brackish water fisheries eliminated.	• Fisheries stewards proposed to monitor stocks, intensively manage selected sites to increase yields, demonstrate how fisheries can be improved, and enforce pre-existing regulations. • Several modifications to catch and size limits and fishing seasons recommended to R.I. Fisheries Council.
7. Hurricanes periodically devastate the region; development is currently at an unprecedented level and future destruction to property and alterations to salt pond ecology will be large.	• Construction setback of 30 times the annual erosion rate and more for commercial structures. • Construction on designated undeveloped barriers prohibited. • Expansion of public utilities prohibited in high hazard areas of barrier spits. • Post storm building moratorium in high damage areas.
8. Human uses and conflicts will further intensify as development proceeds; some further deterioration in environmental quality is inevitable.	• Priority sites for preservation identified. • Recommended upgrading of public facilities and infrastructure specified.

CONCLUSIONS

The Special Area Management Plan has now been in effect for six years. With the benefit of hindsight, the major features of the strategy and their relative success appear to be as follows:

• The Plan has succeeded in providing three levels of government (municipalities, state agencies and federal agencies) with a common, formally adopted set of objectives and strategies. The sense of isolation and working at cross purposes between municipal and state regulatory agencies has been largely overcome. The coordinated review of major development proposals that is a major feature of the Plan does not occur with the formality originally envisioned, but the town requests a review by the CRMC staff at the initial stages of formulating a proposal so that the local planning boards can benefit from technical review and may assume that proposals meet CRMC standards from the beginning of the development process.

• The municipalities have adopted modifications to their zoning plans and ordinances that have significantly reduced the ultimate density of development within the watersheds of the lagoons. Opposition to some of these modifications was intense and well-organized, but the Plan and concern for protecting environmental quality persuaded the majority of voters to support the changes.

• The DEM has extensively reviewed the criteria by which it evaluates the potential impacts of on-site sewage disposal systems. State codes have been changed to provide for more stringent siting and construction standards for septic systems in the salt pond region. Legislation has been passed to allow towns to establish wastewater management districts for non-sewered areas.

• No large-scale proposals have been made to invest in infrastructure such as sewer systems and public water supply systems that would ultimately increase the density of development. Moreover, public infrastructure has been prohibited from storm hazard areas and in one case public water lines have been removed from a hazardous barrier beach area.

- Non-point source pollution loadings are reduced by buffer strips, building setbacks, limiting the number of docks, and requiring grassy swales to treat road runoff.

- Heightened awareness has been sustained among the public and governmental officials for the costs of development in terms of both environmental quality and the public services that must be sustained by local taxes.

- The Special Area Management Plan has served as the model for similar linked research and planning initiatives elsewhere in Rhode Island and in other coastal states. The major features of the Plan have been adopted by planners for the watersheds abutting the original Salt Pond Region to the north and west.

LESSONS LEARNED

- Activity associated with the preparation of the Plan succeeded in modifying the behavior of government and the population living within the watershed of the lagoons. The actions taken, however, have not been sufficient to reverse or halt the identified trends in environmental degradation. Fishery resources today are not more abundant in the lagoons, the sedimentation process continues and water quality in some areas is worse. Many actions have been taken but the lesson appears to be inescapable that society is not willing or able to halt the development process when land is fragmented in thousands of private holdings and when the economic and social pressures are intense to continue the transformation from a rural to a residential community.

- The notable successes achieved in new resource management initiatives and revisions to the procedures and policies of government agencies came because local citizens worked hard to actively support the Plan. Without their participation the required compromises and commitments would not have been made. It was very important to formulate management strategies that actively involved the interested populace in the research, monitoring and planning process.

- The ecological history was of enormous value in framing the issues, providing a common context for all participants, and involving major segments of the local populace.

- The Plan was negotiated on the basis of a fair and open process of evaluation and planning. It was crucial that one group, the URI Coastal Resources Center, was committed to the planning and negotiation process and provided consistent leadership through the four-year period of formulating the strategy.

- The Special Area Management Plan demonstrates how research, planning, policy reform and public education can be successfully knit together into a coherent mutually supportive process.

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Virgin Islands National Park

Efforts to Balance Marine-based Tourism with Protection of Coral Reefs and Seagrass Beds in a National Park

Caroline S. Rogers

The marine resources within the Virgin Islands National Park include coral reefs, seagrass beds, and the fishes and other organisms, including endangered species such as sea turtles which depend on these ecosystems. Stress on these resources come primarily from tourism and intense recreational use, overfishing, and coastal and upland development. Marine-based tourism provides the most visible evidence of change as dramatic increases in the number of people visiting the park has led to congestion and crowding of some beaches; conflicts between the different groups using the park (e.g., boaters and fishermen); breakage of corals by inexperienced snorkelers; and habitats destruction from boats and ships running aground on shallow coral reefs and anchoring on seagrass beds and reefs. The National Park Service has attempted to minimize the adverse effects of human activity by a combination of education, research, communication and direct resource management. This case study describes the efforts of park managers to reduce anchor damage to coral reefs and seagrass beds. It highlights the need for and use of scientific information in the management process. Coral protection is one element of a strategy to manage marine based tourism, based on the clear management objectives of the National Park Service.

INTRODUCTION

Efforts are being made to balance marine-based tourism and preservation of marine resources within Virgin Islands National Park (VINP) on the Caribbean island of St. John, U.S. Virgin Islands (USVI) (Figure 1).

Virgin Islands National Park is now experiencing many adverse consequences associated with recent increases in tourism. The combined resident and tourist use level has more than tripled since 1976. The impact of this number of people on the marine resources and park infrastructure has been significant. Many visitors arrive on cruise ships or charter sailboats whose anchors and associated anchor chains have caused unacceptable levels of damage to coral reefs and seagrass beds inside the park. Documentation of the damage to these valuable resources by the park research staff led to specific resource management actions, which are a focal point of this case study. Unlike many Caribbean islands seeking to increase tourism to bring in much needed revenues, St. John is seeking to avoid excessive use. As with all U.S. National Parks, VINP is mandated to conserve its resources while still allowing for public use. The challenge is to ensure that people can continue to enjoy the park without causing further degradation of valuable marine resources.

BACKGROUND

The marine portion of VINP was established in 1962, six years after the terrestrial portion. The U. S. Code of Federal Regulations prohibits destruction of marine resources in VINP, stating as follows: "No person shall...remove, displace, or break

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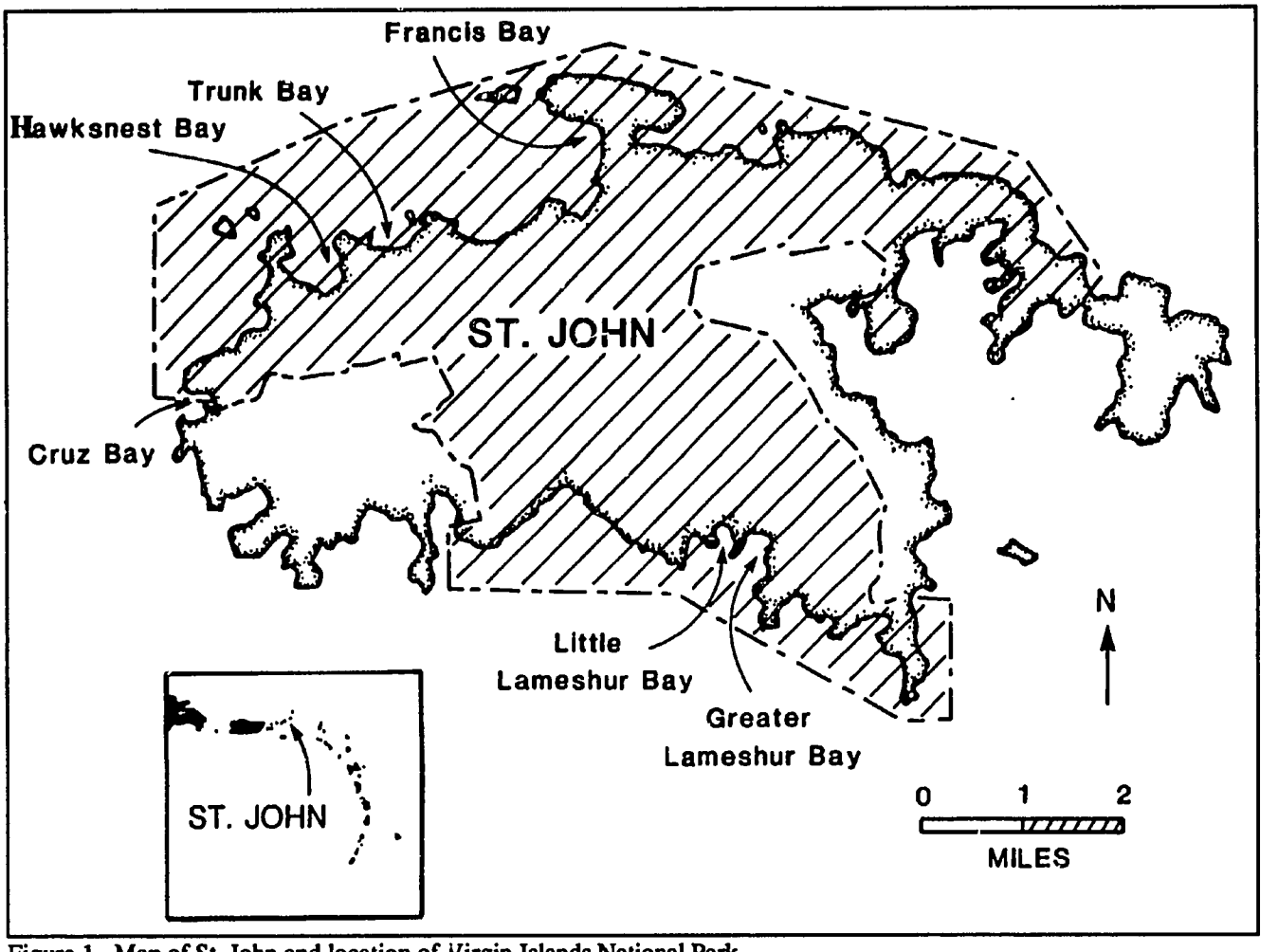

Figure 1. Map of St. John and location of Virgin Islands National Park

off any underwater growth and formation. Nor shall any person...injure or impair the natural beauty of the underwater scene". Also, "No watercraft shall be operated in such a manner, nor shall anchors or any other mooring device be cast or dragged or placed, so as to strike or otherwise cause damage to any underwater features". These regulations have been very difficult to enforce.

The estimated number of people visiting the park rose from about 200,000 in 1976 to over 800,000 in 1988 (Figure 2). Visitation fell slightly in the last two years, perhaps reflecting the effects of Hurricane Hugo in September 1989, concern over traveling during the Persian Gulf crisis, and a depressed economy. Given a resident population of less than 4,000, and an area of only 20 square miles, this level of visitation has resulted in substantial social and environmental pressures. While many people enjoy the hiking trails and scenery in the park, most come to enjoy swimming off the white sandy beaches, snorkeling or diving on coral reefs, and sailing. The average number of boats in park waters increased from about 20 per day in 1976 to over 80 per day ten years later (Figure 3). About 30,000 boats per year anchor in the park. Use of Trunk Bay, the park's most popular beach, rose from less than 20,000 people in 1966 to almost 170,000 in 1986. The largest cruise ships, up to 1,000' long and carrying as many as 2,000 passengers, anchor outside park boundaries and use small boats to transport passengers to shore in Cruz Bay. The park Superintendent has recently been getting increasing numbers of requests for permission to bring groups of up to 800 people for a day on the beach.

PROFILE

Mandate for Program

The marine portion of the Virgin Islands National Park was established in 1962 with a mandate to the NPS "to preserve for the benefit of the public significant coral gardens, marine life and seascapes." The ultimate responsibility for decision making within the park rests with the Superintendent, who has a staff of about 60 and works closely with the US Virgin Islands Department of Planning and Natural Resources (DPNR).

The Coastal Zone Management Act for the U.S. Virgin Islands became effective in 1978 and established a Coastal Zone Management Commission within DPNR. The Commission provides policy direction and leadership on coastal management issues and can promulgate regulations. The Commission consists of three Committees, one from each of the major islands, which evaluate and issue coastal zone management permits. The NPS, as a federal agency, must conduct its activities within the coastal zone, in a manner consistent with the CZM Program.

Geographic Scope

St. John is one of the U.S. Virgin Islands with an area of 20 square miles, situated in the Caribbean Sea, about 85 miles east of Puerto Rico. The Virgin Islands Coastal Zone includes the islands of St. Thomas, St. John and St. Croix, all offshore islands and cays, and the territorial sea. The VINP boundary encompasses 56% of the island of St. John and nearly 9 square miles of nearshore waters within the territorial sea (Figure 1).

Management Procedures/Techniques

The park's General Management Plan and Resource Management Plan provide the framework for park management. Regulations in support of the plans established "no boat" zones, designated and prohibited anchoring areas, and mooring areas. Proposed regulations are subject to public review and scrutiny through publication in the Federal Register and public hearings. In some cases, task forces consisting of park employees and local citizens tackle key issues and make recommendations. The Superintendent also has authority to enact emergency regulations.

A number of stresses affect the marine resources in VINP. The impacts from recreational activities (see Table 1) are being superimposed on an already deteriorating environment as a result of storms, coral disease, and, most recently, an oil spill and subsequent cleanup operations. Hurricane Hugo caused severe destruction to seagrass beds and coral reefs, primarily off the eastern and southern shores of the island.

Fishing with traps, hand-lines, and certain types of nets is allowed within park boundaries, although spearfishing and gill netting are not. There is evidence of severe depletion of reef fishes, conchs, and lobsters within the U. S. Virgin Islands. However, it is not the intent that the park should act as a refuge for heavily exploited species.

The most serious threat to the park's marine resources is probably the accelerating pace of coastal and upland development over which the Park Service has virtually no control. Private lands within and outside the park boundary are being cleared and bulldozed to make way for condominiums, hotels, and home sites. Erosion and runoff of sediment from these sites can result in reduction of light available for photosynthesis by marine organisms and smothering of organisms, leading to deterioration of water quality and degradation of nearshore ecosystems.

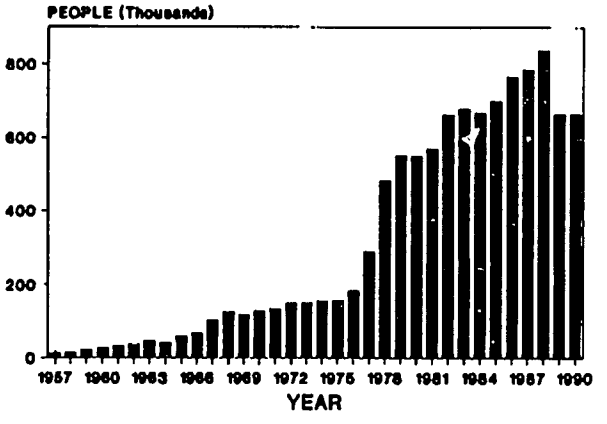

Figure 2. Recreational visits to V.I. National Park, 1957-90

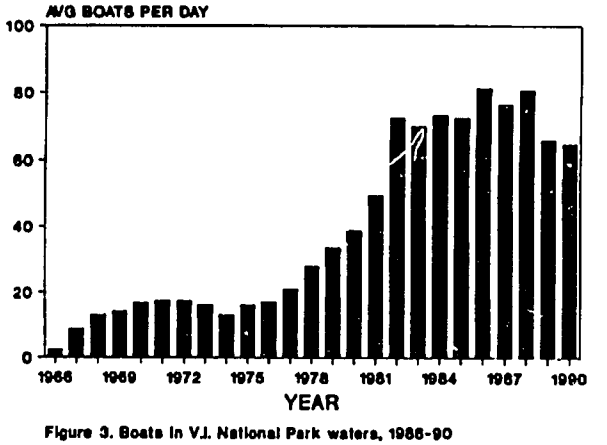

Figure 3. Boats in V.I. National Park waters, 1966-90

Although careless development is potentially the greatest threat to the park's marine resources, boat anchors are currently causing the most immediate damage.

Damage Associated with Anchoring

Anchors and their attached chains can severely damage seagrasses and coral communities. In many cases, the chain is more detrimental than the anchor itself because it scours the bottom as the vessel shifts in the wind and currents, or else moves up and down, bouncing off the bottom. In VINP, anchors and their chains have pulverized hard coral colonies, ripped sponges and soft corals off the bottom, smashed and overturned small patch reefs, and flipped corals upside down. A single anchor drop can destroy reef areas, which support a high diversity of living organisms, and which took centuries to develop. The anchor from a large vessel can weigh several tons and is capable of doing far more serious damage than the lighter anchors of smaller boats. Large anchors can actually fracture the framework of the reef.

Recovery of seagrass beds and reefs is a slow process. Corals grow a maximum of a few centimeters a year. In cases where corals have been pulverized or displaced, recovery depends on successful recruitment of live coral fragments and settlement of coral planulae (larvae). These larvae require hard substrate for colonization. Often the anchor scar contains loose sediments and rubble which do not provide a suitable substrate. Recovery may be prevented or delayed if anchoring continues or if storms or heavy seas prevent the cementation and stabilization of detached coral colonies or coral rubble. Seagrass beds take decades to recover if the rhizomes have been severed. In addition, the root and rhizome systems of seagrass plants stabilize sand, and their destruction can increase sedimentation in nearby areas.

Table 1. Effects of recreational activities on coral reefs and seagrass beds (Adapted from Marion, 1988).

Boating
- Anchor/chain damage
- Damage from boats striking or grounding on reefs
- Propeller damage
- Increased water turbidity
- Oil/gas residues
- Dumping of garbage, human waste, etc.

Snorkeling and Diving
- Damage to corals from touching or standing
- Harassment/displacement of marine organisms
- Feeding of marine organisms
- Collection of living marine organisms

Fishing
- Depletion of reef fishes by spearfishing and hook and line
- Overharvesting of marine invertebrates (lobsters, conch)

CHRONOLOGY OF MAJOR EVENTS

1956	VI National Park established
1962	Boundaries revised to include marine areas
1972	Federal Coastal Zone Management Act
1978	CZMA for USVI became effective
1979	CZM Program for USVI federally approved
1982	VI Resource Management Cooperative (VIRMC) established
1983	NPS provides research funds for VIRMC
1983/88	Research on marine systems
1988	Coral Reef Assessment Program funded
1988	Major cruise ship damage incident monitored

CASE STUDY: Anchor and cable damage to coral reefs and seagrass beds.

The park's Research and Resource Management Division consists of a Resource Management Specialist, a Research Biologist and two Biological Technicians. Studies of reef damage were initiated because of evidence from staff observations and from concerned island residents that boaters were running aground on reefs and inexperienced snorkelers were breaking off shallow corals with their fins. Although the south shore of the island is getting increasing use, most boating and snorkeling takes place in the northern and northwestern bays. In 1986 and 1987, coral colonies were monitored in Hawksnest Bay and off Windswept Reef, two of the hardest hit areas on the north shore, (Figure 1), for evidence of damage from natural processes (e.g., coral diseases, heavy swells) and from human activity (e.g., snorkeling, boat groundings). While it is often not possible to differentiate between natural stresses and visitor-related damage, it was clear that boats and snorkelers caused a considerable amount of coral breakage. In some cases, blue or red boat-bottom paint was observed on smashed coral colonies.

A survey of boats anchoring in northern park waters from January to March 1987 (Rogers et al 1988) revealed that the average length of the surveyed boats was about 45', and 46% of them were anchored in seagrass or coral communities. Severe disruption of the bottom was noted in 23% of the incidents. This estimate is conservative as many rubble and sand bottoms may have supported seagrass and coral communities in the past. Longtime residents of St. John have expressed dismay over the degradation of some of their favorite snorkeling sites.

Although aware of some damage from the anchors of "mini-cruise ships" which range in length from about 150' to 225', attention initially was directed to the numerous smaller boats because up until the mid 1980's, it was unusual for more than one or two of these mini-cruisers to anchor in park waters. The proliferation of these cruise ships in the last 5 or 6 years raised concern because they are capable of entering very shallow, environmentally sensitive areas that are inaccessible to larger vessels. The cruise lines were contacted and the Park Service expressed its concern about environmental destruction from anchoring. In fact, park biologists made several dives trying to find suitable anchor areas for one cruiseline which wanted permission to anchor its ships (about 225' long) close to shore in popular bays. Each ship would have to put out three large anchors and the two bow anchors would have to be about 900' from the stern anchor to be effective in keeping the ship in place. No suitably large mud or sandy bottom could be found within the park.

A dramatic incident on October 8, 1988 made it clear that the greatest threat to the marine resources in the park, the destruction by cruise ship anchors, was not being adequately addressed. On that day, a 440' cruise ship dropped its anchor on a coral reef, dragging it along the reef slope which rises from a depth of 75' to 25' in waters west of Francis Bay (Figure 1). The incident could easily have gone undetected. However, one of the park biologists was out in his boat and was contacted by friends who had witnessed the plume of sediments stirred up by the ship's anchor and anchor chain. Divers discovered a distinct scar, approximately 420' long

and 6-10' wide. Corals and other reef organisms were pulverized, overturned, and ripped from their bases. An area of 340 sq. yards was virtually destroyed. The National Park Service has sued the cruise line, and the case is in litigation.

The documentation of damage from this incident and others led to the establishment of new regulations designed to provide better protection for the marine systems in the park. In the fall of 1989, the Superintendent established restrictions on the size of boats which are allowed to anchor in the park. Boats which are longer than 225' are not permitted to anchor anywhere in the park, while boats ranging from 150' to 225' are permitted to anchor only in Francis Bay in over 30' of water. Francis Bay was selected as a designated anchorage for these larger vessels because it has a predominantly sandy bottom with few coral or seagrass communities.

About a year after the October 1988 anchoring incident, a park employee came across a glossy magazine advertisement for cruises which stopped in St. John, including a photograph of what appeared to be a very large ship. No reference was made to Virgin Islands National Park. The Superintendent personally wrote a cordial letter to the cruise line explaining the park's restrictions on anchoring. In October 1990, about one year after this letter was sent, the ship which had been featured in the advertisement, pulled into park waters and anchored. The park's Chief Ranger went out to the ship and explained to the captain that the ship (438' long) was too large to be anchoring in the park. The anchor site was examined by divers the following day. Although the anchor had landed in sand, the anchor chain had smashed and toppled coral colonies on the nearby reef in 60 feet of water. Park biologists have documented the damage, and a case is being prepared against the cruise line.

Park biologists have had to spend a considerable amount of time attempting to document the damage caused by large ship anchors and, to a lesser degree, small boat groundings. Guidelines for assessment of reef damage have been devised based on staff experience and conversations with scientists and managers of the Florida Marine Sanctuaries who have had to deal with hundreds of groundings (Rogers et al. 1990).

It should be noted that it is not possible to accurately determine the amount of reef area within the park which has already been degraded by boat anchors. Many of the reefs are deep and uncharted. It is not feasible to get an overview of the damaged areas park-wide. Even excellent aerial photographs only show reefs down to a maximum of 60' and do not reveal the condition of the reefs. It is often not possible to determine what caused the death of coral colonies or to differentiate between damage from natural processes or human activities. The incidents documented in this paper are just a few of those which are known to have occurred. Most incidents go undetected. In spite of these drawbacks, it is known that anchors have caused and continue to cause unacceptable levels of destruction, destruction which is superimposed on that from all other causes. The reefs and sea grass beds will never recover if these pressures continue.

Minimizing Damage to Marine Resources

A variety of reasons make it difficult to reduce the damage to the park's marine resources.

The Park boundary. A major constraint to management is the 360 degree access to park waters. The marine boundary is not marked with signs or buoys. To further complicate matters, the boundary appears to have been arbitrarily defined. It cuts through the middle of some bays and lies at varying distances from shore. This open, unmarked boundary has two major consequences. Firstly, many people who cruise or sail into the park have no idea that they are entering a protected area. Some sail, anchor, dive and snorkel in park waters but never set foot on shore. Secondly, those who do go ashore may never stop at the Visitor Center located in Cruz Bay on the western side of the island. Therefore a special effort must be made to make people aware that they are in a national park with protective legislation and to seek their cooperation.

Provision of moorings. Moorings have been used very successfully in several marine protected areas to eliminate or reduce the destruction caused by anchors. In VINP, it is not simply a matter of installing a few moorings and requiring that boaters use them. In some other protected areas, such as Looe Key National Marine Sanctuary, Key Largo National Marine Sanctuary, Buck Island Reef National Monument, and Saba Marine Park, the desirable locations for moorings are fairly evident. All of these areas are comparatively small, with well-defined coral reefs and boater destinations. Most of the people who visit Looe Key National Marine Sanctuary arrive in power boats to dive and snorkel on the forereef. The people who visit Buck Island Reef National Monument arrive on sail and power boats and pick up moorings near the main attraction—the underwater snorkeling trail. At Saba, location of moorings was based on popular dive sites. People come to VINP primarily for sailing and snorkeling in 15 bays and at a number of areas scattered throughout the park. While SCUBA diving occurs in VINP, most diving goes on outside park boundaries.

The moorings that have been successfully used in the Florida Marine Sanctuaries and in Saba Marine Park appear to be able to accommodate boats up to a maximum of 65'. Moorings which could handle mini-cruise ships require heavier and more expensive hardware and other materials. In any event, the chains associated with such moorings can cause extensive damage to the bottom near the mooring.

Designated anchorages. The size of the park and the patterns of use make designation of appropriate anchorages difficult. To date, the park has established "No Boat" zones, all of which parallel shorelines. These "swim areas," delineated with marker buoys, reduce anchor damage to nearshore shallow bottom communities and allow people to swim mostly without fear of being run over. Unfortunately, the increased number of people visiting the park has been accompanied by increased incidence of violations in the form of dramatic jet ski and dinghy forays into the prohibited areas.

The navigational charts which are available only show the shallowest reef areas. The park has bottom maps which show reefs and seagrass beds down to 60'. There are currently no maps which show the deeper reefs, some of which are the best developed reefs around St. John.

Some conflict exists between boaters and fishermen. Out of respect for traditional activities, certain types of fishing are permitted within VINP. Some fishermen are concerned that existing and planned "No Boat" zones will prevent them from netting the baitfish which school in shallow waters in several bays.

Enforcement. In some cases, it is evident that anchoring has caused severe destruction of seagrass beds and coral reefs. However, it is difficult to judge what should be done in cases where an anchor topples a few coral colonies or tears up a small section of a seagrass bed. These incidents present problems for people who are trying to enforce protective regulations, but the emphasis should be on minimizing damage, not seeking compensation for damaged resources.

The park generally has only one to four rangers on duty each day. It is not always possible to have a ranger out patrolling park waters. Unfortunately, recent increases in drug traffic through the park, and the USVI in general, have reduced the amount of time available for dealing with environmental protection. Even with a substantially larger ranger staff, it would not be possible to adequately protect the marine resources without the assistance of the boating public. With increased awareness of park regulations and appreciation of marine resources, enforcement becomes less difficult.

Management Actions Taken to Date

The National Park Service has taken a number of actions in an attempt to balance use of the park with protection of the marine resources for which the park was established. These include communications with user groups, specific resource management actions, environmental education efforts, research programs and regional cooperation.

Communication with cruise lines and charterboat companies. The interests of boaters and park managers are certainly not mutually exclusive. Damage to marine resources from recreational activities is not intentional. Emphasis should be on sharing information on desired uses of the park and on the locations of especially vulnerable areas. Several successful meetings were held with boaters and owners of charterboat companies during development of the park's mooring plan. During these meetings, a number of misunderstandings were cleared up. For example, some people feared a total ban on anchoring after installation of the mooring buoys. The park is not proposing such a regulation at this time. Anchoring is to be prohibited only in Greater and Little Lameshur Bays, the sites of long-term research projects.

Unfortunately, it has been difficult to communicate as effectively with cruise line owners and operators for several reasons. All of the commercial cruise lines are based outside the USVI, e.g., in Seattle and Miami. It is difficult to meet with the owners or ship captains. In some cases, a new captain is not informed of the regulations by the cruise line. The park has contacted the cruise lines in writing on several occasions, to explain regulations and solicit cooperation.

The park staff need to work more closely with the cruise lines and other boat operators in the future to express concerns over marine resource damage, to publicize the new boat length restrictions, and to identify ways that people can continue to enjoy the park without further deterioration of marine systems.

Resource management actions. Specific resource management actions which have been taken in VINP have been based on research on the coral reefs and seagrass beds and careful documentation of resource degradation. As mentioned above, the Superintendent established regulations which prohibit boats over 225' long from anchoring in the park and which require boats from 150' to 225' long to anchor in Francis Bay. Some nearshore areas have been designated off limits to boats to allow recovery of shallow seagrass beds and coral communities.

The park received NPS funding for further studies of the bottom areas around St. John and for installation of marker and mooring buoys. Buoys were installed in May 1991. Prior to installation, the park staff identified specific locations which were appropriate for mooring buoys for boats under 65' and estimated the desirable number of buoys per bay. A Marine Mooring Plan was developed. The following sources of information proved to be extremely valuable in developing this plan:

- Aerial photographs (taken in 1983) which showed presence of reefs and seagrass beds.

- A comprehensive set of benthic (bottom) maps prepared by National Park Service and other scientists (Beets et al. 1986) based on the aerial photographs referred to above, and extensive diving and snorkeling around the park.

- Additional observations by park staff and others diving and snorkeling in the park.

- Records from park ranger boat patrol logs and observations on use patterns, i.e., most popular anchorages.

In the future, the park plans to mark the marine boundary and to identify environmentally sensitive areas in deeper water to assist both boaters and park rangers.

The park's research and resource management staff has attempted to address the increased visitation at Trunk Bay and other popular beaches through a draft management plan which identifies low, medium, and high density beaches. The park will be developing fairly specific guidelines for each beach—for example, Trunk Bay can probably absorb between 500-800 people, while Hawksnest Bay no more than 75. Establishment of use levels will allow a range of different recreational experiences for residents and visitors. The Superintendent recently had to deny some groups use of the

already crowded beaches. Heavy use of beaches on St. John is more of a social issue than an environmental one. It is a vitally important issue that the park has just begun to address.

Environmental education. In the last three years, VINP, in particular the Division of Interpretation, has made exceptional progress in its environmental education program. All of these initiatives can lead to increased appreciation of marine resources.

The park's Research and Resource Management Division and the Division of Interpretation collaborated on production of a VINP Mooring and Anchoring Guide. This guide includes information on the park's marine resources and brief descriptions of bays where moorings have been installed. It also includes information on the proper way to use moorings or to anchor. Specific protective regulations are listed.

The park employs a full-time interpreter assigned to Environmental Education. This person visits local schools to present slide shows on marine systems and to discuss protection of natural resources, and leads programs such as the snorkeling trips for beginners and the seashore walk. During the busy season, park interpreters, biologists, and others give presentations several evenings a week at the popular Cinnamon Bay campground.

The park has a support group called "Friends of Virgin Islands National Park," whose members contribute time and funds for special projects to benefit the park. For example, the Friends produce a newsletter on the park and a series of field seminars on park resources.

Old signs along the Trunk Bay underwater snorkeling trail have been replaced with more colorful and informative signs. Most cruise ship passengers who visit St. John are taxied to Trunk Bay Beach. This year, the Friends Group plans to install a booth at Trunk Bay where a volunteer will talk with visitors and distribute interpretive materials. During the summer, park lifeguards and interpreters teach local children to swim at Trunk Bay.

Other specific actions to improve education include:

- Each of the most popular beaches has a sign which depicts coral breakage from a snorkeler's fin and asks for cooperation in protecting coral reefs.

- A video on the park addresses both cultural and natural resources and special park programs with a section on the coral reefs. The video is now shown on cruise ships and in the park's Visitor Center.

- The newly renovated visitor center has a saltwater aquarium stocked with colorful reef fish and corals and enhanced by a "light box" of interpretive photographs and legends.

- A new park brochure is being produced that contains a beautiful set of illustrations which depict terrestrial and marine resources and identifies many of the plants and animals found in the park.

In the future, the park hopes to have a volunteer on a boat anchored in Francis Bay, one of the most popular bays. This individual will make informal contact with the boating public and distribute educational material related to marine recreation.

Research programs. The National Park Service has shown a substantial commitment to increasing our knowledge of the marine resources in Virgin Islands National Park and Biosphere Reserve, and Buck Island Reef National Monument, another NPS site located 25 miles south in St. Croix. Beginning in 1983, NPS provided funds to support a series of research projects by members of the Virgin Islands Resource Management Cooperative (VIRMC). VIRMC, established in 1982, is composed of NPS staff members and 15 other members, including local and federal government agencies, research and educational institutions based in the U.S. Virgin Islands, the British Virgin Islands (BVI), and Puerto Rico. Between 1983 and 1988, VIRMC members completed 30 projects which emphasized baseline studies of marine systems (seagrass beds, coral reefs, reef fishes), moni-

toring, and synthesis of information (Rogers and Teyraud 1988). Much of the information from these VIRMC projects has provided an essential basis for resource management in the park.

The results of these studies and additional observations by park biologists led to concerns over the environmental consequences of the increasing level of tourism in the park. In 1988, NPS provided further funding to support the Coral Reef Assessment Program for 3-5 years. The overall goal of this program is to establish effective long-term research and monitoring sites at NPS units in the U.S. Virgin Islands (VINP and Buck Island Reef National Monument) and in Florida (Biscayne National Park, Fort Jefferson National Monument). There are six cooperating institutions in this program, including universities and federal and local governmental agencies. Participants in this program are working to standardize methods for determining long-term trends in coral reef systems. It should be noted that the deleterious results of marine-based tourism are superimposed on marine resources which have been subjected to a variety of stresses from natural processes and various human activities.

Regional cooperation. Virgin Islands National Park is actively cooperating with people from several Caribbean islands who have established marine protected areas or who are hoping to establish them in the near future. Several of the VIRMC projects referred to above focused on descriptions and mapping of marine systems in the British Virgin Islands. The research staff in VINP works with the Conservation Office in the BVI on common resource management problems. This joint effort is particularly important because of similar resource management issues such as boat damage and fisheries management. Also, actions which the BVI take could affect resources in the USVI and vice versa. It is worth noting that some of the cruise ships which are no longer allowed to anchor in VINP appear to be causing reef damage in the BVI. In March of this year, two biologists from the Conservation Office came to St. John to receive training in the field in coral reef monitoring methods and reef fish censusing techniques. In May, two VINP scientists went to the BVI for five days to assist with on site establishment of a reef monitoring program.

With the support of the NPS Office of International Affairs, six other individuals have visited the park to learn more about overall park management, interpretation, administration, and research, and to tell the park about the programs in their own countries.

Anchor damage has been recognized as a serious problem around many Caribbean islands, including the British Virgin Islands, Bonaire, and the Cayman Islands (Rogers 1985). One outcome of the Reef Assessment Program will be a Manual of Coral Reef Monitoring, which will be made available to other practitioners. Frequent requests for advice on monitoring of coral reefs and techniques for damage assessment are received by the NPS.

CONCLUSIONS

The coral reefs and seagrass beds within VINP have deteriorated both from natural processes and human activities, but it is not possible to apportion the causes. Elevation of sea water temperatures associated with global warming may aggravate their decline. Storms and coral diseases cannot be controlled, however, these marine systems can recover if pressures from the island's development and tourism are effectively reduced. As part of this effort, park managers are trying to reduce anchor damage by encouraging the use of recently installed moorings and by enforcing restrictions on boats entering nearshore swim areas. Anchoring is still allowed except in two bays which are sites of long-term research. Enforcement of the restriction on boats over 150' is essential.

The management strategy that is being used to manage marine-based tourism in VINP is multifaceted and dynamic. It consists of environmental education, consensus-building, research programs, and specific resource management actions. The carrying out of this strategy has been a park-wide

effort involving the Superintendent, biologists, interpreters, and park rangers.

No formal evaluation of this strategy has been carried out, and it is difficult to measure the degree of success that has been achieved to date. Intangibles like increased appreciation of the natural environment are not easy to quantify.

LESSONS LEARNED

A number of valuable lessons can be learned from the attempts to balance intensive use of a small marine park with protection of the fragile marine resources for which the park was created.

Planning. Anticipation of problems such as tourism development, adjacent uses and future trends is an integral part of a planning process designed to balance recreational use with preservation of marine resources. In order to diversify tourist activity the designation of high, medium and low density use areas may be appropriate.

Education. Protection of marine resources presents unique challenges. As was pointed out by Marion (Marion 1990), "Due to the alien and hidden nature of marine resources, their protection is often overlooked by resource administrators and the public alike. The vastness of the sea implies an unlimited capacity to absorb mankind's pollution and the side-effects of our commercial and recreational uses". It is essential to keep in mind that the marine environment is only a little less familiar to many people than outer space. It is very difficult to get people to care about something they never see, such as a coral reef in 90 feet of water. Most people will not be able to throw on SCUBA gear and personally observe the destruction. Public education is thus a necessary ongoing process and visual aids such as still photographs and videotapes must accompany quantitative descriptions of damage.

Research. The value of research as a basis for management has been demonstrated. It is not reasonable to expect a manager to establish regulations which curtail recreational use of a national park or other protected area without evidence that such use is causing unacceptable degradation of natural resources. The Superintendent of a national park deals with a myriad of issues on a daily basis. He or she must rely on the park staff to assist in identification of management priorities. In VINP, the Superintendent was able to establish critical environmental regulations because he had solid evidence of degradation of marine systems in the park. Such evidence comes not only from biological data and assessment but information on recreational use patterns.

Managers will never have all the information they need. Decisions have to be made on the best available data, and the information must be objective. If any errors are made, they should be on the side of resource protection. Restrictions on visitation or use can always be relaxed if warranted. It is difficult to revive a dead reef. It is also far easier to start off with a good set of regulations rather than add them as an afterthought. Exposure and publicizing of the damage occurring in the park provided the momentum for a substantial amount of funding to address it. For example, the park received funds for long-term assessment of coral reefs and for installation of buoys following documentation of severe resource destruction.

The management process. Effective management of marine-based tourism depends on a strategy of consensus-building, environmental education, research on marine resources, and specific resource management actions. Management is a dynamic process which does not stop with the passing of a regulation or the adoption of a resource management plan. Planning and management require adjustments as new conditions arise. Communication of the park's policies should not consist of a few press releases which will go unnoticed or else be forgotten. It requires a constant effort by park employees and continual communication with people using the park.

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A Perspective on Planning in the Florida Keys

Habitat-Based Land Use Planning

George Garrett

Monroe County, which includes the entire Florida Keys, is one of the fastest growing counties in the State of Florida. At the same time the Keys are home to a rapidly diminishing assemblage of tropical flora and temperate fauna unique in the United States. There are currently over 75 plant and animal species resident in the Florida Keys which are listed as endangered, threatened, or under other protected status.

The resource management issues that are faced in the Florida Keys include:

- **Continued upland and wetland habitat destruction and fragmentation as a direct result of development activities**
- **Continued declines in protected species because of habitat degradation**
- **Degradation of nearshore marine resources as a result of legal but inadequate sewage treatment requirements, nonexistent stormwater management, marina impacts, and boater impacts**
- **An apparent degradation of the Keys' reef complex as a result of natural and human impacts**
- **Poorly planned and high density land subdivision in the 1950s and 1960s coupled with limited or no infrastructural improvements required in these subdivisions**
- **High development expectations as a result subdivision lot availability, accessibility created by bridge improvements, and the convenience provided by water line improvements**
- **Impending capital facility decisions for highways, solid waste sites, the provision of potable water, and hurricane evacuation.**

Local opposition to the state's efforts to improve resource management in Monroe County led to its being declared an area of critical state concern. This exerted pressure on the county to resolve these resource management issues. The subsequent introduction of the Florida Coastal Management Program required the county to produce a comprehensive plan, which was adopted in 1986.

This case study describes as the development and implementation of the comprehensive plan, with examples of how habitat based land use planning is being applied with very different results in North Key Largo and Big Pine Key.

INTRODUCTION

This case study is intended to illustrate creative approaches to resource protection, including the development of a habitat based land use planning scheme. The scheme's intention is to protect the Keys' native habitats through the mandated preservation of a high percentage of existing habitat areas on development sites. Maintaining the character and quality of the habitat as a primary component of the development approval process is complemented by the establishment of a transferable de-

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velopment right program designed to promote density restrictions, and the creation of a Land Authority to acquire properties deemed unsuitable for building.

A number of problem issues and potential solutions are identified in the development of the Florida Keys Comprehensive Plan, and examples of both successful and unsuccessful planning processes in North Key Largo and Big Pine Key are described.

Monroe County, encompassing the Florida Keys, provides a spectacularly beautiful setting for some of the most challenging coastal planning issues in the United States. In almost all aspects, the marine and upland resources of the Florida Keys are unique. They have received an inordinately high level of protection and will receive more in the future. However, the impact that growth has imposed on those resources has been substantial.

Monroe County's population in 1991 is estimated to be over 82,000, with 61,000 additional residents during peak season. The population has increased at an average rate of 3.4 percent per year for the past ten years. These are substantial increases for a county whose potable water is piped 150 miles from the mainland of Florida, whose access is via a single highway connecting 36 islands, whose solid waste facilities are nearing capacity, and whose hurricane evacuation plan requires 36 hours to carry out.

Development has mirrored the rate of population growth. In addition, development interests have tried to provide increasing numbers of resort facilities for a burgeoning tourist industry. The result has been a substantial destruction of upland resources, saltmarsh and mangrove habitat, and has resulted in significant nearshore water quality degradation. Tropical forests have been removed to be replaced

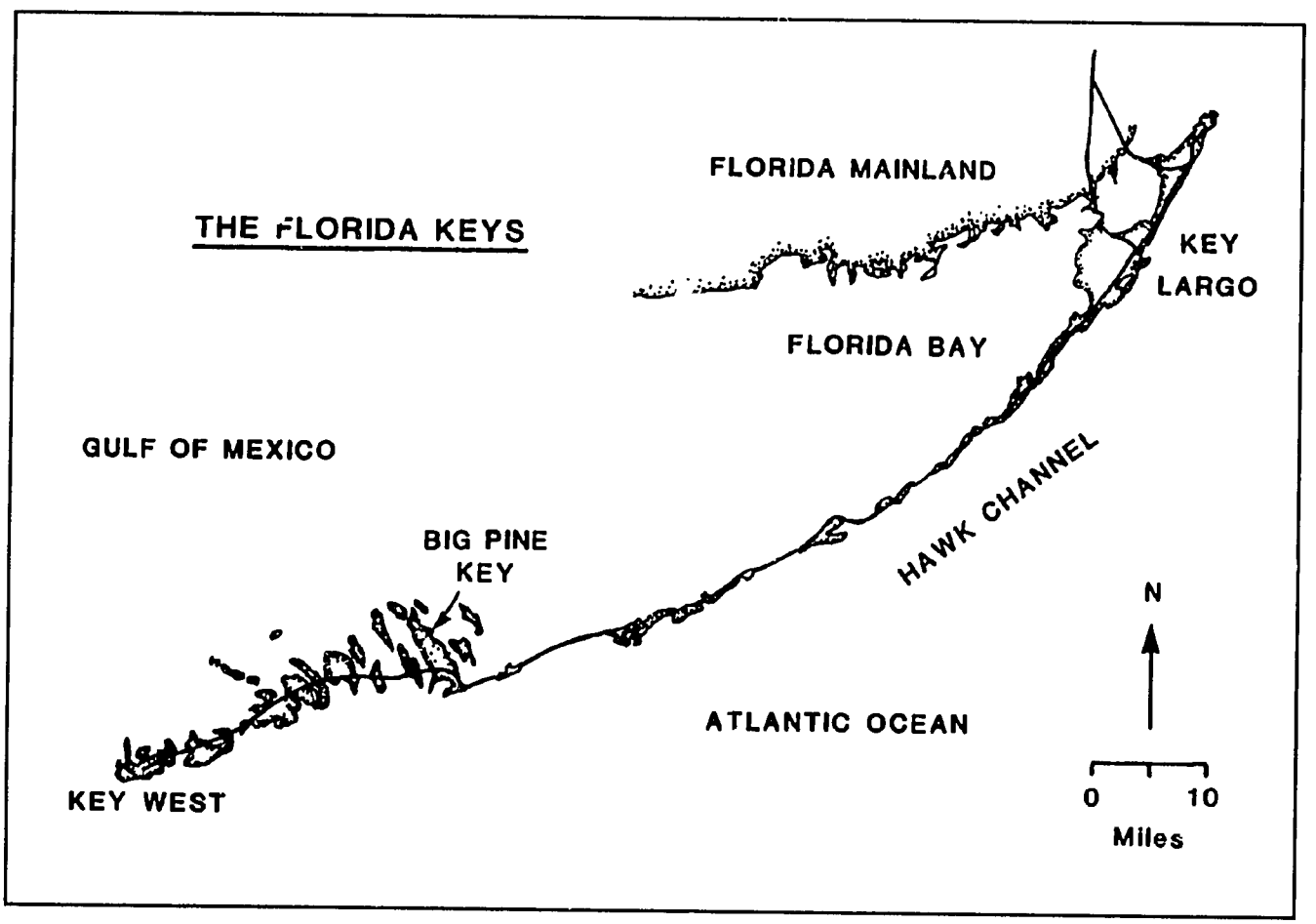

Figure 1. The Florida Keys

by single family homes, while wetland areas have succumbed to the bulldozer and dredge for the creation of filled lots and canals. Since no location on any developed island is greater than a mile from the shoreline water quality degradation is inevitable on an island chain composed of extremely porous carbonate geology, and where on-site septic systems are the principal method of sewage treatment.

Rapid growth rate in the Keys became an issue in 1975 with the Keys' designation as an "Area of Critical State Concern." This was not an honor bestowed on the local government, Monroe County, but the serious criticism by the State Legislation of the County's failure to properly implement its land use and environmental regulations.

The purpose of the designation is as follows:

> "to provide a framework for comprehensive plans and development regulations that will preserve water quality, provide for the optimum utilization of the limited water resources of the area, facilitate orderly and well-planned development, protect the offshore resources

PROFILE

Mandate for Program

Monroe County was designated as an "Area of Critical State Concern" in 1975 under Florida Statute 380. This designation was based upon a decision by the State of Florida that Monroe County was not managing its resources through appropriate implementation of the development guidelines in place at the time. It required that the County adopt new and more stringent development standards. An outcome of the designation was a requirement to control development by means of a comprehensive plan, which was adopted by the county in 1986.

The Florida Coastal Management Program was established in 1981 and is based upon a networking of existing state authorities. The Florida Program addresses regional planning, coastal hazards and disaster preparedness, submerged lands, areas of special concern, beach and shore preservation, and air and water pollution control. Currently Monroe County is updating its comprehensive plan. The required coastal management and conservation elements of the plan are intended to meet the mandates of the state and federal coastal zone management programs.

Geographic Scope

The entire State of Florida has been designated as the Coastal Zone. Monroe County encompasses the entire length of the Florida Keys from Soldier Key in Biscayne Bay near Miami, to Key West and the Dry Tortugas. The entire area is included in the coastal zone. The County also has authority to designate Areas of Critical County Concern, which was done for the two planning examples presented from North Key Largo and Big Pine Key.

Management Procedures

Under the Florida CZM Program resource management and planning issues are resolved through local government comprehensive plans and implemented through land development regulations. Monroe County is unique in its development of a plan predicated upon and driven by criteria which protect the functional and ecological integrity of remaining habitat and which promotes the voluntary reduction of allocated zoning density in environmentally sensitive areas. The County also has a local program which has been established to acquire environmentally sensitive land through purchase. The Monroe County Land Authority was established to achieve this.

of the Florida Keys from the adverse impacts of onshore development, and protect the health, welfare, safety, and quality of life of the residents of the State."

These goals were and are being achieved through the development of a comprehensive plan and land development regulations, which were adopted in 1986. The development and implementation of the 1986 comprehensive plan is a study in itself, but may best be analyzed through the on-going planning processes for two areas within the County. During the development of Monroe County's comprehensive plan, particular areas were defined as "Areas of Critical County Concern" because the environmental planning issues were too tenacious to be resolved within the scope and time frame for the completion of the comprehensive plan for the County as a whole.

Two of the critical areas in question are North Key Largo, located at the northeastern end of the island chain, and Big Pine Key which is located 30 miles east of Key West (Figure 1). The major issues in both areas is the adequate and legally required management of endangered species. While North Key Largo is characterized by large tract ownership and is relatively unpopulated, Big Pine Key is extensively subdivided and is receiving considerable development pressure.

BACKGROUND

The Florida Keys are a 225 mile long archuate archipelago which extends southwest from Soldier Key in Biscayne Bay near Miami, to the Dry Tortugas and Fort Jefferson National Monument (Figure 1). The Keys separate the marine environment of the Gulf of Mexico and Florida Bay from Hawks Channel, the Straits of Florida, and the Atlantic Ocean. There are numerous tidal passes between the islands, particularly in the lower Keys, which provide for water exchange between these waterbodies. Typically the net flow of water is from Bay to Ocean in a south westerly direction. Thus, water from the Bay moves through the tidal channels between islands to Hawks Channel and the bank reef formations which lie parallel to the Keys and adjacent to the Straits of Florida. These waters advect into the waters of the Florida Current; the Gulf Stream.

The low nutrient character of the nearshore waters of the Keys supports unique marine habitats and a diverse variety of flora and fauna, including coral-dominated patch and bank reefs, seagrass beds, hardbottom communities, and extensive fringing mangrove habitats.

The distinguishing feature of the marine environment of the Keys is the living coral reef tract and associated patch reef assemblages. The coral assemblages and the hundreds of other invertebrates and fish that comprise this community are found in no other part of the continental United States. As such, these areas are particularly important economic and environmental resources. These resources are currently under strong natural and anthropogenic (man-induced) stresses. Also associated with the reef areas and throughout Hawks Channel, the island passes, and Florida Bay, are expansive seagrass meadows, which are of potentially even greater ecological significance than the reef system.

The upland habitats of the Keys are equally unique in the continental United States. Tropical hardwood forests, or "hammocks," characterize the majority of the undisturbed upland resources. In addition, the lower Keys with its characteristic freshwater lens, also contain pineland plant communities. The Keys represent the edge of the northern limits of a tropical flora and the southern edge of the limits of a temperate fauna. This makes it an area unique in the world for this pattern of floral and faunal assemblage. No less than 75 endangered, threatened, or commercially exploited species of flora and fauna exist within Monroe County, as defined by the State and Federal government. In addition, experts in the field feel that many other plant species should be listed.

The tropical ecosystems of the Keys are naturally subject to the stresses of wind and water damage

from tropical storms and hurricanes. It is the additional man-made encroachments, however, that may contribute to future ecological imbalances in the form of water quality degradation, loss of native habitat, and extinction of endemic species.

CHRONOLOGY OF MAJOR EVENTS

1950-70	Extensive and excessive subdivision of land within Monroe County
1973	Development and implementation of a comprehensive Zoning Code
1975	Designation of the County as an "Area of Critical State Concern"
1981	Florida Coastal Management Program federally approved
1984	Initiation of the planning process to create and adopt the Florida Keys Comprehensive Plan as required under the County's status as an Area of Critical State Concern
1984	Initiation of the Governor's Study Committee for development of the North Key Largo Habitat Conservation Plan
1986	Adoption and implementation of the Florida Keys Comprehensive Plan, including the establishment of Big Pine Key and North Key Largo as "Areas of Critical County Concern"
1986	Presentation of the North Key Largo Habitat Conservation Plan Study Committee's report for later inclusion into the Florida Keys Comprehensive Plan
1986	Initiation of the Big Pine Key community planning process
1990	Initiation of the process for Florida Keys Comprehensive Plan update
1990	Designation of the waters surrounding the Florida Keys as the largest National Marine Sanctuary in the country
1991	Completion of the Big Pine Community Plan process for later inclusion into the comprehensive plan

Efforts to preserve the quality of this resource and heritage are evident in the existence of four Federal wildlife refuges, two national parks, one national monument, three national marine sanctuaries, three state aquatic preserves, one state geologic site, four state parks, and two state botanical sites. The seriousness of the perceived necessity for protecting the natural areas in Monroe County gained its ultimate strength in 1990, with the federal designation of all waters surrounding the Keys as the largest national marine sanctuary in the nation.

Without question, the reason for the many levels of protection afforded much of Monroe County, is the state and nationwide perception that government at a local level has failed to protect the resources.

Development Patterns

During the years of the 1950s through the early 1970s, Florida was experiencing a massive expansion in its subdivided lands. Large tracts were bought from the state or the federal government and divided for sale by real estate interests. Most of these areas were designed for residential use. The Florida Keys were not exempt from this activity nor from the problems often associated with it.

Platting of land was not well regulated or monitored during these periods and, as a result, the subdivisions that were created were not well planned. Local and state governments frequently did not require assurances that roads or utilities would be provided by subdivision developers, or that other needed infrastructure would be available to those interested in buying lots. Thus, the potential for growth in these subdivided lands was not balanced by local public expenditure to accommodate their development. On the other hand, some types of infrastructure improvements were made beyond the immediate need. In the late 1970s and early 1980s, a rather treacherous bridge system connecting the islands was replaced and improved. In the same time period the potable water supply was improved through a major expansion of the pipeline leading from the mainland. At that point, a changed perception of accessibility and convenience spurred development expectations in con-

cert with the ready availability of platted and semi-improved lands.

Within Monroe County, the early 1970s to the mid 1980s were the years of the "major development" project. Under the County's major development ordinance (now repealed), large parcels of land were rezoned for high intensity resort, condominium, residential, and commercial uses. As in other areas of Florida, such projects were required to assess their impacts on capital facilities and infrastructure (roads, solid waste capacity, and potable water), but were not required to pay the price for their improvement. The value of such projects to the immediate economy was seen as more important than the resource areas that were affected by their completion.

Though there were multiple steps leading to the approval of such major development projects, local planning review was limited by the competency and depth of available staff. More importantly, approvals were virtually assured in a system politically "greased" to issue permits. Monroe County, an area infamous for its history of pirating and shipwrecking, was following what appeared to be its destiny with little regard for the consequences.

Area of Critical State Concern

In 1975 the State of Florida recognized the conflicts between resource protection and an accelerating growth trend in the Florida Keys. In that year the Keys were designated as an Area of Critical State Concern. During the years of the mid-seventies, Monroe County government frequently yielded to local special and/or personal interests with a profit motivation. Commissioners and/or friends may have been the limited benefactors of County Commission actions in the approval of some subdivisions and other large development projects. The losers in this decision making process were; the environment, through permitted destruction of upland and wetland habitats, and the tax payers who are now beginning to feel the burden of the development expectations created through past unchecked subdivision and other development activity. Thus, the purpose of the Area of Critical State Concern designation was to place legislative pressure on Monroe County to take special planning measures to ensure protection of its resources and provide that approved new development proposals were and are compatible with regulatory protection efforts.

However, in the opinion of the author, the problem was not the lack of regulation, but the lack of political interest and desire to enforce the existing laws. The Governor of the State had the authority, if not the justification, to remove the County Commission from office and reappoint its members. This had been done once in Monroe County in actions involving the Florida Keys Aqueduct Authority Board. The political expedient, however, was to direct the enactment of more comprehensive regulations. Since the time of designation, the County Commission and state have been locked in a clash of wills, but after the 1990 election of a professed conservationist majority, the relationship may be improving.

It is important to understand the impact of the Area of Critical State Concern designation on Monroe County, both legislatively and politically. The state, through this legislative designation, maintains oversite responsibility for all development review in Monroe County. The state has the right to appeal any development order (building permit) issued by Monroe County which, in its legal opinion, does not comply with adopted local Land Development Regulations. The state also maintains authority to approve or deny, through the Governor and Cabinet, any amendments to the law, based on the State Statutes and the local comprehensive plan. Thus, in a County which is known for its fierce independence, and with a County Board which, over a state drug interdiction policy voted to secede from the union to become "The Conch Republic," this state oversite authority has not been well accepted.

CASE STUDY: Environmental Planning in the Florida Keys

Comprehensive Plan Implementation

Based on the Area of Critical State Concern man-

date and subsequent adoption of the Florida Coastal Management Program, the Florida Keys Comprehensive Plan was completed in 1986 and provided sweeping changes to development regulations in the County. It occurred through the continual threat of sanctions from the state and with the reluctance of the Monroe County Commissioners that approved it. Meanwhile, concern over the content of the Plan spurred a three fold development increase in the year prior to its adoption. Since the Plan's adoption additional development "panics" have occurred when it was publicly perceived that development in certain areas would cease until capital facility or infrastructure deficits were rectified. Rapid and uncontrolled development was something implementation of the Plan was intended to manage, but to date it has not succeeded. On the other hand, new and clearer environmental regulatory restrictions were adopted for proposed new development. These regulations, which control the degree of habitat destruction allowed, have been in place since the 1986 Plan was adopted. Though they are not perfect, they have provided a more definitive basis than previous regulations for what is allowed.

The 1986 comprehensive plan also provided a mechanism—the Monroe County Land Authority—for preserving environmentally sensitive lands, buying lands made unbuildable by the new regulations, and acquiring lands for needed public facility improvements or additions. Although the program seemed desirable and quite straight forward, initial implementation was not easy.

To date the Land Authority has bought property valued at over $2.4 million through this acquisition process, has loaned nearly $3 million to the Monroe County and a local land trust for public facilities and environmentally sensitive lands respectively, and has received hundreds of acres of land in donations. This has resulted in a direct benefit to the overall effort to preserve remaining forested lands in the Florida Keys.

Interestingly, the attention paid Monroe County through its long effort to plan for the County's future has sparked the interest of many public and private conservation initiatives. The same growth "panics" that have spurred individuals and developers to build, have prompted conservation entities to buy. In 1991, there are one federal, two state, and one local government agency actively acquiring land in the Florida Keys. In addition, three non profit conservation groups are a part of this process. One plays a major role in assisting each of these government agencies in their efforts.

Concern has been raised in the Keys over the effect of the many land acquisition programs on the county tax base. Generally, acquisition is seen as a positive step toward protecting the Keys. It is believed, as well, that reduction of potential buildout density may reduce the proportionate cost of future infrastructure needs. The concerns of many residents may be allayed through an analysis of the current and future cost of infrastructure and capital outlay when compared to the cost of acquisition. Acquisition may well prove to be less expensive.

Environmental Standards

As time passes, the components of the 1986 comprehensive plan and expected revisions that "drive" the planning process will not be environmentally based, but driven by capital facilities issues. This has resulted because reasonably sound environmental standards are in place today. These standards will be refined and better enforced, but are not likely to become much more restrictive. Development approval with attached environmental design standards and mitigation are and will continue to be the appropriate burden born by all developers. Land acquisition, through the Land Authority, the state or other non-profit conservation entities will be the only alternative.

Environmental standards for development were established with two assumptions:

- that development was going to occur
- that environmental protection had to be provided in such a manner as to protect the biological and functional integrity of the Keys' resources.

There are two essential components of the 1986 Comprehensive Plan that establish development criteria; the Land Use District (zoning), and the environmental character of the parcel proposed for development. Through the land use district category, allocated densities and uses are established on a per acre basis. Through the Monroe County Existing Conditions Maps and on site review, habitat character is established.

The comprehensive plan was written with environmental protection in mind. Thus, lower density land use districts typically reflect areas of native character. Based on habitat character, Environmental Design Criteria established in the Monroe County Land Development Regulations are applied to proposed development. Attached to these Environmental Design Criteria are "open space" requirements which define what percentage of each habitat type may be cleared for development. The open space and Environmental Design Criteria were developed through a process of scientific peer review established to determine the sensitivities and impact potential of each habitat. Additionally, open space standards were established, based on the best data available at the time, for the minimum habitat required to maintain the functional and biological integrity of each habitat type in the Keys. By definition, open space must be maintained in its natural state.

In addition to the development of open space standards, the County has established a habitat sensitivity matrix. The creation of this matrix was designed to provide a mechanism to allow county biologists to direct development away from habitats considered to be more sensitive to the perturbations of development. The process of determining habitat sensitivity and developing the matrix was also left to the expertise of the peer group of scientists noted above. In the development of this matrix as later formulated in the Land Development Regulations, habitats requiring greater open space are considered to be "more sensitive."

In order to fine tune the open space and density requirements of the Land Development Regulations, on site assessments are required of potential developers and are reviewed by Monroe County biologists and planners for accuracy. From an environmental perspective, the purpose of this requirement is to define the least sensitive portions of a parcel and to confine development to concise clustered locations within these areas. The benefit of this on site refinement is to avoid destruction of more sensitive or pristine areas on a parcel and to maintain a maximum contiguous habitat area.

One further component of the 1986 Comprehensive Plan provides a mechanism for transferring allocated density from one parcel to another. Allocated densities, termed "development rights," are provided to all Land Use Districts on a per acre basis. Since allocated density, as defined, is discrete and measurable based on the size of a parcel, it is possible to transfer the allocated units as "Transferable Development Rights." The rules for transfer are established based on environmental standards. Density may be transferred from native habitat areas to more suburban or urban areas and from areas of higher habitat quality and sensitivity to areas of lower habitat value. The intent of these regulations is to provide an owner with a reasonable use of his/her land, but to provide the incentive to transfer the development rights away from environmentally valuable areas. Transferable Development Rights are provided on the market for sale and are managed in a manner similar to real property sales.

Environmental Planning Examples

Two examples of environmental planning in the Keys are relevant: the Planning processes for the North Key Largo and Big Pine Key Areas of Critical County Concern. Understanding the planning experience for either area lends an additional perspective on the environmental issues in the Keys. Issues in both areas have provided contentious environmental planning problems. The planning process in combination with an active acquisition program for North Key Largo has been successful, while the planning process for Big Pine Key has largely been a failure. There are several reasons for these outcomes as will be discussed briefly below.

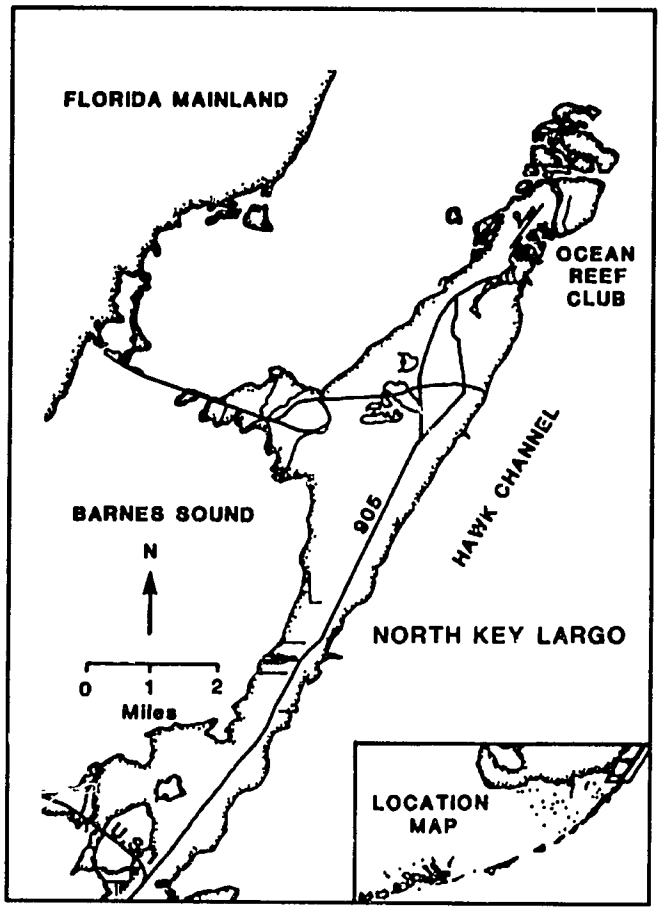

Figure 2. North Key Largo

North Key Largo

North Key Largo lies at the northeastern terminus of the connected islands of the Florida Keys (Figure 2). It is connected to the Florida mainland at either end by two roads, U.S. Highway 1 and the Card Sound Road. U.S. Highway 1 also connects North Key Largo to the rest of the Keys. The two roads are connected to one another by highway 905 which bisects the long axis of the island.

Historically, North Key Largo was settled by homesteaders who cleared areas within the native hardwood forests in order to raise tomato and pineapple crops. Although life was difficult, settlers were able to subsist and even to export their produce to areas as far away as the Carolinas. With the exception of the posh residential and resort community of Ocean Reef Club and several small subdivisions, the previously farmed lands have returned to native forested land. From one end to the other, approximately 12 miles, North Key Largo is the stellar example of remaining contiguous tropical hardwood forest in the Florida Keys.

North Key Largo has strategic environmental importance for two reasons. It is the remaining component in a plan sought by some to connect publicly owned preservation lands and waters from the Florida Everglades to the Key Largo National Marine Sanctuary (now encompassed by the larger Florida Keys National Marine Sanctuary). It is also the home of six endangered fauna species: the North American crocodile, the Key Largo woodrat and cotton mouse, Schaus' swallowtail butterfly, the Eastern Indigo snake, and the Miami Black-headed snake. It was for the endangered crocodile that the Crocodile Lake National Wildlife Refuge was created in 1982 on the northwest side of highway 905.

If the 3,000 people that currently live on North Key Largo create an appearance of quiet serenity, development activities of the mid 1970s and early 1980s show a marked contrast. In 1982, 23,485 units of residential and resort development had been approved or were in various stages of receiving final approval. However, the listing of the species noted above, particularly the crocodile, severely limited the ability of the development community to complete their projects. In the 1980s, the U.S. Fish and Wildlife Service wrote a "jeopardy opinion" stating that planned development in the refuge would "jeopardize" (a legal term of art for "threaten") the continued existence of the species. The legal impact of this assessment was the required cessation of Federal funding or backing for government or private activities which could limit the recovery of the species. Technically this includes funds for utility projects or federally insured loans for development projects, either of which would have been required in order to complete approved development at that time.

The incumbent Florida Governor appointed a North Key Largo Habitat Conservation Plan Study Committee to complete a planning effort for the area. Through a test of wills, and yet a great deal of cooperative effort, the conflicting issues of property rights and the continued survival of the six

listed species were resolved. As a planning process, the resolutions did not meet with the approval of all participants and could be classified as a failure in terms of implementation. In fact, all involved agreed that acquisition of all land in the area would satisfy the goal of protecting habitat and the endangered species, while justly compensating land owners. The planning process itself can best be characterized as a mechanism which provided a level of comfort to developers until a land acquisition program could be completed. The planning process established the importance and value of the development potential which guaranteed a reasonable, if not high return, in the acquisition process.

Today, nearly 100 percent of the land in the Crocodile Refuge has been acquired by the Federal Government. The state has similarly bought approximately 60 percent of the land on the opposite side of highway 905 as a botanical site and as buffer lands for the National Marine Sanctuary. The state is continuing to buy.

Big Pine Key

Big Pine Key lies in the lower Florida Keys, approximately 30 mile east of Key West. U.S. Highway 1 connects the Key to the islands lying to the east and west of it. Big Pine Key is approximately seven miles long with its length axis oriented in a north-south direction (Figure 3). U.S. Highway 1 bisects the island in a roughly east-west direction.

The early history of Big Pine Key is similar to that of North Key Largo. It was settled by homesteaders who were generally farmers and lived a reasonable, if modest life style. They traveled by sail to the City of Key West to obtain provisions, a days journey at that time. Otherwise, these islanders were quite isolated. During the years of the 1950s and 1960s, Big Pine Key was witness to an era of considerable land subdivision. Over 40 separate subdivisions were ultimately created, establishing more than 9,000 new lots which ranged in size from 5,000 square feet to one acre.

During the same era and extending into the 1970s, considerable attention was being paid to the Key Deer, a diminutive subspecies of the Virginia White-tailed Deer. It exists in the lower Florida Keys and the core of its range is Big Pine Key. It has never been particularly numerous, but hunting activities of the 1950s led to its near extinction. Through the 1960s and 1970s the deer herd returned to a semblance of its historic stature, but in the 1980s and early 1990s, the deer has been in a state of decline. The principal issues surrounding the deer's continued viability are mortality on the island's roads, continuing habitat loss, and resulting habitat fragmentation.

The planning effort for Big Pine Key has been less than successful. Environmental groups, both local and national, have become pitted against property owners who have both a financial and personal investment in their land. Land is being acquired by the Federal and State governments and by one non-profit conservation group. However, the salient

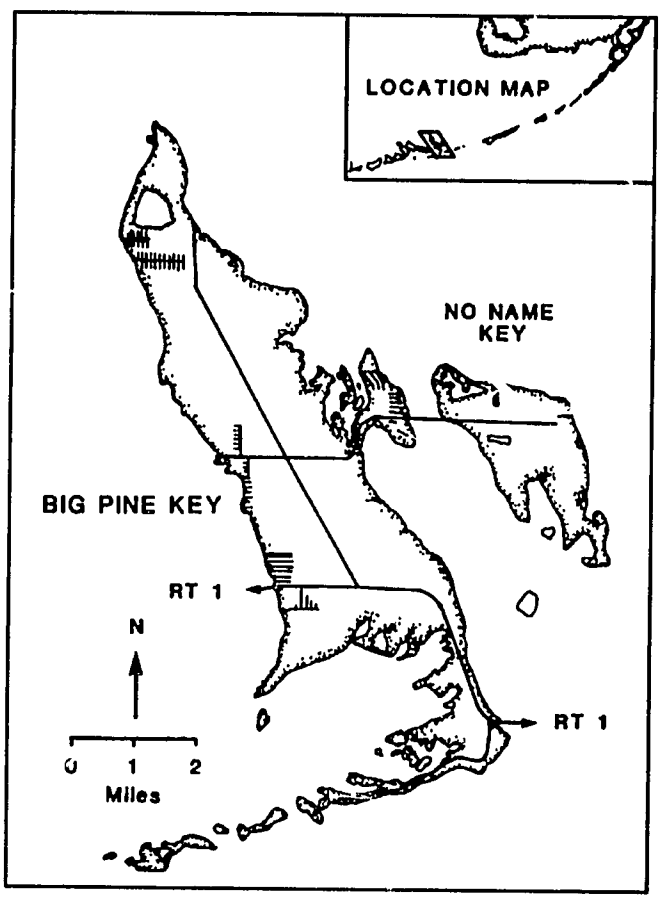

Figure 3. Big Pine Key

question that remains is; "Will acquisition of 'green space' be enough?" On an island with a population of 5,000 which is projected to double within the next 20 years; an island which will see increased traffic generation, and which still contains 3,800 developable lots, the question is a difficult one to answer.

The principal differences between the two planning processes involve the "nature of the beasts" requiring protection, the ownership pattern of the land, and the character of that ownership. First, the Key Deer is a much more mobile animal and requires a much greater range to subsist. It frequently comes into contact with people. Second, the ownership pattern in Big Pine Key is one of single family residential and commercial subdivisions in single lot ownership. In North Key Largo land is largely undivided, remaining in acreage tracts. Third, the character of the ownership on Big Pine Key is one of personal interest, while, in North Key Largo the interests are investment based. These three points have served to make planning efforts for Big Pine Key substantially more contentious and intractable. The immediate and daily impact of development and human habitation on the deer creates an immediate need for acquisition of necessary lands. The large number of small lots on the island makes land assembly through acquisition a literal nightmare. Finally, it is frequently much easier to negotiate land acquisition with a developer whose motives are profit oriented. Single lot owners, whose lives and livelihoods may be tied to a single residential lot, tend to have a far more proprietary interest and are, therefore, much more difficult to negotiate with.

Florida Comprehensive Planning Act and the Florida Keys National Marine Sanctuary

The future stands before Monroe County and the Florida Keys. The County will complete an updated Comprehensive Plan encompassing a broader range of issues, early in 1992. The guidelines governing the adoption of this revised Plan are more definitively stated than for any previous Plan. For each element, adopted goals, objectives, and policies will outline measurable outcomes and establish specified dates for implementation and compliance. Topics which received little serious attention in the past must now be addressed. Examples include the establishment of a sewage treatment master plan, development and implementation of a hurricane evacuation plan, a stormwater management plan, and a potable water management plan. As a coastal county, in a state that receives funding under the Federal Coastal Zone Management Act (CZMA), the updated Comprehensive Plan will also have to meet CZMA criteria. Issues relating to wetlands protection, stormwater management, sewage treatment, marina siting criteria, and water dependant recreation will be paramount issues. And finally, under the tenets of "concurrence management," defined in the Florida Comprehensive Planning Act, development will only be allowed if necessary capital facilities and infrastructure are available.

Concurrent with this process, although not in legal terms, will be the development of a management plan which includes a water quality protection plan for the Florida Keys National Marine Sanctuary. This planning process will focus attention on the protection of the marine resources surrounding the Florida Keys. It will also assess the impacts of Monroe County's existing development and future growth on the marine environment. Maintenance of water quality, boater impacts on the resource, commercial fishing, sport diving, tropical fish collecting, and marine salvage, will be important issues.

Monroe County in 1991, appears to want to effectively and appropriately manage these issues. The federal government certainly will expect results and is looking to Monroe County as a cooperative and enthusiastic local partner.

CONCLUSIONS

The Planning process in Monroe County has been long, arduous, and is beginning to meet with some success. Evidence of success includes the following:

• Increasingly the issue of planning for the future, for coordinated, rational, and responsible growth, has become an acceptable practice and less a point of contention between the county and the state.

• Through the Florida Comprehensive Planning Act, administered at the state level, all counties and municipalities in the State of Florida must produce a comprehensive plan in accordance with certain standards. This has made the planning process in Monroe County more acceptable.

• Environmental protection in the Florida Keys is being achieved in a much more thorough and consistent fashion through the 1986 Comprehensive Plan than previously. Additional improvements will be made through the 1992 update.

• Environmental planning in the the Keys is more firmly based on the best available resource data than it has been in the past. The development review process is more objective and less subject to political pressures.

• Throughout the 1980s and early 1990s, the County has committed resources to increase staffing levels and provide the salaries required to hire competent professionals. The County has at times been reluctant to do this and it is to the state's credit that they have been willing to financially assist the County in its planning efforts. To complete such a planning process requires financial commitment and adequate staff.

The negative side of the Monroe County experience can be related to a comparison of the North Key Largo and Big Pine Key efforts. In North Key Largo, the irreversible commitment of subdivision approval had not been made prior to the planning effort, whereas it had been in Big Pine Key. Land holdings in North Key Largo were held by corporations whose interests were investment based. Further, and very importantly, most of the partners in these corporations lived outside of Monroe County and thus had no local vote. In contrast, ownership of land in Big Pine was principally in single lots and the owners were residents and voters. These facts have a profound impact on the types of planning decisions made by the County Commission, who's members are elected officials.

The effort to protect North Key Largo, its habitat, and endangered species has been successful. Efforts to acquire land in Big Pine have also met with success, but the effort to plan for the inevitable interaction of an increased human population with the Key Deer, and to appropriately plan for and direct growth, has failed to date. The Commissioners have not been willing to act against a growth oriented local constituency. The issue, again comes down to the fact that substantially too many lots were allowed to be platted during the 1950s through the 1970s. The cost to our unique natural resources of allowing continued growth may be too high. Paralleling this concern is a suggestion that the cost of growth in needed infrastructure and capital facilities may be too high as well. In view of these concerns, the county will need to assess the impacts of future growth against its natural resources and its ability to pay for needed capital facilities and infrastructure.

So that the County does not fail in its continuing planning efforts, the following must be assessed:

• the costs of additional development in relation to the cost of paying for required capital improvements
• the costs of new commitments, such as a sewage treatment master plan or a stormwater master plan, for existing development and future growth
• the cumulative impacts of future growth and existing development on the natural resource base
• the impact of additional development on quality of life issues (community character and the reasons that people have come to reside in the Keys)
• the cost of acquiring vacant residential and commercial property against the cost of permitting its development.

LESSONS LEARNED

With hindsight, the planning process in Monroe County has been carried out in less than ideal

circumstances. Since designation as an Area of Critical State Concern, Monroe County has been looking over its shoulder, concerned about the state's scrutiny, rather than making rational decisions based on the issues that are attendant to an area like the Florida Keys. Lessons to be taken from the Monroe County experience are:

- Planning is affected by the structure of the political system and the decision making process.
- As stated in a recent article (Pattison, Carolina Planning, Vol. 16, No.1), "Do not take credit for developing a land use plan. Until it has been adopted and implemented in a political arena, you have not done very much." The political arena that the author referred to was Monroe County. The object lesson is that commitment to comprehensive plan implementation is essential.
- In an inherently democratic system, successful implementation of a comprehensive plan can only be accomplished with the support of a public constituency. Seek it at all costs.
- The "political factor" is not one of the elements of traditional or theoretical planning training. In reality it is the principal element. Embrace it, make it a friend, it is a part of life as an environmental planner.
- From the perspective of environmental protection, outside political influences can help establish a more balanced arena for local decision making. The influences of the many national non-profit conservation entities have helped immeasurably, particularly in the areas of land acquisition and endangered species protection.
- Concurrent management of growth and necessary infrastructure and capital facility improvements is essential to the rational functioning of increasingly densely populated societies.
- Protection of natural resources is vital to quality of life, to the protection of resource based industries and, particularly, tourism economies.
- The economics of growth related to needed capital improvements may work to the benefit of environmental resource protection if economic costs are too high. As planners and biologists dealing with resources issues, learn to lead with economic arguments. Enviromentalism is not always popular. Concern over one's pocketbook gets attention readily.

In conclusion, six years ago the author would have felt a kindred spirit with a favorite childhood character, Don Quixote. Tilting at windmills was something well practiced by the seven Planning Directors holding that position in Monroe County over the last 10 years. The situation is improving and the author is optimistic.

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Technical Document
Policy Document
Map Document

Monroe County Code
Chapter 9.5: Land Development Regulations

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Development in Hawaii:

Management of a Major Resort Development (Kaanapali)

Philip Ohta

The island of Maui, like the remainder of the Hawaiian chain, has witnessed an extraordinary increase in tourism-related development over the past thirty years. Although some early projects were thought to be environmentally progressive, during the 1970s reduced beach access and parking, increased shoreline use, decreasing visual quality and degrading coastal resources, slowly emerged as problems that required resolution. Hawaii's Coastal Zone Management Program (HCZMP) was approved in 1978 and provided an extra level of protection that had not been available earlier. The establishment of Special Management Areas and associated Use-Permits enabled local authorities to resolve many of these emerging societal concerns for sensitive development.

This case study describes a major resort development, the Royal Kaanapali Beach Resort on Maui. It compares how development proceeded before and after establishment of the HCZMP and describes the Special Management Area regulatory procedures that provided the means to control aspects of resort development.

INTRODUCTION

This case study addresses management of a major resort development, the Royal Kaanapali Beach Resort, in Lahaina on the island of Maui.

This study describes the development of the resort before and after the establishment of the Coastal Zone Management (CZM) Program in the State of Hawaii and developments after Hawaii's adoption of the CZM Program in 1978. A comparison is made of the differences and effects that the resort has incurred since the CZM Program, such as beach access, protection of coastal resources, and building design criteria.

Prior to the development of this resort, the Kaanapali area provided open and unobscured access to the beach. Although the land was privately owned, the public was allowed access to the beach. As development progressed, it became evident to the public that clear access and parking areas adjacent to the beach were diminishing, shorelines were being encroached by buildings, views to the ocean were becoming obscured, and coastal resources began to lose their attractiveness. The Coastal Zone Management Program provided a tool to address these unforeseen problems.

BACKGROUND

The Royal Kaanapali Beach Resort is in Lahaina on the western side of the island of Maui (Figure 1) which is the second largest in the Hawaiian chain. In Hawaiian, the words "Ka' Ana Pali" mean "the rolling cliffs" a reference to the wide, open ridges behind the Royal Kaanapali Beach Resort that sweep upward to Pu' u Kukui, the highest mountain peak on West Maui.

Philip Ohta is the Planner and Coastal Zone Management Administrator in the Planning Department in the County of Maui, Hawaii.

PROFILE

Mandate for Program

The objectives of the Hawaii CZMA are:

- provide for and protect recreational resources
- protect and restore historic and cultural resources
- improve scenic and open space areas
- protect coastal ecosystems
- provide for coastal-dependent economic uses
- reduce coastal hazards
- improve the process for managing development
- provide for public participation

Geographic Scope

The Hawaii coastal zone includes the state's waters and all land areas except the state forest reserves. In addition Special Management Areas (SMAs) are designated around the shoreline of each island. In the county of Maui the SMA surrounds the entire island but is predominantly located on the ocean side of the major coastal highway. It includes most of the Kaanapali Resort area.

Management Procedures/Techniques

The lead state agency for the Hawaii coastal management program is the Department of Planning and Economic Development. Policies are implemented through a network of existing legal authorities, a number of state agencies and the four county governments, one of which is Maui. The coastal management program has a statewide Advisory Committee, which includes representatives from state and local government agencies, and interest groups.

The HCZMP gives authority to county governments in designated Special Management Areas. Within SMAs, local governments administer SMA Use Permit programs to control a number of aspects of development, including public access, parking and visual design qualities. In Maui County an Urban Design Review Board advises the local Planning Commission, which reviews SMA Use Permit applications.

In ancient times, Hawaiian fishing villages were built in the Kaanapali area. In the early eighteenth century, a major battle was fought at Kaanapali between two half-brothers and their warriors for control of Maui. The battle lasted for four days and because the slaughter was great on both sides, the battle was given a fitting name, Koko-o-na-moku, which means "Blood-of-the-Islands".

From the mid-nineteenth century to mid-twentieth century, the land at Kaanapali was put to various uses related to sugar production. During this time, the sugar plantation became the property of American Factors, Ltd., which was shortened to Amfac, Inc. in 1966.

In 1956, American Factors decided to develop a planned resort on a substantial section of unprofitable plantation scrubland along two sandy beaches, stretching approximately 3 miles, at Kaanapali. A Master Plan was drawn up for the development of the Royal Kaanapali Beach Resort. The first increment included a 500-acre section of land. Ownership of the land remained with Amfac, Inc. which gave stockholders additional return on their investment from appreciating property values. It was also

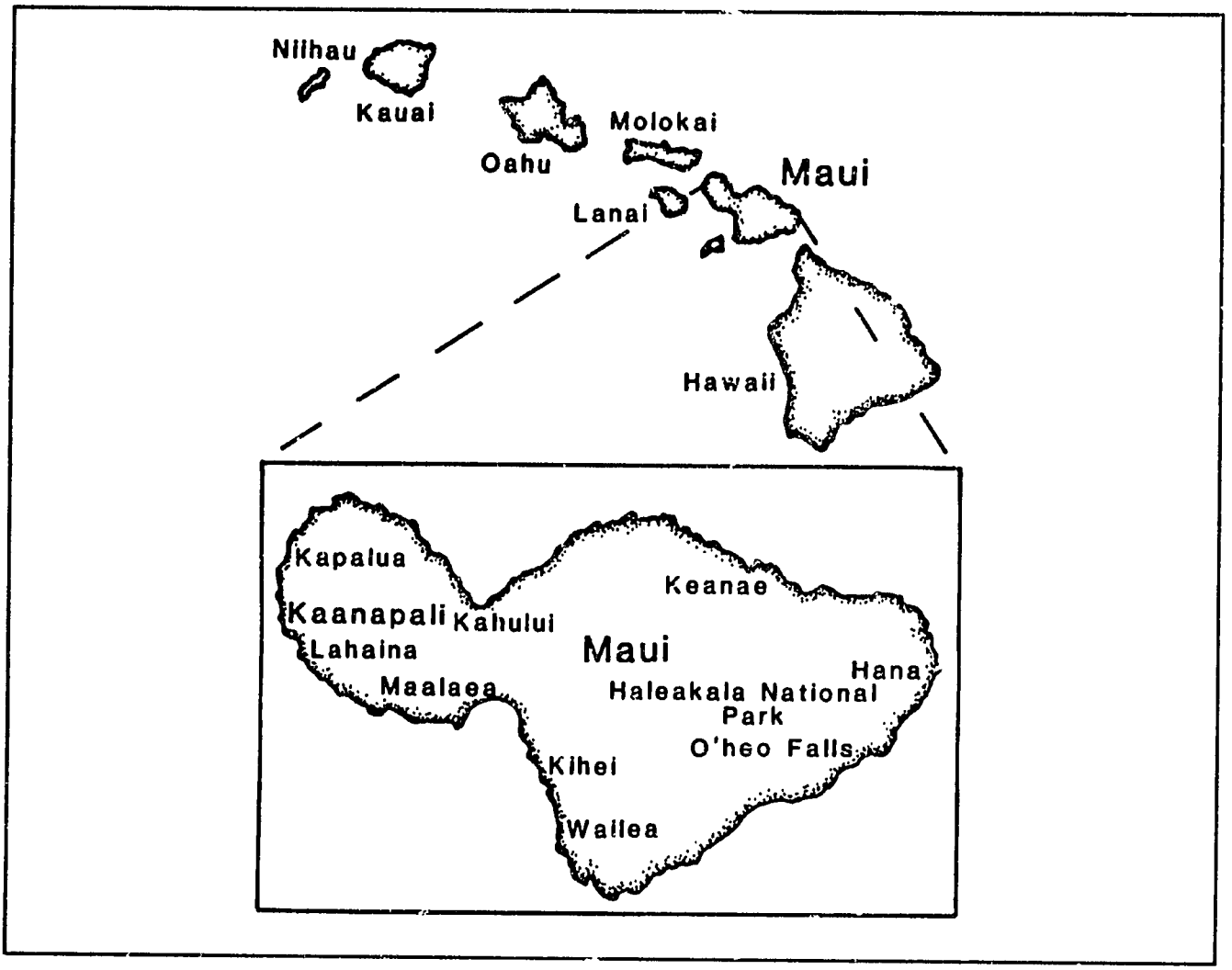

Figure 1. The Hawaiian Islands with Maui inset.

believed that a single owner could best control the density and type of structure built, balancing profitability against an open-spaced design to please residents and draw vacationers back year after year.

One problem that the proposed resort development faced was that the highway along Kaanapali was located along the coastline. Together with the County, Amfac obtained federal funds to move the old highway inland to its present location. This project was completed by 1957, which freed beachfront land for hotel, condominium and golf course sites.

CHRONOLOGY OF MAJOR EVENTS

1957-61	Preparation of Master Plan and building of preliminary infrastructure
1962	Royal Lahaina Beach Club and golf course completed
	Royal Kaanapali Beach Resort officially opened
1963-75	Nine individual development projects completed (Table 1)
1978	Hawaii's Coastal Zone Program approved
1980-82	Four additional development projects completed (Table 2)
1984-88	Additional beach parking and access required for renovation of existing structures
1990	Kaanapali Beach Hotel Special Management Area Use Permit approved for renovation and additions, including beach access and parking

CASE STUDY: Development of the Kaanapali Resort

Between 1957 and 1961 progress on the new resort consisted of building a water supply system, grading hotel sites, constructing a golf course, constructing underground electrical systems, utilities-access roads, a sewage treatment plant and a lagoon.

The official opening date of the Royal Kaanapali Beach Resort was December, 1962. At that time the infrastructure, golf course and the private Royal Lahaina Beach Club were completed. The Royal Lahaina Beach Club comprised 31 two-story individually owned cottages each containing 6 holiday units, all situated along Kaanapali's upper beach and golf course.

After the opening of the Royal Kaanapali Beach Resort, other development followed. Table 1 lists the developments which were constructed in the resort before the Hawaii Coastal Zone Management Program

Table 1. Pre-CZM Program Development

Project	Size (acres)	Date	Beds/Units
Sheraton-Maui	23	January 1963	503
Kaanapali Beach Hotel	10.5	February 1964	430
International Colony Club	11.0	1964	44 cottages
Royal Lahaina Hotel	38	September 1966	724
Maui Eldorado	10	1970	204 units
Kaanapali Plantation and South Golf Course	10	1970	62 units
Maui Surf	12	December 1971	556
Whalers Village Complex	8.5	May 1971	
The Whaler on Kaanapali Beach	7	1975	36 units

The majority of these developments were constructed along the shoreline and were all part of the Master Plan's first increment, which located development on the southern portion of Kaanapali.

This first phase of the Royal Kaanapali Beach Resort Plan was thought to be very progressive at the time. Problems relating to decreasing public access and parking, increasing shoreline use and reduced visual quality were gradually perceived as development progressed. The need to address these issues slowly became apparent. Hawaii's CZM Program became the tool that was needed to address these issues.

Table 2 lists the developments which were constructed after Hawaii's establishment of the Coastal Zone Management Program.

Table 2. Post CZM Program Development

Project	Size (acres)	Date	Beds/Units
Hyatt Regency Maui	18.5*	1980	815
Kaanapali Royal	7	1980	107 units
Maui Marriott	15*	1981	757
Kaanapali Alii	8*	1982	264 units
Westin Maui (formerly Maui Surf)	12*	1987	762

*Note: public beach access and parking provided.

The Coastal Zone Management Program

In 1978 the State of Hawaii's Coastal Zone Management Program was approved by the U.S. Secretary of Commerce. This made the state eligible for federal funding support under the Federal Coastal Zone Management Act. Chapter 205A of the Revised Hawaii Statutes legislation sets forth the procedures governing the implementation of the Hawaii Coastal Zone Management Program. This legislation contains special controls on developments within an area along the shoreline where deemed necessary to avoid permanent loss of valuable resources and the foreclosure of management options. The legislation requires adequate access by dedication or other means to publicly owned or used beaches, recreation areas, and natural area reserves. The legislature declares that it is the state policy to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawaii. To ensure that this policy was implemented, Special Management Areas were established within the shorelines of the state.

Special Management Area

Special Management Area authority was given to the four counties (Maui, Kauai, Oahu and Hawaii)

of the State. Each county established their Special Management Area Rules and Regulations and identified their Special Management Area boundaries on maps. In the case of this study, the Special Management Area for the County of Maui is a continuous strip of coastline surrounding the entire island, mainly located on the ocean side of the major highway. Most of the Kaanapali Resort area is located within the SMA.

The legislation requires that no development be allowed in any county within the Special Management Area without a Special Management Area Use Permit. The Maui and Molokai Planning Commissions have the authority to grant these permits within the County of Maui.

Urban Design Review Board

To gain professional views of the design and quality of proposed developments, the Special Management Area Rules and Regulations of the County of Maui established an Urban Design Review Board. The Board consists of seven regular members and four alternates, all of whom are registered architects, landscape architects, engineers or persons with interest or experience in urban planning, fine arts, conservation or historic preservation. The Board is advisory to the Planning Commission and reviews, recommends and comments on all applications within the SMA which could potentially affect the overall quality of the coastal zone environment. Their recommendations and comments consider the maintenance, restoration, and enhancement of the Special Management Area consistent with the objectives, policies, and guidelines of the Special Management Area Rules and Regulations.

Before a Special Management Area Use Permit application is scheduled for public hearing with the Planning Commission, the proposed development is reviewed by the Urban Design Review Board. Schematic drawings, plans (site plan, floor plan, elevations, landscape planting and irrigation plans, lighting plans, etc.) and the project's description are presented by the applicant. The Board basically examines the size, design, and conformity of the proposal with the County's building codes. The Board submits a recommendation to the Commission, but may on occasion also defer its report to allow the applicant to correct concerns raised by the Board.

Special Management Area Use Permit

The Special Management Area Use Permit is the essential tool used by the counties to assure conformity with the policies, objectives and guidelines of the Hawaii Coastal Zone Management Program. An environmental assessment is required by Maui County as part of all applications.

The environmental assessment provides general information on the property to be developed (location, ownership, description, surrounding uses, infrastructural services, access, etc.) and includes:

- a biological survey to ensure that no rare, threatened or endangered species of flora or fauna exists on the project site or will be affected by the development
- an archaeological survey to ensure that no significant archaeological features are present
- a project description of the proposed project, including the schematic drawings presented to the Urban Design Review Board
- an assessment addressing conformance with the objectives, policies and guidelines set forth in the Special Management Area Rules and Regulations of the County of Maui.

Depending on the type and size of the development, the permit application may also include a preliminary drainage plan, a certified shoreline survey, (if the proposed development is located along the shoreline) and a traffic study. Also required is a list of the tax map showing the names and addresses of all owners and lessees, and a map clearly defining the 500-foot boundary around the development; within which the owners of all parcels must be notified.

The application, environmental assessment and other submittals are transmitted to agencies that may be affected by the development. Their comments and/or recommendations are used as part of the findings for the permit report to the Commission. Such comments and/or recommendations may impose requirements on the applicant.

After the agencies have responded and the proposed development has been reviewed by the Urban Design Review Board, the Planning Department will determine from this input whether the development will incur any special problems. Where such problems are found to be present, the applicant will need to resolve them with the agency. Once such problems are resolved, a Planning Commission public hearing date is scheduled.

A public hearing notice is published in both a local county and a statewide newspaper. This notification, as well as notification to the surrounding owners and lessees of property within a 500-foot radius of the project site, are submitted no less than 25 days prior to the public hearing. This allows the public time to seek more information and offer written testimony on the proposed development.

At the public hearing the Planning Department presents a report on the proposed development. Their report includes: information obtained in the environmental assessment; the project's schematic drawings; agency inputs; written public inputs; and an analysis of the project's relationship to the objectives, policies and guidelines of the Special Management Area Rules and Regulations. Oral and written testimony are then presented to the Commission.

Conditions may be attached to a permit stipulating: a time period for initiation of construction of the project; conformance with agency recommendations; mitigating measures during construction; provision of beach right-of-ways and public beach parking; and if needed, a self-enforcing provision.

Although the Special Management Area Use Permit is the key tool for implementing the Coastal Zone Management Program, Maui County has developed Shoreline Setback Rules and Regulations and Special Accessory Use Permits to restrict certain types of development and uses along the shoreline.

Shoreline Setback Rules and Regulations of the County of Maui.

Increasing demands for utilization of the beach and ocean resources has made it imperative that:

- public use and enjoyment of the shoreline area be insured for the public to the fullest extent possible

- the natural shoreline environment be preserved

- man-made features in the shoreline area be limited to features compatible with the shoreline area

- the natural movement of the shoreline be protected from development.

Such policies are necessary because development and other man-made innovations have resulted in encroachment of structures near the shoreline, and in numerous instances, erosion and other disturbances affecting the natural movement of the shoreline. These rules are also necessary because the Hawaiian Islands are subject to tsunamis and high wave action that pose hazards to residences and other structures near the shoreline. Consequently, the purpose of these rules and regulations is to establish shoreline areas within which the use and activities are regulated in order to protect the health, safety, and welfare of the public.

The setback rules and regulations require that all lots which abut the shoreline shall have a shoreline setback line of 40 feet, with certain exceptions, depending on lot depth and buildable area. Structures are prohibited in the shoreline area without a Shoreline Setback Variance unless it is determined by the Director of Planning to be a minor structure which does not affect beach processes, does not

artificially fix the shoreline, and does not interfere with public access or public views to and along the shoreline. Some examples of minor structures are landscaping features or irrigation designed to stabilize and enhance the buildings, paved lanais, swimming pools, beach use facilities, and paved walkways for public access. A public hearing and Planning Commission approval are required for a Shoreline Setback Variance. The processing and review of the variance request is similar to the Special Management Area Use Permit. A variance may be granted for a structure or activity; if the Commission finds that the proposed development is necessary for or ancillary to cultivation of crops, aquaculture, landscaping, drainage, boating, maritime or water sports recreational facilities, public facilities or improvements, private facilities, or improvements that are clearly in the public interest. The rules and regulations further state that no variance will be granted unless appropriate conditions are imposed:

- to maintain safe lateral access to and along the shoreline or adequately compensate for its loss

- to minimize risk of adverse impacts on beach processes

- to minimize risk of structures falling and becoming loose rocks or rubble on public property

- to minimize adverse impacts on public views to, from, and along the shoreline.

Special Accessory Use Permit

All of the parcels located along the shoreline of the Kaanapali Beach Resort are hotel zoned with the exception of the Whalers Village Complex, which is zoned resort commercial. The County of Maui's hotel zoning ordinance provides a limited amount of permitted uses (related to services provided for the hotel guests) within this district. Other uses, not specifically listed as a permitted use, that are hotel guest oriented are considered to be accessory uses. In order to establish this accessory use, Planning Commission approval of a Special Accessory Use Permit is required. This process helps to control these uses within the shoreline area.

Impact of the Management Program

The Special Management Area Use Permit has been the major tool in the preservation of natural, cultural and coastal resources and environmentally sensitive areas within the Royal Kaanapali Beach Resort. Through the Special Management Area Use Permit, open space quality has been maintained at the Hyatt Regency, Maui Marriott and Kaanapali Alii. View corridors to the ocean have also been maintained. Kaanapali Alii is a prime example of maintaining view corridors. This development includes four towers which are spaced apart to allow views to the ocean.

Landscaping, including shade trees, are required for parking areas and additional landscaping has always been recommended for areas within the hotel grounds to soften impacts from the continuity of building structures. Natural vegetation along the shoreline has been preserved to distinguish the hotel boundaries with the beach.

Any changes or modifications to existing structures, landscaping, etc. are required to be reviewed and processed by the Planning Department by way of a Special Management Area Use or Minor Permit. Because of this, continuity of building design, color, etc. can be maintained. The Whalers Village Complex, through the years, has had its floor space expanded. The owners have not expanded outside of the original complex but have developed within. A continuity of design and color has always been required through the Special Management Area permits.

Conformance with these requirements has also been established through the Urban Design Review Board. In 1988, Whalers Village applied for a permit to provide a new structure for their whale skeleton display. The Board considered that the proposed structure was too large and not within the original framework of the complex. The Board

recommended that a slimmed down display be designed to coincide with the existing structures.

The Board has also recommended that landscaping be implemented in certain areas of a proposed project to soften the visual impacts of the project. Lighting features for parking areas and walkways are also reviewed by the Board to ensure height, safety, direction and brightness are within their guidelines.

Another of the major problems that the Royal Kaanapali Beach Resort Master Plan did not address is the provision of public beach access. At the time the Plan was adopted, access to beaches at Kaanapali and Maui in general was not a problem due to sparse development along the coastline. But as development progressed along the Kaanapali coastline, the public realized that it was becoming difficult to access the beach and also to find available areas to park their cars.

The Special Management Area Use Permit has been the key element in establishing public beach access and parking within the Kaanapali Resort. Developers were required to provide and construct improved public beach rights-of-way and parking along their projects by way of easements to the County as conditions of the permit. Presently, a total of 7 public beach rights-of-way and 150 public parking places have been created between the Hyatt Regency in the south and the Royal Lahaina Resort to the north (Figure 2). All beach right-of-ways and parking stalls are for public use only and provided 24-hours a day. Through conditions of the Special Management Area permits, the access and parking lot providers are required to monitor the use and prohibit all non-public beach users, such as commercial vehicles or hotel employees, from utilizing these facilities. This strategy has been very successful.

Through the Special Management Area permit and Shoreline Setback process, a concrete public walkway, starting from the southernmost boundary of Kaanapali (Hyatt Regency Maui) to its northernmost developed boundary (Royal Lahaina), has been developed. This walkway is available for hotel guest and public use. Conditions of these permits have prohibited any construction of improvements, except landscaping, on the ocean side of this walkway. The result of this provision is an unobstructed view to the ocean.

Uses that have required Special Accessory Use Permit approval and which may create potential impacts along the beach, are beach activity centers. Various services are offered within these centers, such as rental of beach equipment (snorkel equipment, air mattresses, boogie boards, etc.), kayaks, wind surfing equipment; and sales of ocean excursions, snorkeling expeditions, and other activities.

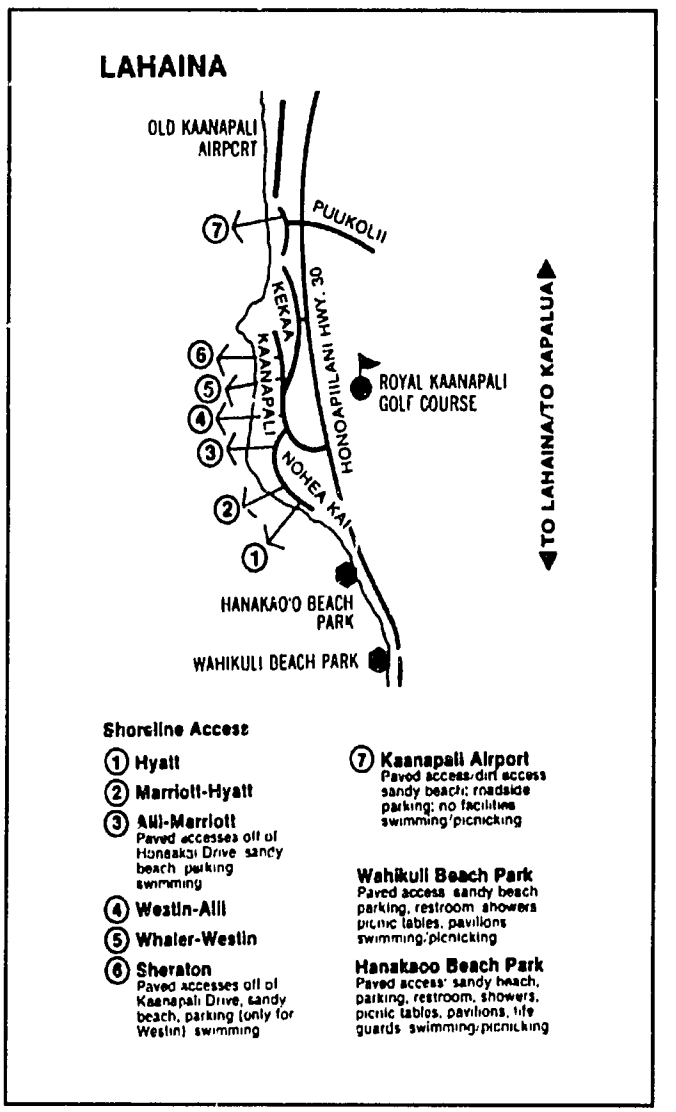

Figure 2. Shoreline Access

Conditions of this permit approval restricts the sale of these services within the activity center and prohibits solicitation on the beach. Beach equipment is also required to be stored on the hotel property. Public beach accesses and parking may not be used by those involved in this commercial activity.

Future Expansion

The Kaanapali North Beach Joint Venture (Amfac Property Investment Corporation and Tobishima Pacific, Inc.) is planning to develop 95 acres of ocean front property directly north of the existing Royal Kaanapali Beach Resort. The joint venture has received Special Management Area Use Permit approval for the subdivision of this property. A total of eleven lots, which may be consolidated into a maximum of six hotel sites and two park sites, had been created. There is also the possibility that fewer but larger hotel sites will be developed.

Conditions of this Special Management Area Use Permit approval include:

- height restrictions for the hotels, depending on their appropriate zoning
- a minimum shoreline setback of 80 feet, which may be increased by the Planning Commission
- the establishment of a transportation management plan dealing with employee and guest traffic
- a limitation on the total number of hotel and condominium rooms to not exceed 3200 for a period of ten years after the start of operation of the initial project
- a prohibition on construction of the initial project until the Lahaina Bypass Highway has been implemented
- provision of a 5.0 acre improved public beach park on the extreme north end and a 3.0 acre improved public beach park on the south end with restrooms, showers, picnic and paved parking facilities and landscape planting
- provision of a shoreline open space area for public use with a paved shoreline walkway setback approximately 30 feet from the ocean side property boundary.

This open space area would be established for public use with emphasis on maintaining the existing natural shoreline character and topography, including abundant tree cover, and providing a defined and usable public space separate from the hotel grounds. This walkway would connect the north and south public beach parks and span the entire length of the 3,200 foot long beach. Shower poles would be provided at appropriate intervals along this walkway, and a public restroom facility is planned for a central location.

In addition, each hotel developer is required to provide employee housing units for their staff to meet the affordable housing shortages on the island. This policy requires that the developer provide one affordable housing unit to its hotel staff for every five hotel rooms constructed. These units are constructed on separate property within the hotel's region.

CONCLUSIONS

The first phase of the Royal Kaanapali Beach Resort was essentially completed before the establishment of the Hawaii Coastal Zone Management Program. Although the Kaanapali plan was a very progressive concept at that time, there were shortfalls that were not originally perceived; such as reduced public beach access and parking, increasing shoreline use and deterioration of visual quality. Through the adoption of the Hawaii Coastal Zone Management Area Program, Maui County was given the tools to redress these shortfalls through Special Management Area permits, Shoreline Setback Rules and Regulations, and Special Accessory Use Permit procedures.

With future proposed developments at the north end of Kaanapali, Maui County has taken steps to require the developer to address and resolve shoreline concerns before initial development. It is evident that this could not have been achieved without the Coastal Zone Management Program, upon which Maui County has relied heavily to provide for and protect shoreline uses from the impact of development.

LESSONS LEARNED

- The successful control of large scale development requires a constraining framework such as the Coastal Zone Management Program.

- The permit process can be used effectively to achieve preservation of desired values.

- The permit process can be an important tool to persuade existing development to come into line with new policies, when applying for a retrofit or expansion.

- Intelligent zoning is effective in limiting development.

- Development should be limited to the existing infrastructure capacity.

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For further information and provision of key references contact:

Plans and Coastal Zone Management Administration
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Coastal Resources Management in South Carolina

Private Development of Hilton Head and Daufuskie Islands

Melvin Goodwin, Margaret Davidson and Shirley Conner

This comparative study examines resource management issues related to the private development of two sea islands on the South Carolina coast. The primary issues involved are water quality, wetlands protection, protection of beaches and dunes, public access to common property resources, and protection of unique cultural resources.

Development on one of the islands studied occurred in the 1950s prior to the introduction of the State's Coastal Zone Management Plan (CZMP). Decisions about how development would occur were made by private developers. Initial Hilton Head developments were widely hailed as environmentally sound and were used as an example of a place where both profit and environmental objectives were met. Subsequently unregulated developments on Hilton Head were not so enlightened and led to significant adverse impacts on coastal resources. In the second example, Daufuskie Island was developed after the State CZMP and other regulatory programs were put in place. The environmental impact of development to date on Daufuskie Island appears less severe. The reason for the latter circumstance is due to a combination of the introduction of government regulation and an awareness among developers and resource managers of the negative aspects of previous development activities. Residents of both islands have experienced significant cultural impacts that have not been addressed either by existing coastal zone management processes or the private developer.

INTRODUCTION

The focus of this case study is the private development of two sea islands on the coast of South Carolina, and the successes and failures of two different approaches to coastal zone management. Resort development on Hilton Head Island in the 1950's was led by pioneers in the field of environmentally sensitive development. Unfortunately, these early developers were followed by others who were less conscientious. In the 1980's, development on Daufuskie Island began with great concern among residents over the probable impact of development on their island's environment. But while environmental concerns on Hilton Head Island were left largely to the conscience of developers, development on Daufuskie Island has been subject to a formal process of coastal zone management through the Federal Coastal Zone Management Act and the South Carolina Coastal Zone Management Act.

In 1949, the Hilton Head Company (HHC) was organized to purchase 19,000 acres on Hilton Head Island, which represented approximately 70% of the total land area. Six years later, the Sea Pines project began, a 4,500 acre planned community that set new standards for environmentally sensitive development. Serious commitment of Sea Pines developers to conservation of the natural beauty of Hilton Head Island resulted in coastal communities that were unique for the 1960's. However, the absence of environmental protection regulations or

The authors are associated with South Carolina Sea Grant and collectively have extensive experience of economic development and coastal resource issues, as well as ongoing involvement with coastal development impacts upon natural and cultural resources.

guidelines, coupled with the temptation to produce quick profits resulted in other projects that caused significant degradation of natural resources. In 1982, it was estimated that 33% of all freshwater wetlands on the island had been eliminated and another 20% had been seriously altered by development activities on their periphery, that affected the natural drainage patterns.

The predominantly black population that existed on Hilton Head Island in the mid 1950's had little impact on the decision making process. In the early 1970's they reorganized the local National Association for the Advancement of Colored People (NAACP) in an attempt to make their voices heard, but funding for the project failed to materialize. Later, many whites also became dissatisfied with development practices. The only agency with applicable regulatory authority (the Beaufort County Joint Planning Commission) appeared unable or uninterested in controlling the aesthetics of construction projects. In 1983, Hilton Head residents incorporated as a municipality to achieve some control over development in their community.

Development of planned communities on Daufuskie began in the mid 1980's amid concerns that it would repeat the experience of Hilton Head Island. Daufuskie residents were mainly low-income blacks whose families had owned property on the island since the end of the Civil War, and they did not want to be forced to move or see their island destroyed. Long-time residents wanted improved services and employment opportunities while still maintaining the unique charm and character of Daufuskie. The local planning commission finally decided to formulate a land use plan in 1983 after several developers requested approval for construction projects. Unlike the process on Hilton Head Island, Daufuskie landowners were involved in the initial planning and have even been consulted by at least one developer.

BACKGROUND

In 1977, the South Carolina Coastal Zone Management Act (SCCZMA) created the South Carolina Coastal Council (SCCC) as the official state agency

PROFILE

Mandate for Program
The South Carolina Coastal Zone Management Act was enacted in 1977 and created the South Carolina Coastal Council (SCCC), with responsibility for directing the state's coastal program. The primary goal of the program is to achieve a rational balance between economic development and conservation of the coastal zone's natural resources.

Geographic Scope
The coastal zone is comprised of eight coastal counties containing "critical areas;" which consist of tidelands, beaches, primary oceanfront dunes and coastal waters. Both Hilton Head and Daufuskie Islands are within the coastal zone.

Management Procedures/Techniques
Regulations allow SCCC to have direct permitting authority for activities which take place in critical areas, and indirect influence in non-designated areas. Decisions on permit applications are based upon evaluation of the economic importance of the proposed activity, the dependence of the activity upon a coastal/critical area location, and the probable impact of the proposed activity upon coastal waters. A Special Area Management Plan has been prepared for Hilton Head.

to implement the CZMA. The SCCC has two potentially conflicting mandates:

- To protect the quality of the coastal environment
- To promote the economic and social improvement of the coastal zone and of all the people of the state

The primary goal of the SCCC management program is to achieve a rational balance between economic development and conservation of the coastal zone's natural resources. Another goal is to promote intergovernmental coordination and public participation in the development and implementation of the coastal management program for the state. Activities in critical areas (beaches, primary sand dunes, tidelands and coastal waters) are controlled by a permit system. Though seemingly comprehensive, these mandates and goals do not give the SCCC total control over coastal development. A variety of other federal and state agencies are also involved. The Beaufort County Joint Planning Commission, the Hilton Head Planning Commission, and the Low Country Health District are three of the most important local agencies involved with coastal zone management in the area of this case study.

The coastal management program encourages public involvement in several ways:

- Complete files for each permit application are available for inspection by the general public
- The SCCC is required to hold a public hearing for any application if twenty or more citizens of the affected county request such a hearing
- Permit applications must be accompanied by a copy of a newspaper advertisement giving public notice of the application

If a developer believes that a project might generate a great deal of controversy, a special review can be requested from the SCCC. A less detailed application is submitted than is required for a regular review so that less money need be invested in a project that might not be approved. Final approval is granted after appropriate agencies review detailed site plans including:

- Delineation of wetlands and other critical areas
- Aerial and/or topographical surveys
- Soil analyses
- Archaeological surveys
- Stormwater runoff plans
- Diagrams and proposals for roads and utilities

Adequate review of proposed coastal development must address the problems of land-use and carrying capacity in a comprehensive manner. Ideally, the entire project is submitted and reviewed as a whole, because the opportunity for environmental degradation is increased when individual components of a project are considered separately.

CHRONOLOGY OF MAJOR EVENTS

1949	Hilton Head Company organized
1955	Sea Pines development begins on Hilton Head Island
1957	Bridge constructed to connect Hilton Head Island with mainland
1957-74	Hilton Head Company master plan prepared and revised
1959	Oyster industry on Daufuskie Island collapses due to pollution
1972	Federal Coastal Zone Management Act enacted
1977	South Carolina Coastal Zone Management Act enacted
1981	Preliminary approval granted for 2330 acre development on Daufuskie Island
1982	Special Area Management Plan prepared for Hilton Head Island
1983	Hilton Head Island incorporated as a municipality
1985	Daufuskie Land Use plan adopted by Beaufort County Joint Planning Commission
1988	Beach Management Act adopted for South Carolina
1990	Zoning and Development Standards Ordinance adopted in Beaufort County

THE CASE STUDY: Hilton Head and Daufuskie Islands

Hilton Head Island

Hilton Head Island is a sea island located between Port Royal Sound to the north and Daufuskie Island to the south (Figure 1). The two islands are separated by Calibogue Sound while a narrow band of marsh and creek separates Hilton Head Island from the mainland. The island is 11.5 miles in length and 6.8 miles wide, including both high ground and marsh. A sandy beachfront runs the length of the island, and elevations range from sea level to 21 feet. In 1971, the U.S. Army Corps of Engineers estimated the annual rate of erosion to be 6.2 feet. Construction of a bridge in 1957 connected Hilton Head Island to the mainland, permitting large scale development of the previously sparsely populated island.

The individuals who first envisioned and then developed a resort community on Hilton Head Island believed that this area had the potential to become an important resort location where people and nature could coexist. With no previous examples to follow, these early developers invested a great deal of effort and money into turning their original concepts into reality. Sea Pines Plantation was started in the late 1950's well before the existence of the CZMA or state and/or local management programs. The goal of the Hilton Head Company was 'protection of the Island's natural beauty and character.' As a first step, boundaries were delineated for conservation areas: salt marshes,

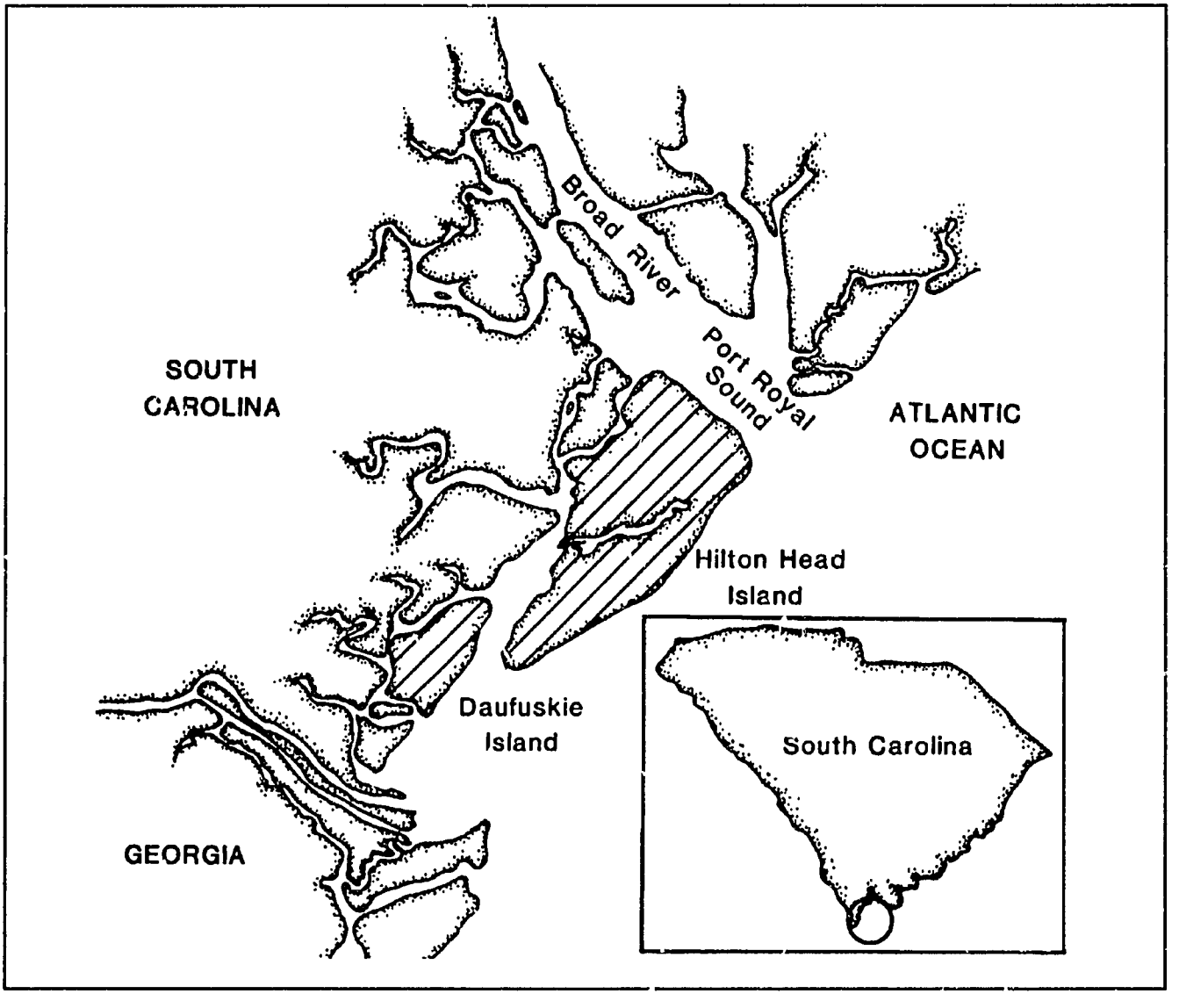

Figure 1. Hilton Head and Daufuskie Islands

bird rookeries and selected forest areas. Next, a preeminent environmental scientist was retained to determine which areas should remain undeveloped and protected, establish guidelines for ecological planning and protection of the conservation zones, and review the final detailed site plan for each development. These plans preserved individual stately trees and even left a particularly attractive pine tree in the center of a golf fairway. The plans also contained recommendations concerning waterfront setbacks, buffer zones, storm water runoff, discharge into marshes and the use of effluent for golf course irrigation. This commitment to the environment was based on the developer's desire to produce an environmentally sensitive development; there were no governmental mandates to control development.

The master plan prepared for the HHC yields an interesting look at a state-of-the-art development plan from the early 1970's. The plan examined the whole island and addressed among other things the topics of traffic congestion, low-income housing for support personnel, conservation of natural resources, saltwater intrusion and the need for a single Public Service District (PSD) to supply water, sewage and fire protection services. In 1972 there were three PSDs, and many homes still relied on wells and septic tanks. The Sea Pines Company reserved the right to continuously revise its master plan for unimproved land to incorporate experiences gained during the development process; nine district master plans were prepared between 1957 and 1974. Creation of pioneering land-use covenants and 1,280 acres of parks and forest preserves were two of the developer's most important contributions to the nature of coastal zone development. It is important to point out that, though the plan is impressive and innovative, today's standards would require a much more intensive soil survey, as well as attention to archaeological or cultural resources which were not considered at all.

Sea Pines gained considerable recognition as a pioneer in the field of environmentally sensitive development. Extensive covenants were created to preserve the dream of harmonious coexistence. Many property owners were forced to abandon plans to build traditional brick houses and seek architectural assistance to create a totally new type of dwelling. This blending with nature makes Sea Pines feel more sparsely populated than aerial photography would indicate. It is a concept that has endured the test of time.

It was not, unfortunately, a concept shared by all developers. As the potential for resort development on Hilton Head Island became increasingly clear, other projects were started whose overriding concern was rapid generation of maximum profit. This resulted in the creation of structures designed to accommodate large numbers of tourists, with little regard for the impact of the structures or their occupants on the surrounding natural environment. The absence of an enforceable policy to protect natural and cultural resources made it possible for these resources to be degraded by inappropriate development; the profits to be made from such development made degradation a virtual certainty.

In 1982, the resident population of 14,000 periodically swelled to more than 40,000 by visitor influx. The prevailing development trend at that time suggested that these numbers would eventually increase to 70,000 and 150,000 respectively. Discharge of treated sewage and storm water runoff had already resulted in significant trouble spots that were expected to expand and change from short-term occurrences to long-term or permanent problems. Pressure was steadily increasing for filling of wetlands to accommodate buildout or for dredging to allow marina construction. Later projects built ever closer to beaches and dunes, often removing secondary dunes and maritime forests that had provided some protection from erosion. Proliferation of private resorts steadily reduced public access to recreational areas. That year, 'concern over long-term implications for the natural environment, public resources and the stability of its economy' prompted the SCCC to develop a Special Area Management Plan (SAMP) for Hilton Head Island. In 1983, the island's residents incorporated as a municipality to better regulate continued construction of unsightly utility buildings that had been erected in large numbers.

The apparent disregard of many developers for the interests of the long-term black residents has caused a great deal of animosity. In 1950, most Hilton Head Island residents were black; but today, whites outnumber them by at least 8 to 1. Before Sea Pines was completed, blacks owned one-third of the Island. As land values and property taxes increased, the black population began to sell their land to the developers. An acre of land that used to sell for $100 now brings $100,000. High prices caused some to sell voluntarily, but many others were living on limited incomes and simply could not afford to pay increased property taxes.

Those blacks desiring to develop their own property have been stopped by the lack of public sewer and water services. The large planned communities like Sea Pines helped establish a Public Service District to provide water and/or sewage service for their residents. Small landowners are not allowed to tie into this system and cannot afford to install their own facilities. The only option is to sell their property to a developer who can obtain these necessary services.

Developments on Hilton Head Island that attempted to build in harmony with nature have been used as models by agencies with mandates to assist in environmentally sensitive development. People like the Sea Pines developers were invaluable in the creation of agency programs to protect the environment. Unfortunately, advice concerning island-wide planning for roads, utilities and low-income housing was not as readily accepted. Today, Hilton Head as a whole suffers from lack of initial comprehensive planning and either incomplete understanding or blatant disregard for the protection of the natural environment on the part of many developers.

Daufuskie Island

Daufuskie Island is separated from Hilton Head Island by Calibogue Sound and from the mainland by a broad expanse (14 miles) of saltmarsh. It is 2.7 miles wide, including both high ground and marsh, and 5.0 miles long with 3.0 miles of sandy beachfront. There are approximately 6,100 acres, 950 of which are saltmarsh. Elevations range from sea level to 30 feet. Compared to other shorelines in the area, the shoreline of Daufuskie Island is relatively stable (Figure 1).

Daufuskie Island is much more isolated than Hilton Head Island. The absence of a bridge to connect it to the mainland and its smaller size have prevented the large scale development that has occurred on Hilton Head Island. The population of Daufuskie reached a peak of approximately 1000 in the early 1900's before cotton crops were destroyed by the boll weevil and oyster beds were closed because of pollution from a neighboring state. With extremely limited employment opportunities, residents were forced to leave the island to support their families. By the time construction of exclusive developments began on the old plantations in the mid 1980's the population had dwindled to fewer than 200. Those that remained were generally the elderly with limited incomes.

Even before developers showed serious interest in Daufuskie, long-time residents were concerned that it might turn into another Hilton Head Island. Although they welcomed the prospect of increased employment opportunities, better health care services, and improved county services, they feared that development would destroy the special charm of Daufuskie. The prospect of large compounds surrounded by fences and guarded gates (common on Hilton Head Island) that would prevent them from visiting the cemeteries of their ancestors, was especially distasteful. Residents voiced their concerns through the Daufuskie Island Community Improvement Club (DICIC), an organization founded in 1966 to represent the islanders' interests to the county government.

In 1981, the Daufuskie Island Land Trust (International Paper) appeared before the Beaufort County Joint Planning Commission (JPC) seeking preliminary approval for a 2,330 acre development. Although the JPC expressed concerns about solid waste disposal, hurricane evacuation, domestic water, sewage disposal, public beach access and transportation, preliminary approval was granted

within one month. When final approval for a twenty six lot subdivision was requested in 1983, the JPC voted to "draft a plan which would recommend appropriate governmental actions for community services, transportation and land use."

The JPC met with the DICIC as part of the planning process to discuss the problems that might occur because of development. All property owners also received a questionnaire that contained three multiple choice questions and one which asked for any other actions the property owner would like government agencies to take to achieve orderly growth or a desirable development pattern on Daufuskie. In addition to the concerns voiced earlier by the JPC, respondents expressed the desire to protect low income property owners from tax increases and showed an overwhelming concern to prevent Daufuskie from becoming another Hilton Head Island. After reviewing the questionnaires, land surveys, recommendations of the Low Country Health District and the implications of the CZMA, the staff prepared the Daufuskie Island Plan which was adopted by the JPC in 1985. The result was a land-use plan that addressed all of the previously mentioned concerns except the property tax issue. But the plan is only a recommendation, and much of the island is now owned by different development companies.

At least one Daufuskie Island developer has been willing to negotiate with residents outside the planned communities. The developer of the Melrose Plantation has hosted cook-outs and public meetings to discuss his plans with residents before seeking agency approval. When residents expressed concern that another cemetery would be behind plantation fences, he agreed to change his plans and permit unrestricted access. This type of give-and-take did not occur on Hilton Head Island where the JPC and developers generally ignored the residents' desire to be involved in the planning process. This lack of concern may have caused residents to bring in national human rights organizations to champion their cause. One such organization involved with Daufuskie Island residents has generated considerable controversy, but has done little to help individual property owners retain title to their land.

To some extent, Daufuskie Island is benefitting from the thirty years of experience gained from development on Hilton Head. That experience provides a vivid demonstration of the adverse impacts of uncontrolled growth, not only upon local residents and natural resources, but also upon visitors and investors. The same experience illustrates the importance of public involvement in charting the course of development. Some lessons learned from Hilton Head Island are reflected in regulations that prohibit at least some of the detrimental activities that characterized that island's development. Examples are the need for adequate infrastructure and preservation of wetlands.

It is unlikely that development on Daufuskie Island will replicate the Hilton Head experience. Absence of a bridge to the mainland will not only prevent the traffic congestion seen on Hilton Head Island, but will also provide the impetus for adequate transportation for workers and residents after they arrive. Cars are prohibited within Haig Point and Melrose, two exclusive communities that operate their own ferries. International Paper Realty Corp. of SC, developer of Haig Point Plantation, and the Melrose Corp. currently control approximately 50% of the land on Daufuskie. Developers have indicated a strong desire to produce environmentally sound developments, but the need for effective regulatory control is demonstrated by the construction of a long sea wall to protect a golf course in one of the developments. At the time of construction, the SCCC was only able to regulate to seaward of the primary oceanfront sand dune and the wall was built three feet behind it. That wall could not be built today, because the Beachfront Management Act of 1988 requires implementation of a forty year retreat policy and long-range beach management plans, which would not permit such a structure. Conscientious development of remaining land can only be ensured if all of the agencies involved adopt binding land-use plans, zoning ordinances, and environmental protection policies for the entire island.

But while the impact of development on natural resources of Daufuskie Island may be better controlled than was the case on Hilton Head Island, there are few formal mechanisms to control the impact on local cultural resources. While more black residents have returned to Daufuskie as development created new jobs, availability of employment in menial capacities on Hilton Head has been accompanied by an increased school dropout rate among children who leave school for jobs that require little education. A tradition of self-sufficiency among Daufuskie islanders is being gradually eroded as more and more of the island is contained within private resorts, separating residents from what were once common property resources. While historic and prehistoric resources are of concern to current coastal zone management programs, living cultural resources are highly vulnerable. The processes of cultural degradation can be insidious; many black sea island residents are unhappy that new enclosed developments on Hilton Head Island and Daufuskie Island are called 'plantations'. They realize that development is inevitable and even welcome the improved employment opportunities, but feel that these new plantations offer little more than those during slavery times: low paying jobs with little or no chance for advancement or reasonable benefits and no real security.

CONCLUSIONS

In one sense, all development on both Hilton Head Island and Daufuskie Island has been successful in achieving some goals. The goals achieved, however, have not all been those that reflect concern for coastal resource management. The Sea Pines development on Hilton Head Island has been widely recognized as a model for environmentally sensitive development, indicating that the goals of those developers were achieved. Those goals were not shared by other developers who achieved their own goals related to economic profits, but did so to the detriment of goals related to sound environmental management.

In the early years of development on Hilton Head, the long-term effects of altering or destroying saltmarsh, dune systems and wetlands were not fully understood and many developers were not able to resist the temptation to turn a quick profit. If customers wanted a beach house, the dunes were often replaced by homes. Development in environmentally sensitive areas was able to command the highest prices and many developers were more than willing to accommodate the demand. One of the Sea Pines visionaries still remembers comments from fellow developers advising him to flatten the dunes and build expensive homes because that was his most "valuable" property.

Coastal zone management on Hilton Head Island evolved in a reactionary and piecemeal fashion. Residents did not organize to develop zoning ordinances until they were dissatisfied with existing construction projects. Even then, each project was viewed as if it were an isolated community. The infrastructure demands of the island as a whole were not examined until it was too late to achieve significant improvements. The importance of incorporating road and utility systems into initial planning became clear when the difficulty and extreme expense of retrofitting were realized.

The progression of development activities on Daufuskie Island suggests that coastal zone management goals have a greater chance of being achieved than was the case on Hilton Head Island. Daufuskie Island is benefitting from the experience of Hilton Head, as well as the existence of enforceable regulations that are intended to protect coastal resources. While a few dedicated visionaries have developed communities that protect the environment on their own initiative, hindsight shows that more traditional, compelling, and formal incentives are required.

LESSONS LEARNED

Given the virtual absence of regulatory mandates for environmental protection in the 1950's, the management strategy used by the developers of Sea Pines on Hilton Head Island seems entirely suitable. But while this strategy was certainly suitable for those who chose to pursue it, the absence of a regulatory mandate for its use limited the

impact of this strategy on the island as a whole. If one were an omnipotent, environmentally sensitive developer in the 1950's one could improve the Sea Pines strategy by forcing uniform compliance with its provisions by all developers. Because such legal mandates are beyond the capability of single individuals, the only improvements that might have been made relate to broadening the scope of environmental assessments (e.g., by including historical and cultural resources).

The management strategy being employed on Daufuskie Island has the potential to build on the positive aspects of the Hilton Head experience. But the equivalent of a Sea Pines visionary has not emerged on Daufuskie. While some developers appear to be pursuing a more responsible approach than is evident in the problematic areas of Hilton Head Island, the extent to which environmentally sensitive development is achieved still depends very much upon the discretion of the developer. The legal instruments to better ensure such development are largely in place. The most significant improvement that might be made would be more substantial public support to require adherence to planning recommendations.

Several general lessons emerge from the experience of Hilton Head and Daufuskie Islands:

• Cultural resources are not adequately addressed in existing coastal zone management programs. While some degree of cultural impact from development is probably inevitable, the character and extent of such impact is much less well-defined and receive much less formal consideration than is the case for impacts on the natural environment. This deficiency should receive particular consideration in coastal zone management programs intended for use in developing countries.

• Agencies involved in coastal zone management must have the authority to restrict harmful practices and a mandate to propose, encourage and regulate innovative approaches to protect the environment. Because of the large sums of money involved, developers tend to imitate previous successful projects and experience tremendous pressure to perpetuate practices that may cause environmental degradation. The temptation to discount environmental sensitivity in favor of profit is not confined to developers alone. One Sea Pines developer believes that when the development began, "stakeholders and the public would have preferred an approach similar to that employed at Myrtle Beach as a model for Hilton Head." The approach referred to, resulted in an extremely dense, high rise strip development on the beachfront, designed for the benefit of high density tourism and paying little attention to environmental protection. He suggests that it was the private land owners rather than the public officials, who wanted a radically improved, environmental approach on Hilton Head and Daufuskie Islands.

• Environmentally sensitive development requires substantial capital investment. Resource surveys, special construction techniques and the potential presence of large critical areas combine to greatly increase the developer's initial costs. If he is not financially secure enough to carry these cost (sometimes for several years), the project may fail and cause other developers to abandon their plans to develop land in the resort area. One of the developers on Daufuskie Island determined that his development would require approximately three years to break even. Losses for those first three years totaled six million dollars. Unless they receive substantial government incentives or work as subcontractors for larger companies, small developers will not be able to participate in environmentally sensitive coastal development. While the general consensus of those interviewed is that the most desirable developments are large planned communities, the same effect could result from comprehensive land-use planning.

• The Hilton Head Island experience underscores the importance of ensuring adequate infrastructure. A comprehensive approach to planning could have examined the important question of carrying capacity of the area (how much can it reasonably accommodate?) Without the answer, planners can not hope to achieve an environmentally sensitive

development. Thorough resource surveys (natural and social) are necessary before agencies begin to develop land-use plans and zoning ordinances. If this had occurred on Hilton Head Island, the road system could have been designed to adequately handle the heavy traffic demands and the freshwater supplies could have been more wisely managed. Today, long-time residents forced to ration water harbor great resentment toward developers who built golf courses and hundreds of housing units with apparently no thought toward the water requirements of the island.

- Somewhat similar is the problem of worker availability. Resort employees generally receive rather low salaries and can not afford to live close to their place of employment. Planners need to develop zoning that incorporates affordable housing units into the area and creates communities. A logical solution is to encourage construction of retail businesses (restaurants, gift shops, etc.) with apartments on the upper floors.

- An obvious deficiency of the South Carolina system is fragmentation of responsibilities. There are six natural resource agencies possessing regulatory/management authority; some activities are managed by several agencies while others are not managed at all. Developers are forced to deal with a multiplicity of agencies to obtain final approval for development projects. Consulting and negotiating with more than one agency can be time consuming and frustrating but are critical to final project approval. Developers need to cultivate good working relationships with the agencies in order to achieve timely completion schedules. Improvement could take several forms. One of the first should be to ensure that agencies involved in coastal zone management have a clearly understood mandate to protect the environment. Similarly, each component of the development process should be assigned to a specific agency. This is not meant to negate the value of checks and balances, but to ensure that nothing is overlooked or "falls between the cracks." With this type of system, interagency relationships are critical. Agencies need specific coordinating mechanisms, regardless of the number of agencies involved, and a clear and accurate view of the development process and the desired outcomes.

- Perhaps most important is the pivotal role of public involvement. A primary motivation for enacting the Coastal Zone Management Act was public concern. Concerned citizens on both Hilton Head Island and Daufuskie Island have been responsible for important initiatives to improve coastal resource management and environmentally sensitive development. An informed and active constituency is probably the best assurance that agency mandates to protect the environment will actually be carried out. In sum, the case studies reported here suggest that environmentally sensitive development requires a dedicated and innovative effort by a constituency sufficiently powerful to achieve its objectives. This constituency may be a small group of dedicated developers, environmental regulatory agencies, or the local residents. The power may come from financial capability, legislative mandate, or significant numbers of voters. Unless such a power base is established, the case studies reported here suggest that environmentally inappropriate decisions and actions are likely to be taken by individuals who seek to maximize personal profit regardless of the cost to society or subsequent generations.

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