

MARINE AND ESTUARINE SANCTUARIES

Proceedings of the National Workshop on Sanctuaries,
28-30 November 1973, Washington, D.C.

Special Scientific Report No. 70
VIRGINIA INSTITUTE OF MARINE SCIENCE
Gloucester Point, Virginia 23062



February 1974

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Edited by

M. P. Lynch B. L. Laird T. F. Smolen

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Special Scientific Report No. 70

Virginia Institute of Marine Science
William J. Hargis, Jr., Director

Gloucester Point, Virginia 23062

February 1974



FOREWORD

This Proceedings volume is the result of a three day workshop held in Washington, D. C., 28-30 November 1973, on the topic of Marine and Estuarine Sanctuaries. The workshop consisted of a plenary overview session, five concurrent workshop sessions focusing on Legal, Economic, Political, Scientific, and Land-Use aspects of sanctuary problems, and a final plenary session during which workshop chairmen presented a summary of their sessions.

In developing this Proceedings volume, verbatim proceedings have been edited by persons presenting various papers and by VIMS staff personnel. In addition, written statements, not originally presented at the workshop, have been accepted for inclusion in this volume where appropriate.

Verbatim proceedings of the concurrent working sessions have been microfilmed and are available for a small handling and reproduction fee*, as an appendix to this report from

The Office of Special Programs
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

* Legal Workshop	- Verbatim Proceedings - Microfiche copy - \$1.50
Economic Workshop	- Verbatim Proceedings - Microfiche copy - \$1.50
Political Workshop	- Verbatim Proceedings - Microfiche copy - \$1.50
Land Use Workshop	- Verbatim Proceedings - Microfiche copy - \$1.50
Scientific Workshop	- Verbatim Proceedings - Microfiche copy - \$1.50

All five Workshop Proceedings ordered at the same time - \$7.00.

ACKNOWLEDGEMENTS

We wish to thank all the participants in this workshop for their contribution to the overall conduct of this study. Special thanks must go to those persons who prepared the overview papers presented here and particularly to the concurrent workshop session chairpersons who did such a thorough job of summarizing their day's sessions.

Special thanks must also go to the staff of the Marine Technology Society, particularly Ms. Mary Anne Paturis and Mr. Robert Niblock who coordinated all conference arrangements.

The aid and support of the Office of Coastal Environment, National Oceanic and Atmospheric Administration, U. S. Department of Commerce, was of much assistance in preparing for this workshop. Particular thanks is extended to Drs. Allan Hirsch and Robert Kifer in this regard.

Particular thanks go also to Ms. Claudia Walthall and Ms. Luciene Hawkins for the many hours spent typing, editing and preparing material for both the conference and this report.

The workshop was supported by funds provided in contract number 3-35406 entitled "A Policy Study of Marine and Estuarine Sanctuaries" from the Office of Coastal Environment, NOAA, U. S. Department of Commerce. The ideas expressed in this volume, however, are those of the individually identified authors or those of the VIMS study team and are not to be construed as official policy or guidance of the Office of Coastal Environment, NOAA, or the U. S. Department of Commerce regarding Marine or Estuarine Sanctuaries.

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WELCOME

by

Allan Hirsch, Director
Marine Ecosystems Analysis Program
Office of Coastal Environment
National Oceanic and Atmospheric Administration

On behalf of NOAA, I would like to welcome you to this workshop and say a few words about what we in NOAA hope will be accomplished here in the next several days. As you all know, it was just about a year ago when the Coastal Zone Management Act authorizing establishment of estuarine sanctuaries and the Marine Protection, Research and Sanctuaries Act authorizing establishment of marine sanctuaries were enacted.

When we in NOAA began to look into the implementation of those two sanctuary provisions under the two laws, we found that we were really breaking new ground. There had been considerable work on marine preserves and sanctuaries and reserves of one sort or another, but we found we had very little clear, definitive guidance as to how we might go about implementing these programs. We had many expressions of interest from various parts of the country, from people who would like to see certain areas established as sanctuaries. Many different points of view had been expressed to us in one way or another as to what those sanctuaries should accomplish.

We came to the conclusion that before getting a running start on these programs, we would like to step back for a moment and have someone take an overview of the background, the history, and the concepts of the whole sanctuaries approach. That is what we have asked the Virginia Institute of Marine Science to do for us. They, in turn, in doing that, have assembled this workshop for the purpose of receiving the views and benefit of experience of various people who have been interested or active in the matters relating to sanctuaries. And I think we have within this room a very good spectrum of experience and interest in that field.

We are hoping to receive, within the next month, from VIMS as a result of their studies and as a result of any advice and guidance that you provide them during this workshop, a comprehensive overview of the whole area of sanctuaries from the legislative standpoint, from the scientific standpoint, and from the socio-economic standpoint. We will be taking that information, assessing it along with whatever other information and guidance we have from our normal working sources and relationships, and then moving ahead early next year into the active development of sanctuaries programs under both authorities. So we are very hopeful that we will hear a good discussion.

As Dr. Lynch has said, those of us here from NOAA are going to recede into the background and hear what the rest of you have to say during these next several days, and we are very much looking forward to having a report of your deliberations.

A POLICY STUDY OF MARINE AND ESTUARINE SANCTUARIES:
BACKGROUND INFORMATION

by

Maurice P. Lynch, Senior Marine Scientist
Martha A. Patton, Laboratory Specialist
Theodore F. Smolen, Research Attorney
Virginia Institute of Marine Science

Foreword

This report has been prepared primarily with the intent of providing the participants in the Workshop on Sanctuaries with background information on the issue of marine and estuarine sanctuaries. The information presented in this report is essentially a digest of information collected during the first part of the policy study for Marine and Estuarine Sanctuaries.

This report is intended also to present a series of concepts as to what might constitute marine or estuarine sanctuaries. These concepts are just that, concepts. They do not at this time constitute a recommendation to the Department of Commerce, but are presented to serve as a starting point for the workshop.

The brief review of legislative history, other programs, and various concepts as to what constitutes or should constitute marine and estuarine sanctuaries is not intended to be a complete treatise in this subject. It is hoped that this review will familiarize those persons only peripherally knowledgeable of this area with some of the highlights. It is also hoped that those persons or interests vitally concerned with these problems will be stimulated into preparing their own cases in a more thorough fashion for presentation at the Workshop on Sanctuaries.

Although one goal of this workshop is some consensus relative to sanctuaries, another goal is the clear exposition of partisan views in context with other either supporting or opposing views.

This workshop along with other phases of this study will provide the Department of Commerce with much of the information base needed for them to establish the policy of the Federal Government with regard to the sanctuary provisions of P.L. 92-532 and P.L. 92-583.

The thoughts or positions stated in this report are those of the contractor and should not be construed as representing a position of the Department of Commerce, the National Oceanic and Atmospheric Administration, the Office of Coastal Environment or any other federal agency.

Introduction

The Coastal Zone Management Act of 1972 (P.L. 92-583) and the Marine Protection, Research and Sanctuaries Act of 1972 (P.L. 92-532) both contain provisions for the establishment of sanctuary programs in the coastal zone and contiguous waters of the United States. There are certain differences in the provisions of the two Acts, which are briefly summarized in Figure 1.

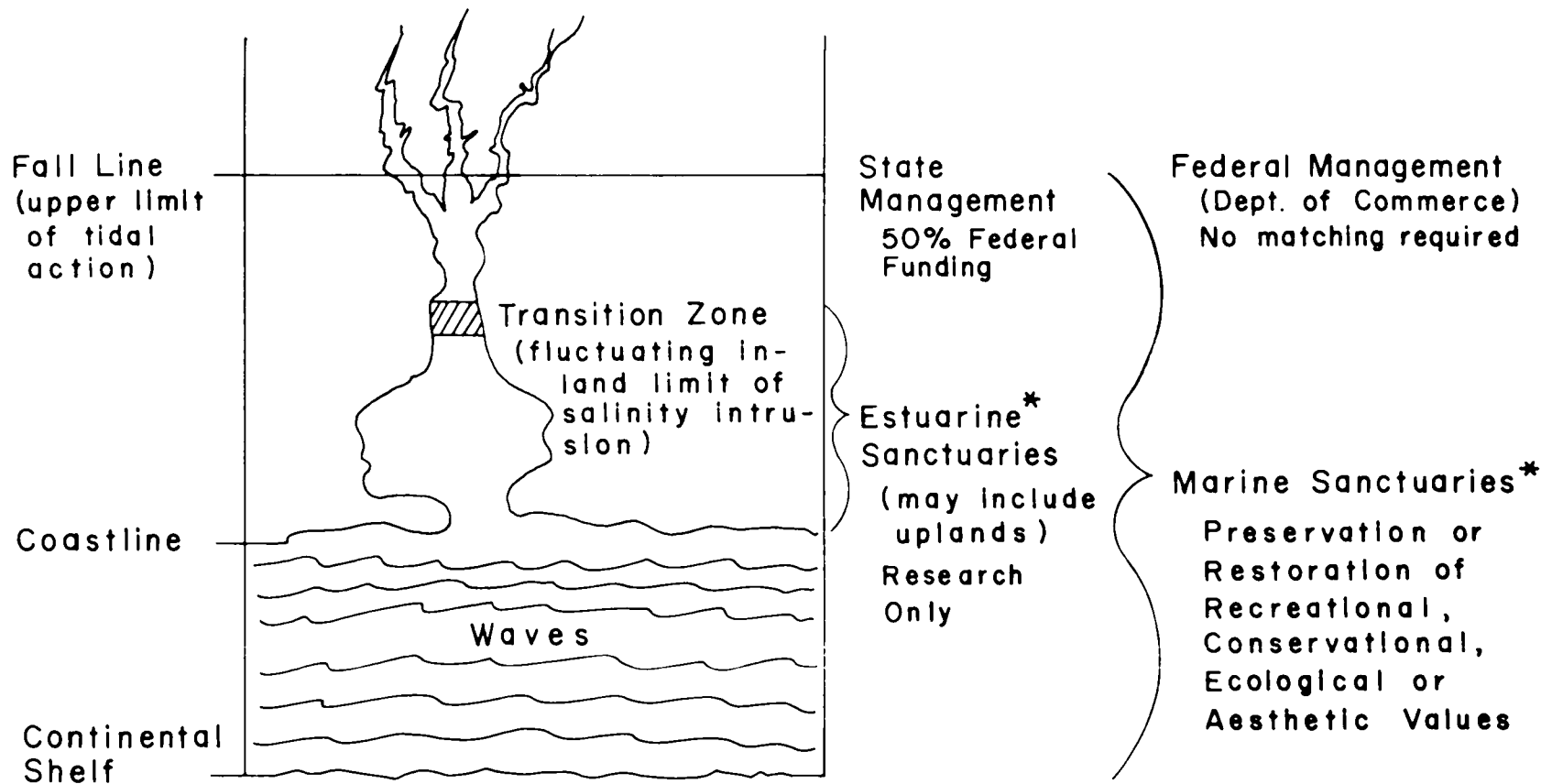
Prior to establishing a policy for administering the two sanctuaries programs, it is desirable to consider certain questions, among which are:

1. What was the impetus for inclusion of these provisions in the respective Acts?
2. What are the various attitudes and concepts of sanctuaries in the public and private sectors?
3. What existing public and private programs appear to have similar or overlapping sanctuary-like provisions?
4. How well are these programs meeting the need expressed by their own charters and/or the charter expressed in the sanctuary provisions of P.L. 92-583 and P.L. 92-532?

Once these questions have been answered, it becomes necessary to consider two additional issues:

1. The need for marine and estuarine sanctuaries.
2. How this need can be met.

It is not the purpose of this report to address these issues directly. Rather, this report presents a very brief summary of information collected during a consideration of the first four questions so that participants in the workshop can address the second set of issues. To assist participants, however, a set of hypothetical sanctuaries is presented based upon certain selected purposes and use criteria. It is hoped that these hypothetical sanctuaries will serve as a common basis for discussion in the forthcoming workshop. No implication is intended that these types of sanctuaries are the only types that can be hypothesized or that these types are necessarily the best types to consider.



*May be established in the Great Lakes

FIGURE 1. Summary of Sanctuary Provisions of the Coastal Zone Management Act (P.L. 92-583) and the Marine Protection, Research and Sanctuaries Act (P.L. 92-532).

Estuarine Sanctuaries

The Coastal Zone Management Act (CZMA) of 1972 (P.L. 92-583) defines Estuarine Sanctuaries as follows:

Estuarine sanctuary means a research area which may include any part or all of an estuary, adjoining transitional areas, and adjacent uplands, constituting to the extent feasible a natural unit, set aside to provide scientists and students the opportunity to examine over a period of time the ecological relationships within the area (Sec. 304 e. P. L. 92-583).

The CZMA further provides that:

The Secretary [of Commerce], in accordance with rules promulgated by him, is authorized to make available to a coastal state grants of up to 50 per centum of the costs of acquisition, development, and operation of estuarine sanctuaries for the purpose of creating natural field laboratories to gather data and make studies of the natural and human processes occurring within the estuaries of the coastal zone....(Sec. 312 P.L. 92-583).

The legislative history of the CZMA and its sanctuary provision can be traced back to reports emanating from the Clean Water Restoration Act of 1966 and the National Estuarine Protection Act of 1968 (Figure 2). The reports developed under these acts, particularly the National Estuarine Study, focused attention upon the pressures facing the nation's estuaries and the valuable national resource represented by these estuaries.

Congressional hearings conducted on a number of bills related to coastal zone management highlighted the conflict between need for preservation of estuaries and need for responsible development and exploitation of estuarine resources.

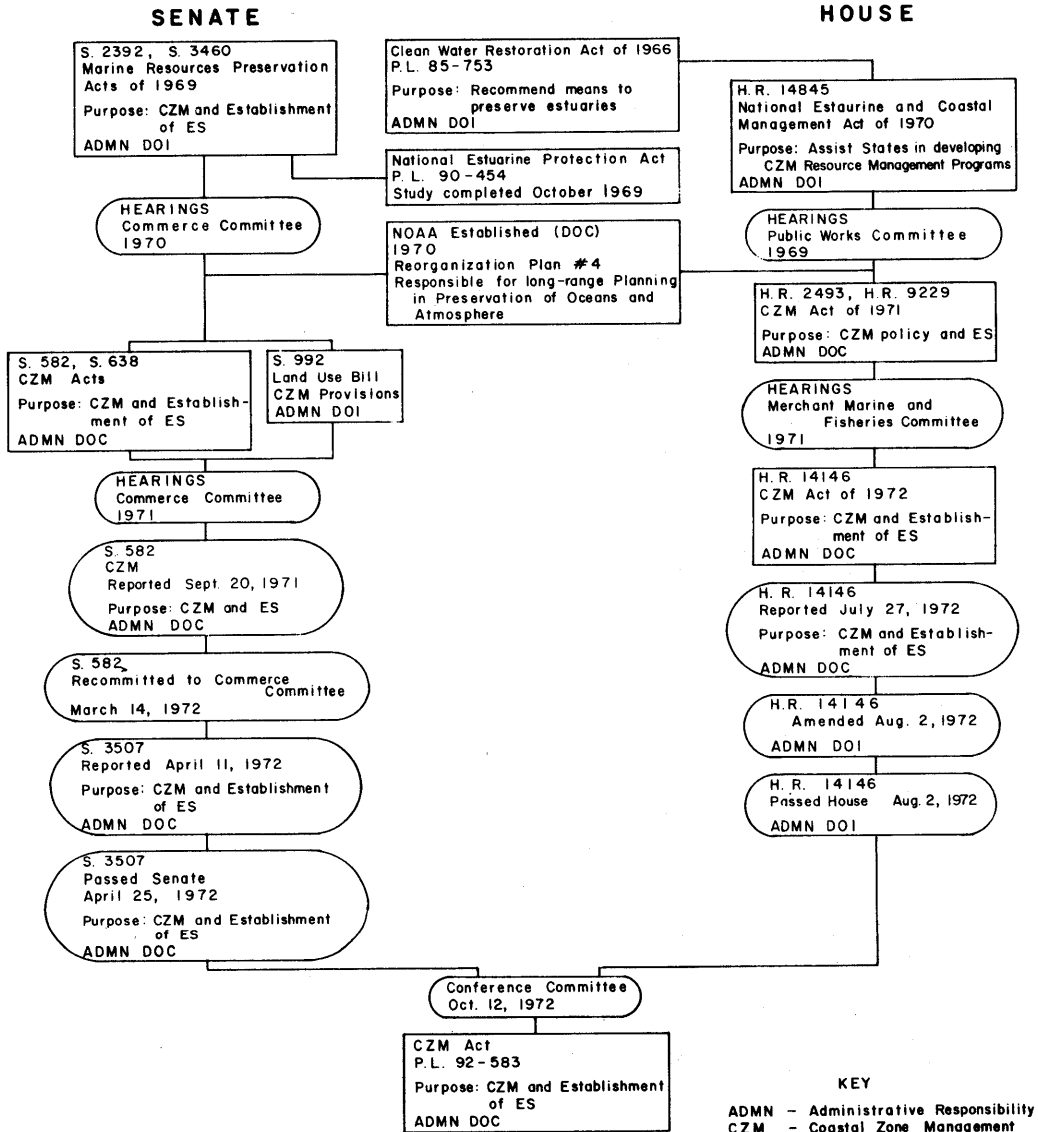
The concept of establishing estuarine sanctuaries first appeared in S. 3460 proposed in 1970. The theme arising from these hearings was that not all estuarine areas had to be set aside and preserved. Instead, the multiple-use concept wherein only irreplaceable and non-renewable resources should be preserved was advocated.

The emphasis on estuarine sanctuary areas arising from these hearings was primarily on study areas as sources for basic ecological research.

The question of estuarine sanctuaries was also covered in the 1971 hearings. Two additional themes arose from House hearings:

**FIGURE 2:
COASTAL ZONE MANAGEMENT ACT
OF 1972**

LEGISLATIVE HISTORY



- KEY**
- ADMN - Administrative Responsibility
 - CZM - Coastal Zone Management
 - DOC - Department of Commerce
 - DOI - Department of Interior
 - ES - Estuarine Sanctuaries
 - NOAA - National Oceanic and Atmospheric Administration

- a) Sanctuaries would help ensure a continued high quality coastal and estuarine environment and
- b) Sanctuary areas should be free from traditional regulations in order to allow a broad range of experimentation.

A policy was advocated that a relatively large number of small estuarine sanctuaries be established to encourage scientific experimentation and education *vice* a relatively restricted number of sanctuaries as had been discussed in previous hearings.

Senate hearings developed the theme that sanctuaries were to be natural areas set aside primarily to provide scientists the opportunity to help predict the impact of human intervention on the natural ecology and to make baseline ecological measurements essential to coastal zone management decisions. A need for sanctuaries to represent regional differences in a variety of ecosystems was also recognized.

The 1972 House hearings developed sanctuary themes similar to those presented at the 1971 Senate hearings. The main emphasis was on sanctuaries being essential for research purposes to provide management information, to monitor significant changes in the environment and to serve as a means of forecasting future impacts.

The only major differences in the CZM bills passing the House and Senate in 1972 were jurisdictional, i.e., the Senate vested administration in the Department of Commerce while the House vested this in the Department of Interior; and territorial, i.e., the House version of the sanctuaries provision provided for establishment beyond territorial waters, while the Senate version restricted sanctuaries to the estuaries within territorial waters.

These differences were resolved in conference by assigning administration to Commerce and restricting the establishment of sanctuaries to territorial waters.

What evolved over the several years of discussion in Congress of estuarine sanctuaries in conjunction with CZM was a Congressional sense of need for areas within the estuaries which would be representative of a large number of ecosystems in which scientists would be able to establish baseline data useful for monitoring the state of the environment and other areas within which scientists could perform experiments to enable forecasting of results of man's activities within the estuaries. Except in the very early years of discussion of sanctuaries, Congress did not appear to recognize the need for establishing sanctuaries solely for preservation in conjunction with Coastal Zone Management.

Marine Sanctuaries

The Marine Protection, Research, and Sanctuaries Act of 1972 (P.L. 92-532) contains three titles:

- I. Ocean Dumping
- II. Comprehensive Research on Ocean Dumping
- III. Marine Sanctuaries.

The title of concern in this report is Title III, Marine Sanctuaries. This title provides that the Secretary of Commerce after consultation with heads of certain appropriate federal agencies and the approval of the President may designate as marine sanctuaries

...those areas of the ocean waters, as far seaward as the edge of the Continental Shelf, as defined in the Convention on the Continental Shelf (15 UST 74; TIAS 5578), of other coastal waters where the tide ebbs and flows, or of the Great Lakes and their connecting waters, which he determines necessary for the purpose of preserving or restoring such areas for their conservation, recreational, ecological, or esthetic values. (Sec. 302 a. P.L. 92-532).

Other provisions of Title III discuss the various procedures to be followed in the event a marine sanctuary is established in state or international waters, and various other procedural matters.

The legislative history of marine sanctuaries in Congress (Figure 3) can be traced back to a series of bills introduced in 1968 in response to public reaction to a series of incidents such as the dumping of nerve gas and oil wastes off the coast of Florida and the Santa Barbara Channel oil spill.

The early bills introduced were for the purpose of studying the feasibility of establishing sanctuaries in specific areas (off the coasts of California, Massachusetts and New Hampshire). One provision of these bills was a mineral exploitation moratorium in the areas under consideration as sanctuaries. The hearings on these bills brought forth evidence of the conflicts arising from competing uses of marine resources. Marine sanctuaries were proposed as a mechanism to attain a national balance of uses in the marine environment and ensuring compatibility of conflicting uses. Some witnesses advocated marine zoning to minimize conflict between competing uses. The concept of sanctuaries as areas for studies of the natural system unencumbered by pollution was brought forward as was the concept of preserving marine areas so that scenic beauty, ocean recreation, and fishing activities could be perpetuated.

Throughout the next few years, many other bills containing marine sanctuary provisions, coupled with mineral exploitation moratoria were proposed. These bills did not fare well, primarily because of concern about oil exploitation restrictions in one

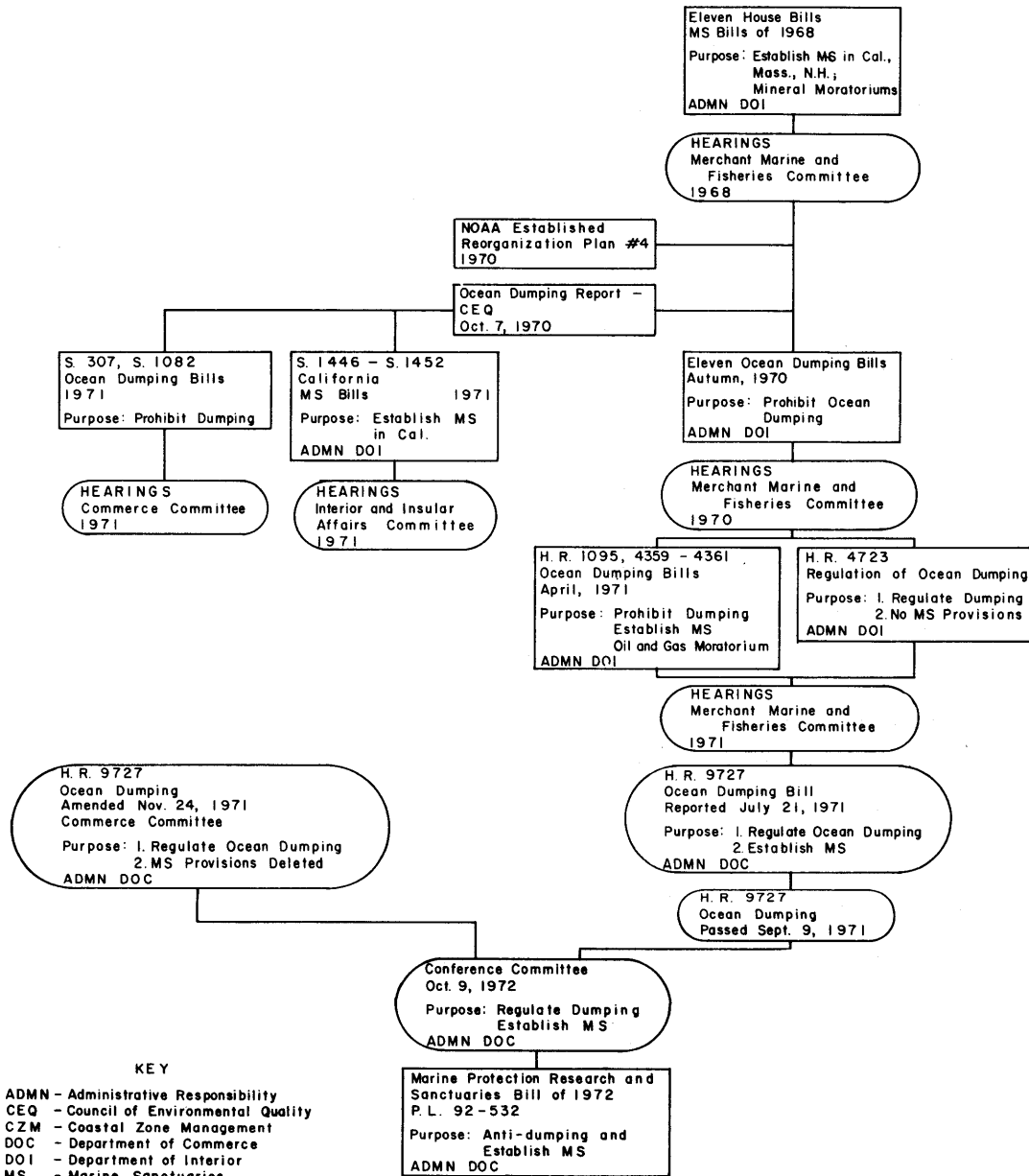
FIGURE 3:

**MARINE PROTECTION, RESEARCH
AND SANCTUARIES ACT
OF 1972**

LEGISLATIVE HISTORY

SENATE

HOUSE



KEY

- ADMN - Administrative Responsibility
- CEQ - Council of Environmental Quality
- CZM - Coastal Zone Management
- DOC - Department of Commerce
- DOI - Department of Interior
- MS - Marine Sanctuaries
- NOAA - National Oceanic and Atmospheric Administration

fashion or another.

In 1971, hearings on a series of bills joining the dumping problem and sanctuaries were held. From these hearings essentially two philosophies of sanctuaries emerged:

- a) Sanctuary areas should be those places where various wastes might not be discharged, and
- b) Certain ocean areas should be preserved or restored for recreation, conservation, ecological or esthetic values.

A discussion of marine mineral moratorium provisions was absent from these bills.

The marine sanctuary provision that eventually became law expressed essentially those concepts arising from the 1971 hearing.

Throughout the hearings on various sanctuary bills, whether related to mineral moratoria or ocean dumping, several themes were apparent. Many users were concerned over restrictions on legitimate uses of coastal waters or resources under these waters. Agencies such as the Department of Defense were concerned about curtailing defense related activities while the Department of Interior was concerned with interference with its Outer Continental Shelf mandates.

On the other side of the coin, much concern was expressed that some of our resources were in danger of damage and that steps should be taken to insure against permanent or potential damage and to preserve our resources. Marine sanctuaries were proposed as conservation areas, research laboratories, outdoor museums for education and sources of esthetic enjoyment. Others proposed that marine sanctuaries be set aside to protect unique, rare or representative features of oceans, coastal and other waters and total ecosystems. Still another concept that emerged from these hearings was that of a sanctuary as a multiple-use area in which management regulations would primarily serve to protect those values related to conservation, recreation, ecology or esthetics.

To ensure compatibility of uses within this sanctuary concept, once a marine sanctuary is established, the Secretary of Commerce is required to promulgate rules and regulations regarding that sanctuary and then certify that each permit, license or authorization granted by other authorities for activities in the sanctuary is consistent with the purposes of the sanctuary before that permit, license or authorization becomes valid.

There do not appear to be any restrictions on the rules or regulations that might be made by the Secretary of Commerce, or the management role to be played by the Department of Commerce or other federal or state agencies within a marine sanctuary with the

exception of the certification requirement discussed above and limitations on enforcement of regulations on non-U.S. citizens in international waters.

Federal Programs

In attempting to assess needs for the sanctuary provisions of P. L. 92-532 and P.L. 92-583, an evaluation must be made of other federal programs and the role they play in preserving or restoring coastal zone areas for scientific, conservation, recreational, ecological or esthetic values. Those federal programs thought to be most relevant in this regard are briefly discussed below. It must be remembered that most of these other federal programs were not inaugurated specifically for the coastal zone. Any implied shortcomings relative to protection, or preservation of coastal zone resources does not in any way imply criticism of the overall program.

The only federal legislation, enacted prior to P.L. 92-532 and P.L. 92-583, which was aimed solely at general coastal area protection was the National Estuarine Protection Act (P.L. 90-454) which contained a provision for management and administration of estuarine areas with 50% federal and state support. Funds for implementation of this provision were never sought from Congress.

National Park Service Programs

The National Park Service (NPS), U. S. Department of Interior, manages some 49 Marine Coastal and Lakeshore units contained within the National Park System. These units included National Parks, Monuments, Seashores, Lakeshores and Recreation Areas (Table 1). With few exceptions these units are primarily shore oriented. The exceptions, such as Biscayne National Monument, Buck Island Reef National Monument, Fort Jefferson National Monument and the Virgin Islands National Park, contain some of the finest underwater habitats in the country.

The NP System units are divided into three categories, Natural, Recreational and Historical. NP System administration and management of the individual units reflect this categorization, although within a given unit internal land classification (Table 2) provides management flexibility.

Certain limitations are imposed upon the NP Service with regard to addition of new areas to the NP System. National Parks, Seashores, Lakeshores and Recreation Areas require congressional action for establishment. National Monuments, however, can be established by either Congress or Presidential proclamation.

A 1972 NP Service report indicates that only the Virgin Islands area has all natural themes adequately represented within the NP System. Figure 4 and Table 3 summarize these findings.

TABLE 1: Marine Coastal and Lakeshore Units of the National Park System.
 (Provided by the United States Department of Interior, National
 Park Service, 15 August 1973).

AREA	CREATED <u>1/</u>	CATEGORY <u>2/</u>
Acadia National Park, ME	Pro. 8 July 1916	N
*Apostle Islands National Lakeshore, WI	Est. 26 Sept. 1970	R
Assateague Island National Seashore, M -VA	Auth. 21 Sept. 1964	R
Biscayne National Monument, FL	Auth. 18 Oct. 1968	N
Buck Island Reef National Monument, VI	Pro. 28 Dec. 1961	N
Cabrillo National Monument, CA	Pro. 14 Oct. 1913	R
Cape Cod National Seashore, MA	Auth. 7 Aug. 1961	R
Cape Hatteras National Seashore, NC	Auth. 17 Aug. 1937	R
Cape Lookout National Seashore, NC	Auth. 10 Mar. 1966	R
Castillo De San Marcos National Monument, FL	Pro. 15 Oct. 1924	H
Chalmette National Historical Park, LA	Est. 4 Mar. 1907	H
Channel Island National Monument, CA	Pro. 26 Apr. 1938	N
City of Refuge National Historical Park, HI	Auth. 26 July 1955	H
Colonial National Historical Park, VA	Auth. 3 July 1930	H
Cumberland Island National Seashore, GA	Auth. 23 Oct. 1972	R
DeSoto National Memorial, FL	Auth. 11 Mar. 1948	H
Everglades National Park, FL	Auth. 30 May 1934	N
Fire Island National Seashore, NY	Auth. 11 Sept. 1964	R
Fort Caroline National Memorial, FL	Auth. 21 Sept. 1950	H
Fort Clatsop National Memorial, OR	Auth. 29 May 1958	H
Fort Frederica National Monument, GA	Auth. 26 May 1936	H
Fort Jefferson National Monument, FL	Pro. 4 Jan. 1935	H
Fort Matanzas National Monument, FL	Pro. 15 Oct. 1924	H
Fort McHenry National Monument and Historical Site, MD	Auth. 3 Mar. 1925	H
Fort Point National Historical Site, CA	Est. 16 Oct. 1970	H
Fort Pulaski National Monument, GA	Pro. 15 Oct. 1924	H
Fort Raleigh National Historic Site, NC	Des. 5 Apr. 1941	H
Fort Sumter National Monument, SC	Auth. 28 Apr. 1948	H
Gateway National Recreation Area, NY	Auth. 27 Oct. 1972	R
Glacier Bay National Monument, AK	Est. 11 May 1910	N
Golden Gate National Recreation Area, CA	Auth. 27 Oct. 1972	R
Gulf Islands National Seashore, FL-MS	Auth. 8 Jan. 1971	R

TABLE 1: (cont'd)

AREA	CREATED <u>1/</u>	CATEGORY <u>2/</u>
Hawaii Volcanoes National Park, HI	Est. 1 Aug. 1961	N
*Indiana Dunes National Lakeshore, IN	Auth. 5 Nov. 1966	R
Isle Royale National Park, MI	Auth. 3 Mar. 1931	N
Katmai National Monument, AK	Pro. 24 Sept. 1918	N
Mar-A-Lago National Historic Site, FL	(Not Open to Public)	H
Olympic National Park, WA	Pro. 2 Mar. 1909	N
Padre Island National Seashore, TX	Auth. 28 Sept. 1962	R
*Pictured Rocks National Lakeshore, MI	Auth. 15 Oct. 1966	R
Point Reyes National Seashore, CA	Auth. 13 Sept. 1962	R
Redwood National Park, CA	Est. 2 Oct. 1968	N
Saint Croix Island National Monument, ME	Auth. 8 June 1949	H
Salem Maritime National Historic Site, MA	Des. 17 Mar. 1938	H
San Juan Island National Historical Park, VA	Auth. 9 Sept. 1966	H
*Sleeping Bear Dunes National Lakeshore, MI	Auth. 21 Oct. 1970	R
Statue of Liberty National Monument, NY-NJ	Pro. 15 Oct. 1924	H
Virgin Islands National Park, VI	Auth. 2 Aug. 1956	N
Wright Brothers National Memorial, NC	Auth. 2 Mar. 1927	H

1/ Pro., Proclaimed by Executive Order (11)
 Des., Designated by Secretarial Order (2)
 Auth., Authorized by Congressional Act (28)
 Est., Established by Congressional Act (6)

2/ N, Natural (12)
 R, Recreational (15)
 H, Historic (21)

* Great Lakes Area

TABLE 2: Land Classification Scheme of the National Park Service

Class*	Description
I.	High density recreation areas.
II.	General outdoor recreation areas.
III.	Natural environmental areas.
IV.	Outstanding Natural Areas.
V.	Primitive areas, including, but not limited to, those recommended for designation under the Wilderness Act.
VI.	Historic and Cultural areas.

*A park contains land falling into three or more of these areas.

NATURAL REGIONS	LAND FORMS OF THE PRESENT			AQUATIC ECOSYSTEMS		
	Coral Islands, Reefs, Atolls	Seashores, Lakeshores, Islands	*River Systems and Lakes	Marine Environments	Estuaries	Lakes and Ponds
OCEANIC						
North Pacific Border		▨		▨	▨	
South Pacific Border		▨		▨	▨	
New England Adirondacks		▨		▨	▨	
Atlantic Coastal Plain		▨		▨	▨	
Gulf Coastal Plain		▨		▨	▨	
Florida Peninsula	▨	▨		▨	▨	
Island of Hawaii	▨	▨		▨	▨	
Maui Island Group	▨	▨		▨	▨	
Oahu	▨	▨		▨	▨	
Kauai, Niihau	▨	▨		▨	▨	
Leeward Islands	▨	▨		▨	▨	
Pacific Mountain System		▨		▨	▨	
Interior and Western Alaska		▨		▨	▨	
Arctic Lowland		▨		▨	▨	
Virgin Islands	▨	▨		▨	▨	
Puerto Rico	▨	▨		▨	▨	
Guam	▨	▨		▨	▨	
Samoa	▨	▨		▨	▨	
Mariana Islands	▨	▨		▨	▨	
Caroline Islands	▨	▨		▨	▨	
Marshall Islands	▨	▨		▨	▨	
----- Not relevant -----						
GREAT LAKES						
Central Lowlands		▨	▨			▨
Superior Uplands		▨	▨			▨

* Relevant only to Great Lakes Regions

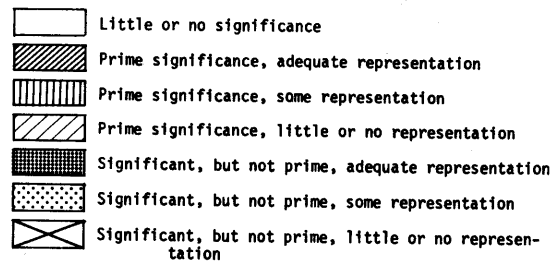


FIGURE 4: National Park Service Evaluation of Adequacy of Coverage of Coastal Land Forms and Aquatic Ecosystems within Coastal Areas.

TABLE 3: Ranking of Coastal Zone Natural Regions and Themes by Adequacy of Representation within the National Park System.

<u>REGION</u>	<u>ADEQUACY OF REPRESENTATION (%)</u>
Virgin Islands	100
*Superior Uplands	71
North Pacific Border	70
Florida Peninsula	63
Pacific Mountain System Alaska	56
Island of Hawaii	54
Maui	53
New England-Adirondaks	29
South Pacific Border	24
Atlantic Coast Plain	21
Gulf Coast Plain	17
Central Lowlands	16
Interior and Western Alaska	0
Arctic Lowland	0
Oahu	0
Kanai Niihau	0
Leeward Islands	0
Puerto Rico	0
Mariana Islands	0
Caroline Islands	0
Marshall Islands	0
Guam	0
Samoa	0

<u>THEME</u>	<u>ADEQUACY OF REPRESENTATION (%)</u>
<u>Landforms</u>	
River Systems and Lakes	43
Seashores, Lakeshores, Islands	42
Coral Islands, Reefs, Atolls	18
<u>Aquatic Ecosystems</u>	
Lakes and Ponds	39
Marine Environments	24
Estuaries	24

The NP Service is constrained to some degree in establishing management policy for its units by the designation of the unit as a natural, recreational or historical area in the enabling legislation or proclamation. Recent trends in NP Service management strategy appear to be more conservation oriented, within the charge that NP System units be made available for use by all citizens.

At present, the NP Service is the repository for the largest amount of experience relating to management of recreational, historical, and natural areas in marine and coastal environments within the Federal Government.

Federal and Federally Funded Refuge Programs

The Duck Stamp Act (16 USC 718-718h) provides revenue to purchase waterfowl refuges and production areas for purposes of migratory bird conservation. Figure 5 illustrates that many of these areas are located in the coastal zone. As of the end of FY 1972, 8.2 million acres were included within refuge lands and 1.2 million acres in waterfowl production lands. The precise number of acres that could be characterized as tidal wetlands was not determined, but represents the largest holdings of Federally controlled wetlands in estuarine areas. Public hunting is allowed on up to 40% of refuge lands and 100% of waterfowl production areas.

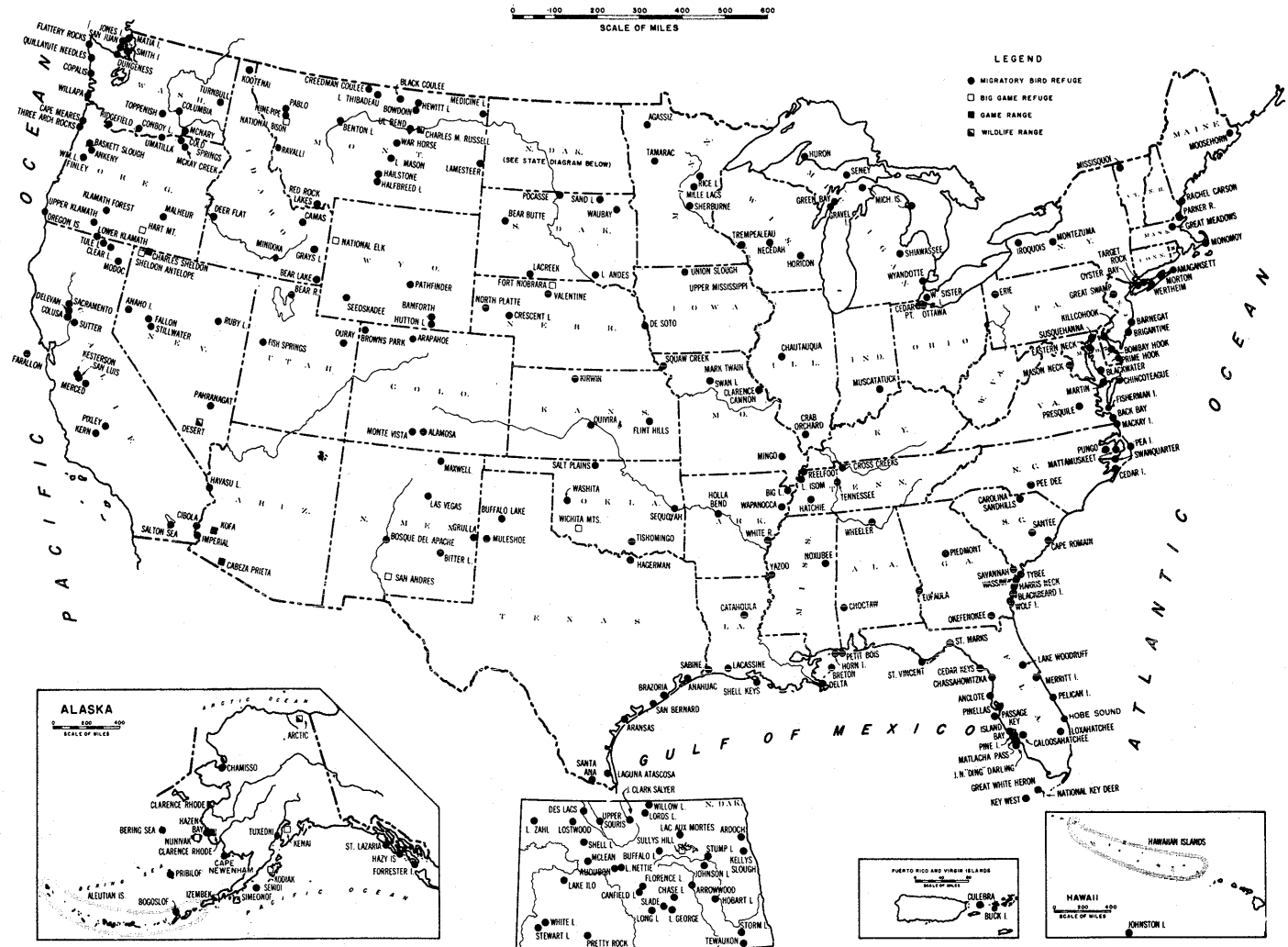
In addition to the Stamp Act Program, the Federal aid in Fish and Wildlife Restoration Programs (Fish, Dingell-Johnson, 16 USC 777-777kk1c; Wildlife, Pittman-Robertson, 16 USC 669-669L) have provided funds to the states (on a matching fund basis) since 1937 and 1952 respectively, with which the states can, among other things, purchase Fish and Game lands and water areas. Within marine and estuarine areas the major acquisitions have been waterfowl habitats purchased with Pittman-Robertson funds. No major estuarine land or water purchases were identified as having been made with Dingell-Johnson Funds. Major use of D-J funds for acquisition in the marine and coastal areas is for access areas such as launching ramps and piers. Through 1966, six coastal states and Guam and the Virgin Islands had used D-J funds to construct artificial reefs.

Pittman-Robertson, Dingell-Johnson and the Federal Refuge Programs are managed by the Department of Interior. Preservation and conservation of waterfowl resources appears to be adequately planned, managed and financed in coastal and marine areas when compared to other resources.

Land and Water Conservation Fund Program

The Land and Water Conservation Fund Act (16 USC 460s *et seq.*) established a fund, to be administered by the Secretary of the Interior to be used for matching grants to states (50% match) for outdoor recreation projects and for Federal acquisition of recreation

FIGURE 5.
NATIONAL WILDLIFE REFUGE SYSTEM



lands adjacent to National Wildlife refuges and hatcheries, any National areas authorized for preservation of endangered species, for recreational purposes in existing National Park System Units and National Forests, and for future recreation areas.

Management of areas acquired under this program is by the states, or by the NP Service, National Forest Service or Bureau of Sport Fisheries and Wildlife.

For FY 1974 \$50,000,000 was appropriated for this program and \$128,000,000 was carried over from the previous year. In addition to direct appropriations, funds for this program are derived from unrefunded motor boat fuel taxes, Federal surplus property sales and recreational area user fees.

Outer Continental Shelf Programs

No discussion of federal activities related to marine areas is complete without mention of the Outer Continental Shelf (OCS) Lands Act (43 USC 1331-1343). This act gives the Department of Interior responsibility for administration of continental shelf lands beyond territorial waters. This responsibility is exercised by the Bureau of Land Management (BLM) within the Department of Interior. The major management function of the BLM with regard to OCS lands is to lease areas for oil, gas and sulfur extraction.

A provision of the OCS Lands Act allows the withdrawal from disposition of unleased lands of the OCS. Under this provision two areas have been withdrawn.

1. The Key Largo Coral Reef Preserve and
2. The Santa Barbara Ecological Preserve and Buffer Zone.

Regulations for the Key Largo Coral Reef Preserve essentially parallel those of the adjacent State of Florida John Pennekamp Coral Reef Park. These two units are essentially managed as one unit by the Florida Park Service.

Regulations for the Santa Barbara area are essentially limited to non-leasing of oil and gas drilling rights.

Federal Research Natural Areas Program

A pertinent federal program related to marine and estuarine sanctuaries is the Research Natural Areas program coordinated by the Federal Committee on Research Natural Areas (FCRNA). Initially established by the Secretary of Interior in 1966 with representatives from the U. S. Forest Service (Department of Agriculture) and Bureau of Land Management, Bureau of Sport Fisheries and Wildlife, and National Park Service (Department of Interior), together with liaison representation from the Department of Defense, Smithsonian Institution, Atomic Energy Commission and the Tennessee Valley Authority, the FCRNA

inventoried natural areas established on federal lands and prepared a directory of Research Natural Areas.

A Research Natural Area was defined as:

"An area where natural processes are allowed to predominate and which is preserved for the primary purpose of research and education. These areas may include: a) Typical or unusual faunistic and/or floristic types, associations, or other biotic phenomena; b) Characteristic or outstanding geologic, pedologic or aquatic features and processes."

Research natural areas have these objectives:

1. To assist in the preservation of examples of all significant natural ecosystems for comparison with those influenced by man.
2. To provide educational and research areas for scientists to study the ecology, successional trends, and other aspects of the natural environment.
3. To serve as gene pools and preserves for rare and endangered species of plants and animals.

A total of 420 Research Natural Areas (including 58 hydrologic bench-marks) were ultimately described in the 1968 directory and a 1972 addendum. A review of this directory and addendum indicated that only 22 areas could be categorized as possibly being related to marine or estuarine sanctuaries. As indicated in Table 4, only 16 of these appear to contain significant aquatic habitats. Major marine and estuarine categories erected by the FCRNA which are not represented within the Research Natural Area system are indicated in Table 5.

The number of Research Natural Areas in marine and estuarine areas falls far short of providing representative areas for the diverse and unique habitats found in U. S. marine and estuarine environments.

It must be recognized that as valuable as these areas might be, there is a restriction that research on these areas must be of a nondestructive nature and reasonably consistent with the purposes and characteristics of the surrounding land. Research which involves manipulation of the ecosystem is not normally possible in these areas.

Coordination of the Research Natural Areas program moved from the Department of Interior to the Office of Science and Technology (OST). Since the demise of OST, no central focus for this program has emerged. Individual members of the FCRNA do attempt to coordinate activities.

TABLE 4: Marine or Estuarine Research Natural Areas (from Research Natural Areas, 1968 and 1972 Addendum compiled by the Federal Committee on Research Natural Areas.)

STATE	NATURAL AREA NAME	FIELD UNIT	AGENCY	SIZE (ACRES)	MARINE OR ESTUARINE ORIENTED FEATURES
Maine	Bald Porcupine Island NA	Acadia NP	NPS	40	Steep seashore
	Eastern Head NA	Acadia NP	NPS	140	Steep shoreline
Massachusetts	Ludlow Griscom Dune NA	Parker River NWR	BSF&W	150	Exposed coastline with unconsolidated sediment; Barrier beach sand dunes.
New Jersey	*Egg Island NA	Brigantine NWR	BSF&W	600	Tidal salt marshes
	*Little Beach Island NA	Brigantine NWR	BSF&W	1,250	Tidal salt marshes (400 acres); Exposed coastline with unconsolidated sediment.
Delaware	*Marshall Island NA	Bombay Hook NWR	BSF&W	120	Tidal salt marsh.
Virginia	Chincoteague NA	Chincoteague NWR	BSF&W	150	Near sea level to wooded sand dunes.

TABLE 4: (cont'd)

STATE	NATURAL AREA NAME	FIELD UNIT	AGENCY	SIZE (ACRES)	MARINE OR ESTUARINE ORIENTED FEATURES
Georgia	Blackbeard Island NA	Blackbeard Island NWR	BSF&W	450	Low sand ridges parallel to coastline.
Florida	*St. Marks NA	St. Marks NWR	BSF&W	1,066	Tidal salt marshes (828 acres).
Texas	*Little Beach Island NA	Brigantine NWR	BSF&W	1,250	Tidal salt marshes (400 acres); Shore-bird rookery (100 acres); Exposed coastline with unconsolidated sediment.
	*Lone Tree Bayou NA	Anahuac NWR	BSF&W	200	Tidal salt marshes.
	*Matagorda NA	Matagorda AFR	USAF	?	Bayside salt marshes.
California	*Point Reyes Headland NA	Point Reyes NS	NPS	640	Shallow shore waters; Exposed coastline with rocky substrate.
	*Estero de Limantour NA	Point Reyes NS	NPS	548	Estuary and tide flats.
Alaska	Halibut Cove NA	Anchorage District Office	BLM	120	West slope of mountain to salt water.

TABLE 4: (cont'd)

STATE	NATURAL AREA NAME	FIELD UNIT	AGENCY	SIZE (ACRES)	MARINE OR ESTUARINE ORIENTED FEATURES
Hawaii	*French Frigate Shoals NA	Hawaiian Islands NWR	BSF&W	107,772	Semi-tropical coral atoll; green sea turtle; Hawaiian monk seal.
	*Gardner Pinacles NA	Hawaiian Islands NWR	BSF&W	6	Islands, reefs, atolls.
	*Laysan Island NA	Hawaiian Islands NWR	BSF&W	1,010	Flat sandy atoll surrounded by coral reefs.
	*Lisianski Island NA	Hawaiian Islands NWR	BSF&W	383	Flat sandy atoll surrounded by coral reefs.
	*Necker Island NA	Hawaiian Islands NWR	BSF&W	45	A rock protruding from sea; Seabird.
	*Nihoa Island NA	Hawaiian Islands NWR	BSF&W	170	Steep rocky volcanic island jutting from the sea; Seabird colonies.
	*Pearl and Hermes Reef NA	Hawaiian Islands NWR	BSF&W	95,582	Inlets surrounded by circular coral reefs 17 mi. by 9 mi.
AFR, Air Force Range		NP, National Park			
BLM, Bureau of Land Management		NS, National Seashore			
BSF&W, Bureau of Sport Fisheries & Wildlife		NPS, National Park Service			
NA, Natural Area		NWR, National Wildlife Refuge			
*Appears to have significant aquatic habitat associated with Natural Areas.					

TABLE 5: Major Marine and Estuarine Habitats Not Included within the Research Natural Area System (from Research Natural Areas, 1968, Compiled by the Federal Committee on Research Natural Area.)

Mangrove swamps

Lagoons

Protected coastline with rocky substrate

Extensive kelp beds

Offshore marine features

Lake shorelines

Protected coastline with unconsolidated sediment

Habitats of marine species of special interest

The FCRNA had no management responsibility for this program beyond conducting an inventory of Research Natural Areas, compiling a directory of these areas and identifying gaps in the system. Responsibility for management of the areas lies primarily with the Department of Agriculture and the Department of Interior as the "owners" of the greatest number of designated natural areas.

Management of specific areas is carried out by the field unit which manages the area in which the Research Natural Area is located.

An attempt is being made by individuals within the concerned federal agencies to revitalize this program and coordinate this into a national Natural Areas program embracing state, private and federal areas. The efforts of the state and private sectors will be discussed in a subsequent section.

National Wilderness Act (16 USC 1131-1136)

The purpose of this act is to preserve areas in their natural condition. In order for an area to qualify as a wilderness area it must be a roadless, primitive area of 5,000 acres or more. The Secretary of the Interior is required to periodically review all tracts which may qualify and recommend their designation as wilderness areas to the President who in turn makes recommendations to Congress.

Once an area is designated a Wilderness temporary roads, use of motor vehicles, motorboats, aircraft and other motorized equipment are prohibited. Also prohibited are structures, installations and commercial enterprises.

As of August 1972, 16 areas in the coastal zone had been set aside as wilderness areas (Table 6). Other areas are under consideration and may be now be set aside.

Summary of Federal Programs

The major federal programs related to preservation of areas within the marine and coastal areas are the National Park System and the National Refuge Systems within the Department of Interior. These programs are primarily but not exclusively land oriented. Parts of these programs are designed to provide recreational outlets to the public, primarily but again not exclusively oriented towards natural recreational experiences.

The National Refuge program is designed to protect a group of organisms, i.e., migratory waterfowl. No other group of species or species itself is protected in a formal way although there are provisions in the Land and Water Conservation Fund Act to purchase areas to protect rare and endangered species.

TABLE 6: Wilderness Areas Established under the National Wilderness Act (16 USC § 1132)

<u>REGION</u>	<u>STATE</u>	<u>WILDERNESS SITE</u>	<u>DATE OF DESIGNATION</u>
GREAT LAKES	Michigan	Huron Islands	October 23, 1970
		Michigan Islands	October 23, 1970
	Wisconsin	Wisconsin Islands	October 23, 1970
ATLANTIC	Massachusetts	Monomoy	October 23, 1970
	Florida	Cedar Keys	August 7, 1972
		Island Bay	October 23, 1970
		Passage Key	October 23, 1970
	Pelican Island	October 23, 1970	
PACIFIC	Oregon	Oregon Islands	October 23, 1970
		Three Arch Rocks	October 23, 1970
	Washington	Washington Islands	October 23, 1970
	Alaska	Bering Sea	October 23, 1970
		Bogoslof	October 23, 1970
		Forrester Island	October 23, 1970
Hazy Islands		October 23, 1970	
	Tuxendi	October 23, 1970	

State Programs

As of the present time only a few of the states have enacted specific marine and estuarine sanctuary legislation. The general trend has been for the states to deal with natural resources as separate systems rather than elements of a fully integrated ecosystem. Most conservation measures taken in the past have been in the form of fish and game laws, soil and water conservation laws, wetlands protection or state park and recreation provisions. A reconnaissance of state legislation thought to be relevant to marine and estuarine sanctuaries produced the results shown in Figure 6. Many states are currently active in the general area of coastal zone management, so that although the reconnaissance was only made this past summer, Figure 6 may already be dated.

Of particular interest to us in this study was an assessment of the land acquisition authorities that could be related to estuarine or coastal area protection. These authorities are fairly extensive and are summarized in Table 7.

Only a few of the state programs will be discussed in this report. Several coastal states have legislation providing for setting aside estuarine areas for research purposes. However, it must be noted that generally the research activity is restricted to specific marine resources such as fish or shellfish rather than general ecological relationships.

Legislation has been enacted in Maine providing that the Commissioner of Sea and Shore fisheries may acquire land and water areas no more than 2 acres in extent for the purpose of scientific research relative to fish and shellfish. The Commissioner may hold any lands so acquired for ten years only.

Specific provision is made in the Illinois statutes for setting aside "Nature Preserve" areas for scientific purposes. The Department of Conservation has authority to acquire land and water areas which may be used for the public purposes of scientific research and education.

In Virginia the Marine Resources Commission has provided specific areas of bottom land for experimental purposes of the Virginia Institute of Marine Science.

Many of the sanctuary provisions in the states are general provisions that apply to all areas within the state. Four states, however, California, Florida, Hawaii and Massachusetts have enacted specific legislation for preserving coastal zone areas.

		MARINE SANCTUARIES	ESTUARINE SANCTUARIES	COASTAL ZONE MGT.	WETLANDS LEGISLATION	TAX INCENTIVES	REFUGE PROVISIONS	PARK & RECREATION AREA MANAGEMENT	GENERAL SOIL & WATER CONSERVATION	SHORE EROSION	OFFSHORE MINERAL DEVELOPMENT	OFFSHORE DUMPING	FISH & GAME LAWS	FISH RESTORATION	PROTECTION OF EN-DANGERED SPECIES	GENERAL ENVIRONMENTAL PROTECTION LEGISLATION	OPEN BEACH LAW
GREAT LAKES	MINNESOTA		●	●	●	●	●	●			●		●			●	
	WISCONSIN		●	●			●	●	●		●		●		●		
	MICHIGAN				●		●	●		●			●		●	●	
	ILLINOIS		●				●	●	●				●			●	
	INDIANA							●			●		●			●	
	OHIO		●					●	●		●		●			●	
	PENNSYLVANIA				●	●		●					●				
ATLANTIC	MAINE		●		●			●					●	●		●	
	NEW HAMPSHIRE				●			●			●		●				
	MASSACHUSETTS	●			●		●	●			●	●	●			●	
	RHODE ISLAND			●	●	●		●					●			●	
	CONNECTICUT				●			●	●			●	●				
	NEW YORK				●		●	●			●		●	●		●	
	NEW JERSEY	P		●	●			●		●		●	●				
	DELAWARE			●			●	●		●			●				
	MARYLAND			P*	●		●	●		●	●	●	●			●	
	VIRGINIA			●	●			●		●			●	●	●	●	
	NORTH CAROLINA			P	●			●	●	●			●			●	
	SOUTH CAROLINA							●					●				
	GEORGIA			●	●			●			●		●				
GULF & CARIBBEAN	VIRGIN ISLANDS	●					●	●					●				
	PUERTO RICO						(NOT AVAILABLE)						●				
	FLORIDA	●	●		●			●		●			●				
	ALABAMA			P			●	●					●			●	
	MISSISSIPPI			●	●		●	●					●				
	LOUISIANA			●				●					●			●	
	TEXAS			●				●		●			●	●			●
PACIFIC	CALIFORNIA	●		●	●			●		●			●	●			
	OREGON			●				●		●			●				●
	WASHINGTON	●		●				●		●			●			●	
	ALASKA			●				●	●				●				
	HAWAII	●		●			●	●	●	●			●				
	GUAM						(NOT AVAILABLE)						●				
	AMERICAN SAMOA	●		●				●					●				

* P - PROPOSED

FIGURE 6: Summary of Sanctuary Related State Legislation

TABLE 7: Summary of Estuarine Related State Land Acquisition Authority

STATE	AGENCY	PURPOSE	AUTHORITY
<u>GREAT LAKES:</u>			
Minnesota	Dept. of Natural Resources	State Parks	M.S. § 85.011
		Scientific & Nature Areas	M.S. § 84.033
		Game Refuges, Hunting	M.S. § 97.481
		Wildlife Habitat Easements	M.S. § 272.59
Wisconsin	Dept. of Natural Resources	Forests, Parks, Hunting & Fishing Areas, Fish Hatcheries	W.S. § 23.09
		Scientific Areas Preservation Council	W.S. § 23.27
	Park Dept.	State Parks	W.S. § 27.01
Michigan	Dept. of Natural Resources	Outdoor Recreation Areas	M.C.L.A. Ch. 299.3
		Wilderness Areas	M.C.L.A. Ch. 322.760
Illinois	Dept. of Conservation	Nature Preserves	I.R.S. Ch. 105 § 465a
		Conserve Areas of Scenic Beauty	I.R.S. Ch. 63 § 19
		Extend Parks, Acquire Riparian Rights	I.R.S. Ch. 105 § 92
	Dept. of Transportation Municipalities	Natural Coastal Areas Recreation Areas	I.R.S. Ch. 19 § 66 I.R.S. Ch. 11 § 92-2
Indiana	Dept. of Natural Resources	Public Parks	I.C. § 60-725
		Nature Preserves	I.C. § 60-888e
Ohio	Dept. of Natural Resources	Nature Preserves	O.R.C.A. § 1517.01
		Wild River Areas	O.R.C.A. § 1501.16
		Animal Management	O.R.C.A. § 1531.06

TABLE 7: (cont'd)

STATE	AGENCY	PURPOSE	AUTHORITY
Pennsylvania	Dept. of Environmental Resources	State Parks Open Acres Fish Propagation Stream Pollution	P.S. § 55-361 P.S. § 19-11941 P.S. § 30-294 P.S. § 32-5116
<u>ATLANTIC:</u>			
Maine	Board of Environmental Protection Commission of Sea and Shore Fisheries	Wetlands Acquisition Flats and Waters for Scientific Purposes	M.R.S.A. 12-4701 M.R.S.A. 12-3701
New Hampshire	Dept. of Fish & Game	Coastal Wetlands	N.H.R.S. 483-A:1
Massachusetts	Dept. of Natural Resources	Coastal Wetlands Wildlife Sanctuaries State Parks and Forests	M.G.L.A. 130-105 M.G.L.A. 131-7 M.G.L.A. 132A-2A
Rhode Island	Dept. of Natural Resources	Wetlands Acquisition	R.I.G.L.A. § 2-1-15
Connecticut	Dept. of Environmental Protection	Wetland Acquisition General Purposes	C.G.S.A. 26-17a C.G.S.A. 22a-25
New York	Dept. of Environmental Conservation	Wetlands and Forest Preservation Fish and Wildlife Management	L.N.Y. ECL § 260 L.N.Y. ECL § 10501
New Jersey	Commissioner of Conservation & Economic Development Hackensack Meadowland Development Commission	Wetland Acquisition Wildlife Habitats Wetland Development	N.J.S. 13:8A-4 & N.J.S. 13:8A-24 N.J.S. 13:1B-15-5 N.J.S. 13:17-6(g)

TABLE 7: (cont'd)

STATE	AGENCY	PURPOSE	AUTHORITY
Delaware	Dept. of Natural Resources & Environmental Control	Parks	D.C. 7-5802
Maryland	Dept. of Natural Resources	General Purposes	M.C.A. 66C-186
Virginia	Cities, Counties, Towns	Federal Water Resource Development Projects	Va. Code 62.1-150
	Various State Agencies	Open Space Lands	Va. Code 10-152
	Virginia Outdoors Foundation	Open Space Lands	Va. Code 10-163
	Commission of Outdoor Recreation	Scenic River Areas	Va. Code 10-175
North Carolina	Dept. of Conservation & Development	Natural and Scenic River Areas and Estuarine Areas	S.N.C. 113A-34
South Carolina	NO PROGRAMS		
Georgia	State Forestry Commission	Forests	G.S. 43-207
<u>GULF AND CARIBBEAN:</u>			
Florida	Water Management Districts	Wetland & Water Management	F.S. 373-139
Alabama	Environmental Improvement Authority	Environmental Improvement	A.C. 8-277
Mississippi	State Land Commissioner	Forest Reserves & Wildlife Refuges	M.C. 49-5-1
	Game & Fish Commission	Fish & Game Mgt. Projects	M.C. 49-5-11
Louisiana	Dept. of Wildlife and Fisheries	Fish Hatcheries, Preserves and Sanctuaries	L.R.S. 56:581 L.R.S. 56:702 L.R.S. 56:801

TABLE 7: (cont'd)

STATE	AGENCY	PURPOSE	AUTHORITY
Texas	Municipal Park Boards of Trustees	Parks	T.C.S. 6081g-1
	Game & Fish Commission	Fish Hatcheries	T.C.S. 40496
Virgin Islands	Board of Supervisors	Soil Conservation	R.O.A.V.I. 7-46
Puerto Rico	NOT AVAILABLE		
<u>PACIFIC:</u>			
California	Cities	Oil and Gas	C.C. 37383
		Submerged Lands	C.C. 37386
	San Francisco Bay Comm.	Wildlife Refuges	C.C. 66606.5
	Director, Parks & Recreation	Parks and Recreation	C.C. 5096.85 & C.C. 5096.94
Oregon	State Game Commission	Wildlife Preservation & Management	O.R.S. 496.325 & O.R.S. 496.330
		Refuges & Recreation Areas	O.R.S. 496-405 & O.R.S. 496.410
	Div. of State Lands	Riparian Rights	O.R.S. 274.450
	State Highway Commission	Scenic & Historic Areas	O.R.S. 390.110
	State Fish Commission	Fishery Resource Development	O.R.S. 506.321
Washington	Dept. of Fisheries	Fishery Administration	R.C.W.A. 75.08.040
	Committee for Outdoor Recreation	Marine Recreation	R.C.W.A. 43.99.020
Alaska	Dept. of Fish & Game	Fish & Game Management	A.S. 16.05.050
	Dept. of Natural Resources	Recreation and Parks	A.S. 41.20.020

TABLE 7: (cont'd)

STATE	AGENCY	PURPOSE	AUTHORITY
Hawaii	Dept. of Land and Natural Resources	Parks General Public Use	H.R.S. 184-21 H.R.S. 171-30
<u>TERRITORIES:</u>			
Guam	NOT AVAILABLE		
American Samoa	NOT AVAILABLE		

Some states also have programs for setting aside areas for protection or preservation of specific species in addition to the federally funded programs for fish and wildlife discussed previously. Virginia for example has established a blue crab sanctuary in which the taking of female blue crabs during certain seasons is prohibited primarily to protect spawning populations.

California

California has an extensive system of underwater parks established along the entire coast. These parks are primarily in local or university control, but the State Division of Parks, through an Underwater Parks Advisory Board, coordinates the overall program.

California has established a number of marine sanctuaries for the purpose of excluding new oil and gas leasing within the areas.

The areas so designated within California extend from the high water line to the 3-mile limit. The areas are off

1. San Diego and Orange Counties
2. Los Angeles County
3. San Clemente and Santa Catalina Islands
4. Santa Barbara County
5. San Luis Obispo County
6. Monterey and Santa Cruz Counties
7. Humboldt and Mendocino Counties
8. Islands of Anacapa, Santa Cruz, Santa Rosa and San Miguel.

In addition, the tidelands of San Francisco Bay and those off Del Norte County are established as "oil sanctuaries" until March 1975.

The only regulation pertaining to the "sanctuary" status of these lands is a prohibition of oil and gas leasing.

Provision is made in the legislation establishing the sanctuaries to initiate leasing in the event drainage of oil reserves is threatened by wells in adjacent areas.

Another program, under the direction of the University of California, is the Natural Land and Water Reserve System (NLWRS). The NLWRS is designed to protect diverse samples of California's natural land and water areas for study and conservation, with emphasis on the value of ecological diversity as a scientific resource. The NLWRS expects to gather over 50 reserves. The reserves are managed by the various branches of the University of California, management being decided by proximity and interest.

Florida

Florida has two programs that are particularly relevant to a study of sanctuaries. The first Underwater State Park in the United States was the John Pennekamp Coral Reef Park off Key Largo, Florida. Except for a small land area containing concession facilities, this park is entirely underwater. The park and the adjoining Key Largo Coral Reef Preserve are managed by the Florida Division of Parks and Recreation as a single unit. The park management is oriented to providing recreational experiences to its visitors, but with strict regulations, such as an absolute prohibition of spearfishing and taking of corals, for protection of the underwater habitats.

The other Florida program is the state system of aquatic preserves. The Board of Trustees of the Internal Improvement Fund, as holder of title to all state owned submerged land, can set aside exceptional areas of state owned land and associated waters. The regulations, primarily anti-dredge and fill, are designed to keep the areas in the same condition as at the time of preserve designation. Three types of preserves are envisioned under the system.

1. Biological - to preserve or promote certain forms of animals or plant life.
2. Esthetic - to preserve certain scenic qualities or amenities and
3. Scientific - to preserve certain features, qualities or conditions--which may or may not include biological and esthetic--for scientific or educational purposes.

It was not considered necessary to establish aquatic preserves for general outdoor recreation.

Florida now has 123,900 acres of land and 667,970 acres of salt water in the aquatic preserve system.

Hawaii

Hawaii has two mechanisms for establishing coastal zone sanctuaries, Marine Life Conservation Districts and Natural Areas Reserves. Both of these areas may be established by the Board of Land and Natural Resources. Three areas have been established under these provisions, two Marine Life Conservation Districts and one Natural Area Reserve. These areas have very restrictive regulations which, with the exception of hook and line fishing in one subarea, forbid any taking of animal or plant life and any activities which will interfere with or hazard animal or plant life. These areas are managed as much as possible to retain them

as undisturbed natural areas, and are not recreationally oriented.

Massachusetts

The Commonwealth of Massachusetts has established 4 Ocean Sanctuaries encompassing state owned submerged lands in certain areas of the state. The first sanctuary established, the Cape Cod Ocean Sanctuary, is intended primarily to serve as a protective buffer to the Cape Cod National Seashore. A provision of the statute establishing the first sanctuary states:

"The Cape Cod Ocean Sanctuary...shall be protected from any exploitation, development or activity that would seriously alter or otherwise endanger the ecology or the appearance of the ocean, the seabed or subsoil thereof, or the adjacent Cape Cod National Seashore."

Sanctuary legislation in Massachusetts is essentially prohibitory. In the Cape Cod, Cape and Islands and Cape Cod Bay Ocean Sanctuaries, building any structure on the seabed or under the subsoil, removal of sand, gravel or other minerals (except for approved public beach replenishment projects), drilling for subsoil minerals, gas or oils, commercial advertising, and dumping any commercial or industrial waste is prohibited.

Approved cable laying, channel and shore protection projects and navigation aids or improvements are allowed as is harvesting fish and shellfish.

Thermal effluents are permitted in all and incineration of solid waste or refuse on vessels is prohibited in all but the Cape Cod Ocean Sanctuary.

The North Shore Ocean Sanctuary provisions are essentially the same as in other sanctuaries with the exception that sand and gravel or other mineral extractions are permitted under license from the Department of Natural Resources. The Commonwealth of Massachusetts, however, has established a moratorium on marine mineral exploitation so no management experience is available for mining activities in the sanctuary.

Other State Programs

The Wisconsin Scientific Areas Program was begun in the early 1950's in an effort to provide natural areas for research and preservation of native species. The original statute had no provisions for staff, but recently the State Board for the Preservation of Natural Areas has obtained legislation providing for a trained permanent staff and operating expenses of an expanded field program. The areas which have been investigated by the Council include several sites on the Great Lakes, including forests, beach and dune areas, marshes and wetlands.

The Indiana Nature Preserves System was established by legislation in March, 1967. The bill provided for the establishment of the Division of Nature Preserves, under the Department of Natural Resources, whose duty is to maintain a registry of actual and potential preserves and preservation of these areas. The preserves are intended to retain for the people of Indiana the opportunities to benefit from the scientific, aesthetic, and cultural values of the areas.

Summary of State Programs

To summarize, the state coastal sanctuaries established fall into six general categories. These categories, however, are not mutually exclusive in that in a given sanctuary or regulated area, other categories may occur to a greater or lesser extent.

1. Recreational: Areas set aside primarily for recreational purposes with regulations to ensure the protection and preservation of the resources providing the recreational experience, i.e., John Pennekamp Coral Reef State Park, Florida.
2. Multiple-use: Areas in which specific activities are either prohibited or closely regulated, i.e., California's Oil Sanctuaries and Massachusetts' Ocean Sanctuaries.
3. Natural: Areas set aside to preserve in the natural or wilderness state, activities and presence of man severely restricted and regulated, i.e., Hawaii's Natural Area Reserves and Marine Life Conservation Districts and some of Florida's Aquatic Preserves, Wisconsin's Scientific Areas Program.
4. Esthetic: Areas in which regulations are designated to protect general quality of an area rather than a specific resource, i.e., some of Florida's Aquatic Preserves and to some extent California's and Massachusetts' Ocean Sanctuaries and some Indiana Nature Preserves.
5. Scientific: Areas established primarily to enable scientific and educational activities, i.e., some of Florida's Aquatic Preserves, Wisconsin Scientific Areas.

6. Species Preserves: Areas in which regulations are designed to protect a given species or group of species, i.e., Virginia's Crab Sanctuary and all the state waterfowl refuge programs.

Non-Government Programs

There are several very active programs underway within the private sector of the Nation. Two groups, The Nature Conservancy and the National Audubon Society have active acquisition programs. National Audubon Sanctuaries are areas of outstanding natural value that the society has acquired to protect from destruction or disturbance or areas that serve for nature education. Only one Audubon area includes an area set aside primarily for public viewing. There are just under 30 Audubon owned or managed sanctuaries in the coastal zone. The other major acquisition program is that of The Nature Conservancy. The Conservancy traditionally has purchased natural areas to protect biological and physical features from destruction. Once purchased the lands are usually turned over to other agencies for management. The Nature Conservancy has very recently purchased several of Virginia's barrier islands and is now considering the possibility of managing these islands themselves.

The Nature Conservancy, in conjunction with the Smithsonian Institution Center for Natural Areas and the International Biological Programme Conservation of Ecosystems subcommittee (US/IBP-CE) are conducting various kinds of natural area inventories. The IBP-CE purpose is to establish the theoretical and practical foundation for a National System of Ecological Preserves.

These inventory programs were conceived and initiated independently, but are presently cooperating so as to avoid unnecessary duplication of effort. These activities and the Natural Area Inventory of the National Park System exchange relevant information so that the Federal and private efforts are supportive of each other.

Hypothetical Sanctuary Types

Ideas, Philosophies and Attitudes Toward Sanctuaries

Five major philosophies regarding coastal area sanctuaries emerge from a review of the opinions and attitudes of interested parties. These are: habitat preserves, species preserves, research areas, recreational areas, and multiple-use areas.

The various expressions of opinion regarding these types of sanctuary areas have been synthesized and are presented below. Before discussing these types of sanctuaries, however, it is necessary to consider one very important aspect, the difficulty of protecting a sanctuary once established.

It has been suggested that sanctuaries contain or be surrounded by buffer zones. This concept is practiced within the National Park System in its land classification system (Table 2).

Another suggestion that has presented itself in the course of this study, partly from the precedent set in Massachusetts with the establishment of the Cape Cod Ocean Sanctuary to protect the Cape Cod National Seashore, is initially establishing marine or estuarine sanctuaries adjacent to land areas already under some form of protection such as National or State Refuges, National or State Parks, National Seashores or Recreation areas, or even privately protected areas such as Audubon or Nature Conservancy holdings, for mutual protection.

The Estuarine Sanctuary provisions of the CZMA specifically include necessary uplands within the definition of the sanctuary. The Marine Sanctuary provisions of P.L. 92-532, however, stand mute on this point.

The following five sanctuary types are presented to serve as a basis for discussion during the Workshop on Sanctuaries. It may, and probably will be, that sanctuary programs whether they be Estuarine or Marine combine certain aspects of most of these "types." It is possible to envision that some sanctuaries may be proposed to protect a very limited or specific resource and that any activities which do not adversely impact that resource may be allowed.

Habitat Preserves

This concept advocates the reservation, protection and management of essential or specialized habitats utilized by rare or endangered plant and animal species or representative habitats of outstanding quality. Management recommendations usually involve total preservation or severe restriction in use. It is generally agreed that the quantity and type of public access should be limited and controlled in wilderness areas to protect the values for which the preserve was created. This does not necessarily mean all human beings should be prohibited in order to maintain an area as it is. In many cases excluding man would be the first occasion in a long time that an area was without human inhabitants.

Species Preserves

This type of sanctuary is intended to conserve genetic resources. Some persons would advocate preventing the extinction of endangered species, or maintaining or increasing only those species which would provide substantial public benefit. The general feeling, however, is

that ecological diversity of itself has incalculable value as a scientific resource. The Council on Environmental Quality has stated that the "widest possible diversity of and within species should be maintained for ecological stability of the biosphere and for use as natural resources. The survival of all species, including man, depends upon the diversity of existing gene pools." A primary purpose for the establishment of these preserves is to maintain species populations and communities for restocking other areas and for reestablishment purposes in the future. It is generally felt that the constraints on these areas need not be as stringent as for habitat preserves. Some uses which are compatible with the natural life there could be permitted. The orientation toward species preservation might entail the protection of migratory pathways, spawning grounds, etc., which adds another dimension to this sanctuary concept.

Research Areas

There are two concepts of estuarine and marine sanctuaries dedicated to scientific research and education: natural areas and field laboratory areas. Research natural areas are lands left undisturbed for purposes of research and education. Taking or disturbing animals and plant life, natural rocks and soils, etc. is prohibited. Basically, the only activity intended is observation. Field laboratory areas are subject to manipulation, ranging from collection of plants and animals and experiments to study responses to human modification to severe manipulation to study both the stress effects and the restorative process. Also suggested is experimental aquaculture by which the natural environment would not only be preserved but conceivably even, enriched. The purpose of both types of research areas is to establish ecological baselines against which to compare and predict the effects of man's activities, and to develop an understanding of natural processes, which forms a basis for intelligent management of the coastal zone.

A philosophical (and management) problem arises with reconciling the two concepts of research areas. The two concepts are to some extent mutually exclusive when applied to or at a restricted site. Solutions to this problem may involve establishment of separate natural and manipulative areas covering the same type of ecosystem, or establishment of sanctuaries of sufficient size that manipulative studies may be conducted without impacting significantly upon natural areas.

Research areas should be chosen according to the biota they support. Many feel that they should be selected to include representative samples of all the significant ecosystems in the country. Others recommend protection of environmentally unique sites. It has even been implied by some scientists that where unique organisms and unique biological communities are not present, preservation may not be justified, although there are perhaps more compelling arguments

that research should be concentrated in more representative areas to provide more meaningful information to CZ managers, particularly if the sanctuary is established under provisions of the CZMA.

Management options range from protection only, to active management and manipulative practices, based on ecological principles to maintain desired types. It is important to consider the size of a research sanctuary. One consideration is that a sanctuary must be sufficiently large to accommodate the number of research scientists, students and instructors anticipated, without their causing significant damage which would sharply reduce its educational and scientific usefulness. Areas must also not be so limited that the biological compartments of the habitat will simplify rather than maintain their natural diversity and stability. When considering the preservation of estuaries, the entire drainage basin, or tidal watershed, must be taken into account. The quality of water entering and leaving the sanctuary must be considered and if possible protected. It has been suggested that estuarine sanctuaries be set up on a natural drainage or other physiographic basis. In all the above mentioned cases, it may be desirable to establish a buffer area zoned into natural use surrounding the sanctuary.

Recreational Areas

This sanctuary type is intended primarily for public enjoyment based on esthetic or recreational values of the area. As with research areas, selection may be determined according to either unique or representative aspects. Some feel that the public interest should be uppermost and, therefore, the maximum recreational use of shores and underwater areas by all the populace must be developed, balanced, of course, with preservation. This often means placing the benefits within reach of the largest possible number of people. Thus, proximity to urban centers is a frequent criterion, as is accessibility.

On the other hand, the opinion is often voiced that many recreational activities conflict with the concept of wilderness preservation, and great care must be taken not to destroy the environmental quality and the ecological balance. People of this opinion advocate limited access, reduction in the number of visitors allowed, and restriction of recreational uses. Some uses that are specifically mentioned as undesirable are hunting, the use of motorized transportation (motorboats, for instance, accelerate shore erosion from wave action), and uses that are not based on unique characteristics of the area (in other words they could be provided elsewhere). Regarding use of private automobiles, some groups advocate only public transportation within the preserved areas, with parking lots, etc., kept outside. Other facilities related to recreation, tourism, and "housekeeping" functions

could be also restricted to the perimeter. Public education is important and more should be done to explain the values of the natural area to the visitors. A zoned use concept has been recommended with zones set up according to carrying capacity for various kinds of activities. Acceptable and compatible recreational uses are assigned for each zone. The recreational activities could also be confined to marginally productive lands outside a wilderness or research area. This is in line with the recommendation for buffer zones surrounding research areas mentioned in the previous section.

Multiple-Use Areas

The multiple-use philosophy maintains that the natural environment can be protected and still provide multiple public benefits. Areas should be selected to meet all present and future needs for products of the marine environment. One suggestion is to designate lands which are not considered critical to ecological balance as conservation areas, to be used for extensive land uses as opposed to intensive. These could serve as buffer zones for preservation areas and would represent retention of use options for future generations.

One interest particularly concerned with this type of sanctuary is the fishing industry which feels it is in the interest of all the people to develop and protect living aquatic resources. This entails maintenance of high water quality standards and protection of fish habitats (spawning, feeding and nursery grounds). The industry maintains that it contributes directly to the nation's food supply and uses the resources in a renewable fashion. Waterfowl hunting is another use advanced under this concept. The sand and gravel industry feels that the effects of dredging in waterways is negligible, and disturbance is limited in area and duration. The public benefits on the other hand are many, including improvement of navigation, adding sand to beaches, and providing construction aggregates. In its opinion the use of estuaries and other waterways must be balanced according to the value received by the public in each instance. Oil industry spokesmen oppose the establishment of sanctuaries that would prohibit oil drilling. Such action would cut off a source of oil, that of the outer continental shelf, which is critical to the nation. They offer their good safety record, training schools set up to teach proper well control techniques and oil spill cleanup organizations established along the coast as evidence of environmental concern.

Potential Legal Problems Associated with the Establishment of Marine and Estuarine Sanctuaries

A perusal of the sanctuary provisions of the Coastal Zone Management and Marine, Protection, Research and Sanctuaries Acts indicates that

there is much potential within the rubric of the Acts for conflicts with existing concepts of international law and United States Statutes, rules, and regulations. The purpose of this section is merely to acquaint the reader with some of these potential conflicts. However, there is a *caveat*. Because of the nature of the statutes discussed here, an apparent conflict between two statutes may be resolved by a conclusion that the acts are supplementary to each other. This conclusion may be based upon the supposition that most Federal Legislation in the fields of conservation and resources regulation has been land - oriented in a general way and the sanctuary provisions are much more specific.

In view of the above, only the most obvious potential conflicts have been selected for analysis. No attempt has been made to resolve these conflicts with one exception. The issue of state enforcement of state statutes in areas under Federal jurisdiction has been resolved in Federal Court and is presented here.

Potential legal conflicts have been categorized as follows:

1. Conflicts with International Law
2. Conflicts with other Federal Laws
3. Conflicts with Federal Permit Programs
4. Enforcement of State statutes by state officials in areas under Federal jurisdiction.

Potential Conflicts with International Law

Conflicts in this area will be discussed within the context of United States jurisdiction over the territorial sea and the Continental Shelf *vis-a-vis* rights enjoyed by foreign states in these same areas. Foreign rights are those acquired by custom and tradition and through bi-lateral and multi-lateral treaties and conventions.

The Territorial Sea.--Under general principles of international law, the territory subject to the jurisdiction of the United States includes all land areas under its dominion and control, the ports, harbors, bays and other enclosed arms of the sea along the coast and a marginal belt of the sea extending from the coast line outward a marine league, or three geographical miles. Ocean areas seaward of the three mile limit are high seas and international waters and are considered to be the common property of all nations.

Within this three mile wide territorial sea, United States authority is very broad and is similar to the authority exercised in inland waters. The most obvious right enjoyed by foreign flag vessels is the right of innocent passage, codified in 1958 under the Convention on the Territorial Sea and the Contiguous Zone (15 UST 1606).

The Contiguous Zone.--In order to provide for the protection and perpetuation of fisheries resources contiguous to the nation's coasts, President Truman in 1945 issued a Presidential Proclamation stating that the United States deemed it proper to establish conservation zones in areas of the high seas contiguous to the nation's coasts wherein fishing activities have been or in the future may be developed and maintained on a substantial scale (10 F.R. 12304). In addition, the United States conceded that all States had the right to establish these conservation zones off their shores provided only that these states recognized the right of the United States to do so. This Proclamation cited no specific boundary line.

In 1964 legislation was enacted by Congress prohibiting all fishing activities by foreign states within United States territorial waters without specific authority from appropriate United States Government agencies (P.L. 88-308, 78 Stat. 194).

In 1966 the Congress established an explicitly defined fishery zone contiguous to the territorial sea of the United States (P.L. 89-658, 80 Stat. 908). Within this zone the United States exercises the same rights with respect to fisheries as it has exercised in the territorial sea. However, the United States does recognize rights of traditional fishing activities of foreign flags. The inner boundary of the contiguous zone is the outer limit of the territorial sea and its outer limit is defined as a line drawn so that every point of it is nine nautical miles from the nearest point on the inner boundary.

Under the Convention on the Territorial Sea and the Contiguous Zone, signatories are authorized to exercise the control necessary to:

- (a) Prevent infringement of customs, fiscal, immigration or sanitary regulations.
- (b) Punish infringement of the above regulations committed within its territory or territorial sea.

Rights exercised by foreign flag vessels in the United States Territorial Sea and Contiguous Zone under treaty conditions are many and varied. At the present time, the United States is a party to at least 38 fishing treaties with 58 nations.

The Continental Shelf.--The principal documents governing United States Policy on its Continental Shelf are the Outer Continental Shelf Lands Act (OCSLA, P.L. 83-212, 67 Stat. 462) and the Convention on the Continental Shelf signed at Geneva in 1958 (U.N. Doc. A/Conf. 13/L.55). OCSLA pertains to all submerged lands outside of the boundary of the United States territorial sea and lying on the continental shelf. Under this act the United States has extended its laws, jurisdiction, and authority to all seabed and subsoil regions on and under the Shelf.

The main thrust of the act is aimed at setting up an administrative process through the Secretary of the Interior whereby mineral extraction may be regulated in such a manner that rights of fishing and navigation are unaffected.

Under the Convention, the coastal state exercises sovereign rights over its shelf for purposes of exploration for and exploitation of its natural resources. Natural resources, for purposes of the Convention, are mineral, non-living resources of the seabed and subsoil and sedentary species of living organisms. Sedentary species are those organisms which, at the harvestable stage are either immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or subsoil.

For purposes of the Convention, it will be assumed that establishment of a marine sanctuary beyond the three mile limit and on the continental shelf is tantamount to "exploitation of natural resources." Article 5, § 1 of the Convention expressly prohibits "any unjustifiable interference with navigation, fishing, conservation of living resources or fundamental oceanographic research."

Article 5, §§ 2-7 provides that the littoral state may construct any device necessary for exploitation. Safety zones within a radius of 500 meters may be established around such installations. The Convention makes it clear that these installations do not possess the status of islands, have no territorial sea and their presence does not affect the delimitation of the territorial sea of the coastal state.

Regarding scientific research, the Convention expressly states that consent is necessary but the littoral state shall not normally withhold consent if the request is submitted by a qualified institution for purely scientific research. The coastal state has a right to be represented or participate in such research.

Under the Convention, the possibility exists that the establishment of a marine sanctuary would probably interfere with navigation, fishing or oceanographic research. Therefore, prior to the establishment of a sanctuary there would have to be consultations with foreign governments.

The High Seas.--The principal document governing United States policy on the high seas is the Convention on the High Seas (U.N. Doc. A/Conf. 13/L.53). Under this convention, the high seas are defined as all ocean areas not included within the territorial sea or internal waters of a state.

Basic rights insured by the convention include, *inter alia*, freedom of navigation and fishing, freedom to lay submarine cables and pipelines and freedom to fly over the high seas. Article 8 provides that warships on the high seas have complete immunity from the jurisdiction of any state other than the flag state.

Potential Conflicts with Other Federal Laws

During hearings held prior to passage of the Coastal Zone Management and Marine Protection, Research, and Sanctuaries Act of 1972, concern was expressed by various parties that these pieces of legislation might conflict with existing Federal legislation or possibly overlap or duplicate authority vested in Departments outside of Commerce. For purposes of this section three previously existing major Federal Acts have been chosen for discussion: 1) The Land and Water Conservation Fund Act, 2) The Estuarine Area Study Act and 3) The National Wildlife Act.

A review of the broad grant of authority to the Department of Commerce as set forth in the Coastal Zone and Marine Protection Acts reveals a legislative intent to gain the desired protective policy through two avenues: indirect federal control through an assistance program involving federal-state cooperation, and direct federal control through the broad grant of authority to the Secretary of Commerce to designate marine sanctuaries and promulgate rules and regulations regarding their uses.

Does such a broad grant of authority preclude sanctuary establishment activities by other departments? In order to answer this question, several other Congressional enactments must be briefly discussed.

The Land and Water Conservation Fund Act.-- First, certain provisions concerning federal recreational programs involve authority which could conflict with the authority granted the Secretary of Commerce in the above two acts. Under the Land and Water Conservation Fund Act (16 USC § 460k) the Secretary of Interior is required to administer areas under the National Wildlife Refuge System, National Fish Hatcheries and other conservation areas for purposes of public recreation. The Secretary of Interior is also empowered to curtail recreational activities at his discretion. Title 16 § 460k-1 authorizes the Secretary of Interior to acquire land for fish and wildlife oriented recreational development or for the protection of natural resources. The Secretary of Interior is authorized to inventory the recreational needs of the nation and to develop a national plan to see that these needs are fulfilled. Although the areas over which the Secretary of Interior is granted authority may include areas which fall under the jurisdiction of Commerce under P.L. 92-532, there is little likelihood of conflict. The grant of authority to Interior, although conservation oriented, makes no specific mention of sanctuaries and an interpretation which includes the establishment of sanctuaries would be by implication. The sections

read in the context of the entire act reveal a primary Congressional intention of fulfilling growing recreational needs. The establishment of sanctuaries is neither mentioned nor implied.

Estuarine Area Study Act.--The Estuarine Area Study Act (16 USC § 1221 et seq.) further reveals a grant of authority to the Secretary of Interior to conduct research and inventory the nation's related areas. The study was to focus attention on whether an area should be acquired or administered by the Secretary of Interior or by a State or subdivision or whether the area could be adequately protected and maintained without federal land acquisition or administration. It is further specified by 16 USC § 1223 that no lands be acquired until authorized by subsequent act of Congress. After completion of the study, the Secretary of Interior may enter into agreements with any state for the permanent management, development, and administration of any area in an estuary. Here there is no specific mention of a statutory grant of authority for the purpose of establishment of estuarine sanctuaries. The act read in context seems to delegate authority to gather information and make recommendations for Congressional action. There seems little area for conflict with authority granted the Department of Commerce under the CZM and Marine Protection Acts. The authority granted Commerce is specific regarding sanctuary establishment. The power granted Interior is broad but deals only indirectly and by implication with authority for sanctuary establishment. Therefore, the question initially stated must be answered in the affirmative. The authority granted Commerce appears sufficiently broad in scope to preclude establishment of sanctuaries by Interior. However, § 1223 of the Study Act seems to provide authority whereby such a sanctuary, once established, could be managed by the Department of the Interior.

The National Wilderness Act.--The National Wilderness Act (16 USC §§ 1131 et seq.) provides for the establishment of a National Wilderness Preservation System composed of federally owned areas designated by Congress as "wilderness areas." In general, a "wilderness area" is an undeveloped area which "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable" (16 USC 1131). Certain uses are permitted such as those necessary to realize recreational or other wilderness purposes.

Areas incorporated in the wilderness system will continue to be managed by the department and agency having jurisdiction at the time of inclusion in the system. No appropriation can be obtained for management of the wilderness system as a separate area.

A casual reading of the Wilderness Act would suggest that Congress did not contemplate the inclusion of submerged areas within the system because of the lack of certain words commonly associated with legislation involving submerged areas. However, there is no language which either specifically excludes or includes

submerged areas.

Any Federally owned land meeting the criteria set forth in § 1131 qualifies for inclusion within the system. A listing of the necessary qualifications would include the following:

1. It must be untrammelled by man.
2. Man himself must be merely a visitor therein.
3. It must be undeveloped.
4. It must retain its primeval character and influence.
5. It must be without permanent improvement or human habitation.
6. It must appear to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable.
7. It must have outstanding opportunities for solitude or a primitive and unconfined type of recreation.
8. It must be of sufficient size to make practical its preservation.
9. It may contain features of scientific, educational, scenic, or historical value.

None of the above listed criteria would exclude submerged lands. The language is of necessity general in order to cover all types of land areas. By implication submerged lands are covered by the Act and should not be excluded merely because the specific authorization is absent. It would seem within the spirit and policy of the Act to include within its protection all areas which meet the qualifications and are approved for inclusion by Congress.

The next question logically is: Does the inclusion of submerged land within the Wilderness System conflict with Title III of the Marine Protection, Research and Sanctuaries Act of 1972? There would seem to be no jurisdictional conflict with Title III as the Wilderness Act specifically provides in §1131 (b) that incorporated areas would continue to be managed by the department and agency having jurisdiction at time of inclusion in the wilderness system. Therefore any submerged area incorporated in the wilderness system under the Wilderness Act would be administered in accordance with the Act thus avoiding any inter-departmental conflict. In the same context a Marine Sanctuary designated and established by the Commerce Department under Title III, would, if included within the Wilderness System, remain under the administration of Commerce. The principal difference

between the two acts is merely in the procedure involved in officially designating an area as within the protective policy of Congress.

In conclusion it would seem that submerged areas are included by implication in the National Wilderness Act provided the area meets the statutory prerequisites necessary for inclusion and further, there seems to be no jurisdictional conflict with Title III of the Marine Protection, Research and Sanctuaries Act of 1972.

Potential Conflict with Federal Permit Programs.

The establishment of Estuarine and Marine Sanctuaries in coastal zone areas seems to present a fertile ground for potential conflicts with already existing Federal regulatory programs. A survey of the various permit programs indicates that those departments and agencies most affected are the Federal Power Commission, the U. S. Army Corps of Engineers, the Environmental Protection Agency the Department of the Interior, and the Department of Commerce.

Under the Federal Power Act (16 USC §§ 792-823) the Federal Power Commission is responsible for licensing non-federal hydro-electric projects and under the Natural Gas Act (15 USC § 717 (f)) is responsible for issuing certificates of public convenience and necessity for the construction and operation of natural gas pipeline facilities.

The Corps of Engineers has the responsibility of evaluating permit applications for the construction of dams and dikes across waterways (33 USC § 401), the building of piers and dredging in waterways (33 USC § 403 and 407), the building of structures on the Outer Continental Shelf (43 USC § 1333(f)) and improvements in navigable rivers (33 USC § 565).

Under provisions of the Federal Water Pollution Control Act of 1972 pollutant discharges from point sources are prohibited unless a permit has been issued. In order to qualify for a permit the applicant must comply with applicable effluent limitations. This program is administered by the several State water pollution control activities under Environmental Protection Agency guidelines.

Under the dumping provisions of the Marine Protection, Research and Sanctuaries Act the Administrator of the Environmental Protection Agency is authorized to issue permits allowing dumping of materials other than dredge spoils. Responsibility for issuing dredge spoil permits lies with the Secretary of the Army.

The potential conflicts discussed above seem to be obviated by the fact that prior to establishing a marine sanctuary the Secretary of Commerce is required to consult with the Secretaries

of State, Defense, Interior, Transportation, and the heads of other interested agencies. Under the Coastal Zone Management Act, the onus appears to be on coastal states to resolve estuarine sanctuary establishment conflicts with appropriate Federal agencies. Table 8 lists those Federal Regulatory Programs which may have an impact on sanctuary establishment.

Enforcement of State Statutes by State Officials in Areas Under Federal Jurisdiction

This issue is most likely to arise where there are contiguous Federal and State sanctuaries at the three mile limit, where State jurisdiction ends and Federal begins.

For purposes of illustration, we shall assume there is some unique commodity such as sponge or coral which is under Federal and State protection in the commodity's respective areas. We shall further assume that a State enforcement agency is actively engaged in enforcing its laws for the protection of the commodity and necessarily finds its officials in Federal waters. Given the foregoing background, our hypothetical situation is as follows: A defendant is apprehended by state officials in federal waters, beyond the three mile limit, the protected commodity is confiscated, charges of theft are made, and the criminal proceeding is brought in a state court, what is the result when the defendant moves to dismiss for lack of jurisdiction? The court should dismiss the defendant's motion. "A state has power to govern the conduct of its citizens upon the high seas with respect to matters in which the state has a legitimate interest and where there is no conflict with acts of Congress" (Skiriotes v. Florida, 313 U.S. 69). By analogy, a state can enforce its laws outside the three mile limit but within the twelve mile limit.

The criteria then are twofold: a legitimate state interest plus absence of conflict with acts of Congress. The first question to be answered concerns the legitimacy of the state interest. Both the State and the Federal Government have established that protection of the commodity is recognized public policy. To effectively carry out state policy, it is imperative that the state not be restricted to enforcement within the three mile limit. "When its action does not conflict with federal legislation, the sovereign authority of the state over the conduct of its citizens upon the high seas is analogous to the sovereign authority of the United States over its citizens in like circumstances" (Skiriotes v. Florida, 313 U.S. 78-79). The remaining question then is whether there are conflicting federal laws. The applicable statute is the hypothetical Federal Commodity Protection Act prohibiting the exploitation of the unique commodity. Nothing in this statute specifically prevents the exercise of State police power within federal jurisdiction so long as such enforcement is not destructive of the declared policy of the federal government. In the situation considered herein, it would seem that such state enforcement is encouraged. Where state and federal policy coincide,

TABLE 8: Federal Regulatory Programs with Possible Impact on Sanctuary Establishment.

PROGRAM	COGNIZANT AUTHORITY	U.S.C./C.F.R. CITE	PURPOSE AND REMARKS
Construction Permits and Licenses	Corps of Engineers	33 U.S.C. 401	Pre-requisite to construction of bridges, causeways, dams or dikes in or over navigable waters.
		33 U.S.C. 403	Pre-requisite to construction of wharves, piers, dolphins and booms in navigable waters.
		33 U.S.C. 565	Pre-requisite to making improvements to navigable rivers or harbors. Any improvements must not impede navigation and no toll may be imposed for their use.
		33 U.S.C. 525	Pre-requisite to construction, operation and maintenance of bridge over navigable waters.
		43 U.S.C. 1333(f) Outer Continental Shelf Lands Act.	Pre-requisite to erection of any structure on the Outer Continental Shelf.
	Federal Power Commission	16 U.S.C. 797(e) 18 C.F.R. § 4 et seq.	Licenses required for construction and operation of dams, water conduits, reservoirs, power houses, and transmission lines.
		15 U.S.C. §§ 717 f(c) and f(e)	Certificate of public convenience and necessity is a pre-requisite to construction and operation of natural gas transmission facilities.

TABLE 8: (cont'd)

PROGRAM	COGNIZANT AUTHORITY	U.S.C./C.F.R. CITE	PURPOSE AND REMARKS
	Atomic Energy	42 U.S.C. 2133, 2234 et al. 10 C.F.R. 50.1 50.110	License required for construction and operation of nuclear production and utilization facilities
		42 U.S.C. 2011, et seq.	Regulates effluent discharges from nuclear plants.
	U. S. Coast Guard	33 U.S.C. 401, 491-507, 511- 534, 33 C.F.R. 114.10.	Bridge construction permit based upon Coast Guard evaluation from a navigational standpoint.
Spoil Disposal Activities	Corps of Engineers	33 U.S.C. 1341(c)	Pre-requisite to depositing spoil in navigable waters.
Dredge and Fill Permits	Corps of Engineers	33 U.S.C. 403 33 C.F.R. 209.120	Permits required for dredge and fill activities in navigable waters.
Transportation and Dumping of Materials	Environmental Protection Agency, Corps of Engineers	33 U.S.C. 1412 40 C.F.R. 220	Permit from E.P.A. required to transport for the purpose of dumping or to dump any materials including radiological, chemical and biological warfare agents into certain ocean waters. The only materials excepted are dredged materials. The Corps has cognizance in this area.
Pollutant Discharge	State water pollution	33 U.S.C. 1341 National Pol-	Any person applying for any Federal license or permit is required to demonstrate compliance

TABLE 8: (cont'd)

PROGRAM	COGNIZANT AUTHORITY	U.S.C./C.F.R. CITE	PURPOSE AND REMARKS
	control activities under E.P.A. guidelines.	lutant Discharge Elimination System.	with E.P.A. issued standards or permits will not be granted.
Sewage Sludge Disposal	E.P.A.	33 U.S.C. 1345	Disposal of sewage sludge into navigable waters is prohibited except in accordance with a permit issued by the Administrator of E.P.A.
Nuclear Facility Effluents	Atomic Energy Commission	42 U.S.C. 2011, et. seq.	Regulation of effluents from nuclear facilities.
Whaling*	National Marine Fisheries Service	16 U.S.C. 916J 50 C.F.R. 230.1 16 U.S.C. 916J 50 C.F.R. 230.13	Licenses required to engage in all forms of whaling. No licenses were issued after 31 December 1971. Permit necessary to take, tag or study whales for scientific purposes.
Northwest Atlantic Commercial Fisheries	NMFS	16 U.S.C. 986 50 C.F.R. 240.1-240.11	License required to fish certain species in Northwest Atlantic waters contiguous to U. S.
Herring Fisheries	NMFS	16 U.S.C. 986 50 C.F.R. 242.1-242.8	Licenses required to take herring in Northwest Atlantic area.
Marine Mammals	Marine Mammal Commission	16 U.S.C. 1361-1383; 50 C.F.R. Part 18	Permits required to take members of the orders Cetacea (whales) and Pinnipedia (seals).

TABLE 8: (cont'd)

PROGRAM	COGNIZANT AUTHORITY	U.S.C./C.F.R. CITE	PURPOSE AND REMARKS
	International Whaling Commission	Art. V, 62 Stat. 1718, §§ 2-14, 16 U.S.C. 916	Regulation of world-wide whaling activities.
West Coast Halibut Fisheries	International Pacific Halibut Commission	Art. III, 5 U.S.T.S., TIAS 2900	License required to fish halibut in territorial waters and high seas off Western Coast of Canada and the U.S.; applies to all vessels over 5 tons displacement and those using set lines.
Pacific Tuna Fisheries	Inter-American Tropical Tuna Commission	16 U.S.C. 951 50 C.F.R. 280.1-280.14	Commission regulates fishing of Yellowfin Tuna in the Eastern Pacific Area.

*Subject also to Marine Mammal Act.

no argument for restriction of the state's power should prevail. An argument for restriction should prevail only where state policy conflicts with federal policy. Where, as here, state policy supports and complements federal policy, prosecutions brought in State courts for offenses committed outside the three-mile limit should not be dismissed for jurisdictional technicalities. Such would be destructive of the declared policy of both the United States and the State. Until Congress specifically excludes state enforcement from federal waters under these circumstances, state enforcement must be allowed to continue for the protection of the commodity.

Natural resources do not adhere to jurisdictional boundary lines. Effective protection of a commodity both within and without the three-mile limit depends upon prompt prosecution and conviction of offenders. So long as the policies of the State and the U. S. with respect to commodity protection coincide, the State should be permitted to apprehend offenders whether the offense is within or without the three-mile limit. To deny the State the ability to effectively enforce outside the limit will ultimately defeat the State's efforts within the limit. Abuse of natural resources would thereby be encouraged by jurisdictional technicalities and the ultimate loser will be the people of the United States.

The United States may enforce state laws in areas under its exclusive jurisdiction even if the offense is not punishable by any act of Congress (18 USC § 13).

Discussion

QUESTION: Does this legislation contemplate economic utilization of these marine sanctuaries?

RESPONSE: The economic utilization is not mentioned in the actual legislation, itself. One reason we have an economic workshop is that I believe there should be some consideration of economic impacts of sanctuaries.

One of the real problems is: What is a sanctuary? I went to five dictionaries trying to get a good definition of a sanctuary. Most definitions related to various religious areas, churches, naves, sacred groves, etc., and there was only one definition, a bird refuge, that was relevant to this workshop.

I think NOAA is interested in finding out if it is thought that sanctuaries can be established and still have economic gain from the sanctuaries. I think this is why they encouraged us to have industry representatives at this workshop. And I hope the people from industry at the workshop will be able to persuade some of the people who aren't from industry that we can have our cake and eat it, too, that these economic activities are possible within an area in which you are trying to preserve certain portions or a certain set of values.

QUESTION: The Marine Sanctuaries Act, Title III, under Section 302(a) indicates that the Secretary may designate areas as marine sanctuaries. What process is involved prior to his designating these areas as sanctuaries?

RESPONSE: NOAA, at this time, has not developed administrative procedures and guidelines. It is hoped that this workshop will give them some help.

QUESTION: Shouldn't we define the thing first? How are we going to do it in this workshop? I don't see how we are going to come up with a definition that everyone will accept.

RESPONSE: The real purpose is not to come up with a definition that everyone will accept but come up with definitions that are acceptable to certain groups of people and then NOAA is going to have to pick and choose from this. I don't expect us to come up with a consensus from this workshop. There are just too many interests that are diametrically opposed to each other over this whole program. What we are hoping to do in the workshop is provide a forum so that these differences can be brought out so they can be understood by everybody.

QUESTION: Does the legislative history cast any light on why the Commerce Department was given the implementing authority on this, rather than the Department of Interior? It seems very much like the National Park concept.

RESPONSE: Yes, the primary reason appears to be the decision to create NOAA as a focus for ocean-oriented activities. Marine and Estuarine Sanctuaries fall in the category of ocean-related activities. If you look at the earlier bills that have been submitted, you will see that administration prior to the establishment of NOAA has been in Interior. If you had no NOAA in Commerce, you would probably have no sanctuaries provision being managed by Commerce.

COMMENT: I think you indicated the Wilderness concept could not be brought to bear in these circumstances. I am sure that it is true, where federal ownership is involved, it could be brought to bear even though the area is less than 5,000 contiguous acres. The Secretary of Interior is obligated to study, in wildlife refuges, those areas of 5,000 acres or more, but it is permissive where there is less than 5,000 and the Wilderness Areas have been brought into the system in numerous areas such as Monomoy off the coast of Massachusetts. Brigantine in New Jersey has a 4,000-acre proposal which has not yet gone through the Congressional pipeline but hopefully will.

QUESTION: To some, the estuarine sanctuaries provisions may seem to be an attempt for the scientists to create a "playground" in which they can come up with the information that will provide answers to our

estuarine problems. The question is: Can the marine sanctuaries be turned around the other way in terms of maintaining for the continued use of our country the resources, such as oil, that we need in our economy, if not being maintained for esthetic or recreation or conservation values in the natural science sense but more from the practical utilization sense?

RESPONSE: The legislation has not mentioned setting up sanctuaries for this purpose. But it does not forbid the utilization of areas that are designated as sanctuaries for resource development. This is one of those things that we have to thrash out today. Now, I am already sure because I have talked to some industry people, that they think some of their activities can be compatible with sanctuary status. The first time I mentioned this to somebody from the oil industry, they told me, "We are not against sanctuaries. We are against driving us out of the areas where we think we should legitimately go. If there is a reason for setting up a sanctuary, that is, a good sound reason, set it up. We can live with it as long as you tell us what you are trying to do." And I think that is a fairly sensible attitude.

QUESTION: Can we only set up one type of sanctuary or can we set up different types?

RESPONSE: That is another thing we want to thrash out. As mentioned, we came up with essentially five philosophies. We separated them, although if you look at most of the existing sanctuaries now you will find many of them have two or three facets involved in them. I think you can set up a multi-use sanctuary or sanctuaries designed for specific reasons. A lot depends on what you are trying to do with the sanctuary provisions. For one thing, it is the first time anybody has given the scientific establishment the ability to buy one of their "playgrounds." One of the few "playgrounds" set up in the coastal zone for coastal zone studies is owned by the Smithsonian Institution on the Rhode and West Rivers in Maryland which is turning out to be a very valuable research area. They essentially control most of the watershed and are able to do a lot down there because of this. We even talked about burning some of the marshes. Down in Virginia, a lot of the local people think this is the way to manage salt marshes, go out and burn them every year. The question is: What does burning do? A controlled burning experiment could answer this.

QUESTION: I know you went to the dictionary to try to find the meaning of sanctuary. Did you try to go back to the committee staffs and determine what the Congress meant by a sanctuary?

RESPONSE: Yes. And I think it still isn't clear what they meant by the estuarine sanctuary. They spelled out that they meant a research area, but not what kind of research. But in defining marine sanctuaries, they were even more vague. There were different thoughts of different Congressmen on what the sanctuary should be. These

thoughts changed throughout the legislative history to some extent. The first were oil and gas sanctuaries which were specifically areas where there would be no mineral exploitation. That was the sole purpose of them. In some of the other bills, the prime purpose was to prevent ocean dumping. But then you started to have a broader concept come in of what sanctuaries should be and it is not spelled out clearly in the legislative history exactly what Congress intended.

COMMENT: I would like to correct a statement you just made. The Ocean Dumping Act does not prevent dumping. It was not set up to prevent dumping, but to regulate it.

RESPONSE: Yes, but the sanctuary provisions were set up to establish areas in which no dumping would occur.

THE NATIONAL PARK SYSTEM

by

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National Park Service

The problem of defining a sanctuary is rather interesting. I was trying to do a discussion paper on what a park is, which is roughly the same problem as what is a sanctuary. So I went to a good dictionary, the Oxford Unabridged, based on historical principles, and it said, "Park, as in 'national park', entered the language in 1872 with the Yellowstone National Park Act." I have a feeling that along with religious sanctuaries and other sorts of things, the New Webster's Fourth or whatever it may be, will have "Sanctuaries, as in 'national sanctuaries'".

It gives me a good deal of pleasure to be here this morning and tell you a little about what the Park Service is doing. Obviously in the time allotted, I won't be able to do as much as I would like to do, but let me try to sketch out some things in terms of what our legislative mandates are, what are some of the things we use to do our business, and some of the problems we have faced.

As I was sitting listening to the discussion this morning, practically every problem that you raised somehow has either been resolved or compromised in the park system some place. And I think if the people who are administering this program would pay attention to some of the precedents that have been established, perhaps you will find there are already solutions to many of the answers you are seeking.

Let me start by saying that the Park Service, itself, is a collection of laws. And I would presume that during this workshop, the session where the action is really going to be is the one on legal aspects, because while we may speak very heroically about what we are going to do or what we are not going to do or what it might be nice to do or what it might be very pleasant to do in all of those places that are going to be set aside, in all probability what happens where is going to be defined either in law or by regulation.

If you start with the National Park Service, the act is the Yellowstone Act, 1872, in many ways an outstanding ecological document, probably one of a kind. When you consider that to many botanists, Anton Kerner's Flora of the Lower Danube, published in 1865, is considered to be the starting place of plant ecology. (I am sure very few of you really know anything about Anton Kerner.) It is somewhat startling that, seven years later, there is a document which is not an academic document of what it would be nice to do if, but a legal document that says what shall be done when.

The Yellowstone Act, if none of you have read it, should be required reading. Among other things, it says that all of the wonders and all the marvelous things there shall be safe from spoilation and that the area shall be maintained in its natural condition. This is 1872. We hadn't been teaching any courses on ecology. There was no Conservation Foundation of America, no Wilderness Society, nor anything else, and yet one of the most enlightened pieces of legislation is on the books. From my own personal viewpoint--I don't know who wrote the act and I am going to do a little legislative sleuthing myself--whoever wrote that act really deserves to be the father of American ecology.

Then it comes to 1916 before the Organic Act comes into being. So we go from 1872 with a whole number of national parks and parcels of land coming into the system between then and 1916, and the Organic Act in 1916 which has some stirring phrases that among other things says the land shall be preserved and conserved and maintained for future generations. It also says some things about grandeur and other reasons for setting aside parks.

Nevertheless, there are two elements that are combined inextricably in the Yellowstone Act and in the Organic Act of 1916. Firstly, there are places people ought to see, visit, use, enjoy, find renewal in; and secondly, there are places which, because of their uniqueness, their scientific value, their scenic grandeur or whatever it is, ought to be preserved so not only this generation can enjoy them but others.

The significant word in the Organic Act of 1916 is "conserve" as well as "preserve". And if we consider wise use as conservation, then I think we are talking about a system which is not dedicated to the single-minded purpose of closing up areas in order to preserve them from whatever, but actually the more expansive use of the word "preserve" which really means a habitat where man can be as comfortable as the beings, the organisms, that normally are found there had man not had anything to do with it. It is quite obvious that what we are talking about is a creation of man. We are talking about our own definitions and talking about things that are based in law.

Now with that as a kind of background, let me say a couple of things about areas that the Park Service manages which might fit in this category of coastal zone management or marine sanctuaries. Probably for many reasons, some of them economic, the Park Service was propelled into the coastal zone business. I think in every act setting aside a national seashore, if one wants to look into the political history of the time, there might be something else kind of lurking in the weeds. It just so happens that the Corps of Engineers statutes of 1938 indicate quite specifically whose responsibility it is to do what in this coastal area. It is really quite obvious that the federal government is not accepting or is not intending to accept the total responsibility

for the management of private lands or non-federal lands in a coastal zone. These are areas of high dynamic physiographic processes, and the management problems are severe.

There are usually provisions for cost-sharing when it comes to state lands, and other kinds of provisions when it comes to private lands and what one is able to do in them. It should not be surprising, then, to discover that a number of national seashores exist where the federal government owns the land between some certain portion of the land and the ocean, which would be the part in greatest need of management, and there might be private holdings or exclusions or in-holdings beyond this zone. When Cape Hatteras was set up as a National Seashore, this exact condition prevailed, and we now are faced with a situation where, because of natural processes in the coastal zone, the land the federal government once owned and presumably was to manage and hold in perpetuity doesn't exist anymore, and the ocean waves are lapping onto private land, which goes into a state jurisdiction as soon as it becomes involved with the tidal zone.

These problems aside, there are good reasons to have places like Cape Hatteras and Lookout, Cumberland, Assateague, Cape Cod, Padre, and the Gulf Islands. These are places which both from the standpoint of scenic beauty and recreational potential are very high on the scale. I don't know specifically what the carrying capacity of Cape Hatteras is, but under certain kinds of use conditions it obviously has to be pretty high.

Part of the problem the Park Service has found no matter where it has gone in this area is a conflict between the dedicated uses of these lands, and if anything is settled at the beginning of a new program, it ought to be a very clear definition of what these kinds of conflicts are likely to be. We find that under the terms of the enabling legislation in most areas that we manage, it is incompatible to have to manage the land for public values, recreational and/or others, and to satisfy the requirements for private values at the same time. If one again takes Cape Hatteras as the example, Cape Hatteras, itself, is a mixture of private, state, and federal ownership. It is an island that is migrating toward the continent. It has all kinds of problems. The problems are very severe and most of them are legal and are going to be settled in court, by law, or by regulation. One island to the south, Core Banks, in the Cape Lookout complex, has no problems. The island is a very "viable" ecosystem in every sense of the word. It is a beautiful place. The recreational potential is just as great and high as it is at Cape Hatteras, but it is not developed. Nobody lives there. There is no conflict between public and private values at Cape Lookout, while there is conflict at Cape Hatteras. There is conflict at Fire Island where the Park Service has some 38 miles of undeveloped seashore and down the shore are a number of "villages" with an estimated real estate value of around a billion dollars.

In order to understand the Park Service and its problems, one has to go park by park and place by place to find out what the management problems are, what the law is, and subsequently, how the Park Service is reacting to it. Let me give you two examples of this. Padre Island, which is one of the most magnificent wilderness beaches we have on the coast of Corpus Christi, has some 80 miles of undeveloped beach. The mineral rights at Padre were reserved; that is to say, they did not devolve to the federal government. So there is oil exploration, active oil exploration, on Padre. It is designated as a recreation area. In this particular case, the uses are not incompatible, at least as yet. We had one little skirmish over the route of a pipeline. The route across the park was the shortest and the cheapest, but there were other alternatives and the other alternatives turned out to be just as good in the long run.

Hatteras, on the other hand, has a legislative history which says the area must be maintained as a primitive wilderness. The notion of the law is completely incompatible with what has subsequently developed on Hatteras, namely second-home development. It is hard to reconcile maintenance of Hatteras as a wilderness with \$40 thousand, \$50 thousand, and \$60 thousand houses on lots which run a significant fraction of that price. They are obvious incompatibilities. They are not going to be solved by research or clever management. They are going to have to be solved by a rigorous examination of whose authority it is to do what, what the law says, and what it should say. And my prediction is that ultimately it will have to be solved by the Congress.

One thing that might be of interest to you is to say, "Okay, how do the units get into the Park Service?" They get in in every conceivable way. They may come in by proclamation. They mostly come in by acts of Congress. These acts of Congress may be the results of interested individuals who want to do something and have the muscle to do it. The number of reasons are varied, and in a very real sense they reflect the political climate, the conservation climate. It is really a kind of equilibrium condition of all the things that are happening at that time.

In some cases, the condition of these areas is indicative of the circumstances under which they came into the system. The circumstances of Redwood coming into the system to a large extent has determined the subsequent management problems. The buffer zone concept never worked at Redwood. The upper slopes of Redwood Creek are being logged. There is a tremendous amount of siltation into Redwood Creek, itself, with some rather severe consequences to the park. These problems will have to be resolved ultimately by legislation. I don't think any amount of study, research, or what not is going to tell us. It will document what we already know and will enable us to make a stronger case than we perhaps are now making, but I think ultimately we are talking about the resolution of these kinds of problems in a legal fashion.

We have another way which is the formal way for units to come into the system. We have a program which is called the Natural Landmarks Program and we have a program which is called the National Park System Plan. Park II of the National Park System Plan is designed to establish natural area type parks. We have a systematic study underway in various portions of the United States to determine which areas merit consideration for either natural landmark status or, ultimately, which ones should be added to the system; that is to say, which should be added to the National Park System. These are then made as legislative proposals and go through the regular mill of the Congressional business and are acted upon in a normal way. The process is enormously complicated but it is very well documented. If anybody would like to explore the whole process of theme studies, new area studies, master planning, development concepts, resources management planning--the whole business from the beginning to the end, in planning, design, construction and operation of these kinds of areas--the system within the Park Service is very well documented and very well spelled out.

What we are really trying to do in the coastal areas is to maintain these areas in as natural a condition as we can. The papers have recently said we have abandoned Hatteras. We haven't abandoned anything. The newspaper story was a leak, and it has nothing to do with the official policy of the organization. We have under consideration a number of very active proposals for Hatteras, not the least of which is to try to figure out how to live up to the enabling legislation which says it should be maintained as wilderness.

In many of the areas in which we work, it turns out that the works of man have an overriding effect on what we are doing, and we can either choose to stand and fight or we can have the system work for us. One of the things we are trying to do in New York Harbor where we will own most of the land that abuts on the harbor, i.e. Breezy Point, Staten Island, Sandy Hook, and Jamaica Bay, is to reach an agreement with the Corps of Engineers in which they tell us where they are dredging sand and we tell them where we need sand. When we think of normal ecological processes involving mineral cycling and energy flow, what we are thinking about is the flow of sand through this particular system, instead of the present policy of dredging and dumping, i.e., dredging and using the sand in construction purposes or dredging and dumping at sea. The question is how can we have a sand cycle. How can we close the cycle and, when a channel is dredged, move it back on the beaches?

We have the same problems on Gulf Islands where a couple of islands are migrating into shipping channels, which is the same as feeding the island into a buzz-saw. The present practice is to move the sand out of the dredged channels and take it out to sea and dump it. Why not bring it around to the other side of the island? The same thing is going on at Hatteras. There is dredging going on there. We want to know why the sand cannot be brought back economically, instead of being dumped at sea.

Most of the seashore areas we manage don't have these sorts of problems. The Rocky Shores of Acadia and others don't have these problems, but they operate in precisely the same way. Where we own the water, we try to manage it the same as we manage the land. Again, however, one has to go back specifically to legislation to say why it is we do what we do where. For instance, the Park Service owns most of Florida Bay. Commercial fishing is permitted. This is commercial fishing within the boundaries of a national park, but it exists there because the legislation which established the park says it can exist there. It is obviously a compromise between all the interests that are involved in the setting aside of this place. One can find this to be incompatible with an ideal definition of a national park but on the other hand, we do have the park, millions of people do come to see it, and most of it is being operated and maintained in its natural condition. Some of the ways which might be considered to be incompatible at first perhaps are not so incompatible if a proper way of regulating these activities can be found. And I am not so sure that we have the ideal way of regulating commercial or sports fishermen in Florida Bay, but certainly we have the mandate, and if we have the will and the cleverness to do it, we should be able to do it.

Many other places within the Park Service are set aside in which no kinds of consumptive uses are permitted. Again, in a system as large as the Park Service, and let's say in a country as large and affluent as the United States, there is no reason why we can't have areas in which we really and truly are trying to establish natural ecosystems operations. We would like to view most of the park system as falling into this category, as being areas where natural ecosystems processes can be studied.

Combining some of these programs, say, with the Council on Environmental Quality mandate for environmental monitoring, there will really be no reason why these things cannot be both in the national interest and to the national benefit. We really ought to have some kind of handle on the effects of technology on the biosphere. I would like to think the Park Service is such a laboratory which is determining the effects on the biosphere. We have parks in highly developed, high density areas, and parks in low density areas. And I personally think that federal agencies, NOAA with this program going on here, and others, working together should be able to establish from time to time what the environmental health of the nation is.

The National Park System has just recently produced a book entitled "A Strategy for Management of Marine and Lake Systems within the National Park System." I would recommend this to anyone interested in the problem of management of coastal ecosystems.

NATIONAL WILDLIFE REFUGES: AN OVERVIEW

by

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Division of Refuges
National Refuge System

The National Wildlife Refuge System today contains over 450¹ units managed under the Refuge Administration Act of 1966 (16 USC 668 dd-ee) and includes over 31 million acres of wildlife habitats. The largest unit in the system comprises 8.9 million acres in Alaska while the smallest unit totals only 0.6 acres in Minnesota. Habitat types range from the arctic slopes of northern Alaska to near tropical islands in Puerto Rico; from the Maine hardwoods to the volcanic isles of Hawaii.

All classes of American wildlife may be found on national wildlife refuges--large and small carnivores and herbivores, all orders of North American birds, reptiles, amphibians, fish and a wide variety of aquatic animals from invertebrates to marine mammals. Eighty-two refuge units provide habitat for endangered species. Some, such as the Key Deer unit and Aransas in Texas, are essential to the continued survival of particular species. Arctic tundra to true desert, alpine lakes to ocean waters, true wilderness to intensively managed units where farm crops replace natural forage plants, refuges provide areas for production, migration, feeding and wintering of American wildlife.

In 1970, the Refuge Division proposed a special mission or objective for itself to provide, manage and safeguard a national network of lands and waters sufficient in size, diversity and location to insure protection of all types of wildlife and to provide environments in which human relationships with land and wildlife are encouraged. Specific management objectives vary according to the species involved and the purposes for which the unit was established. As with the Park Service, the enabling legislation often mandates a refuge objective or purpose. At times, the master planning process determines the best mix of objectives for a unit of the system. Recent management has been directed at maintaining basic ecological relationships in as nearly natural conditions as possible or in returning necessary elements of the natural communities to former status (rehabilitation).

In general, the uses of refuges are as varied as the size, habitats and wildlife found within their boundaries. The main, overriding feature of recreation on national wildlife refuges relates to the constraint that recreational activity must be consonant with the primary purposes of the area. Wildlife-wildlands recreation is especially en-

¹ Includes over 110 waterfowl production areas totaling about 1.2 million acres.

couraged so long as it does not conflict with management objectives. Scientific investigations of the natural world and its inhabitants are encouraged. Studies often range from elementary school groups in an outdoor classroom learning experience all the way through postdoctoral work on specific problems of a complex ecological system. Schools and other Federal agencies often utilize refuges to obtain baseline environmental data to compare or monitor manipulative actions on adjacent or similar lands and waters.

Over 40 percent of the recreational use of refuges consists of activities classed as "interpretive" (e.g. sightseeing, nature trails, birdwatching, photography). Fishing is a major activity on most refuges and accounts for 20-25 percent of the recorded recreational use-days. Hunting amounts to about four percent of the recreational visitation on refuges. (Most refuges may have up to 40 percent of the land and water area open to hunting, but such use does not account for a large portion of the visitor use). Total refuge visitor use-days have exceeded 18 million in recent years.

The coastal involvements of the National Wildlife Refuge System date from the earliest refuge in the system. Pelican Island was established in 1903 as the first National Wildlife Refuge and was dedicated to protection of pelicans and other colonial nesting birds. Since that initial establishment, the system has acquired over 700,000 acres of coastal and estuarine habitats encompassing over 2,200 miles of U. S. coastline. Generally, refuges established in a coastal area have the boundary set at the mean high water mark. There are, however, some exceptions to this with the most notable one being Nunivak Island in Alaska. In addition to the one million acre island, the refuge has jurisdiction over nearly two and one-half million acres of coastal and submerged lands surrounding it. Coastal or marine island refuges comprise over 5.5 million acres and number over 200 individual islands. Many of these have been studied for possible wilderness designation; all of them will be studied. When it is considered that all the islands of the contiguous 48 states comprise a total of 7.5 million acres, then these 5.5 million acres (which include Alaska islands) become quite significant.

What are the needs for the future as far as refuges are concerned? Are we through buying them or are we through acquiring them? The original surveys and inventories for determining needs for refuges were, of course, tied to waterfowl. The basic roots of the National Wildlife Refuge System can be traced to waterfowl. Thus, the earliest "needs" surveys to determine the number and size of refuges required related to waterfowl management "needs." It was determined that 12.5 million acres of wetland and other waterfowl habitats would be necessary to maintain "target level" waterfowl populations. Of the 12.5 million acres, about 4.5 million acres were to be managed by the state conservation agencies; a small amount was designated for private ownership and management, and the remainder was to be acquired and managed by the Federal Government. The states have acquired about three million acres, and presently over four million acres have been placed under Federal management. Thus,

there is yet a substantial amount remaining to be acquired just to meet the original goal for waterfowl purposes.

As yet, there have been no specific acreage needs identified for endangered species or other coastal inhabitants. A key problem in this regard is that inventories of "critical habitats" have been severely hampered by a lack of knowledge on what constitutes habitats for the many species that may be involved. Even in the waterfowl field, one that we have studied longer and more intensively than any other migratory species, we find inconsistencies between what are considered "key" habitats by the biologists and the areas actually used by the waterfowl. A more complete discussion of the research needs in this field may be found in Proceedings of the Marsh and Estuary Management Symposium (Newsom, 1968), held in Louisiana in 1967. Particularly informative presentations on this subject were made by John Lynch, Alexander Sprunt, IV, and John Sincock.

Thus, it is apparent that one of our greatest needs at this time is research aimed at providing reliable methods of inventory and classification of coastal habitats. Such data would permit land acquisition and other programs to be aimed at protection of the most valuable lands and waters, thereby placing them under adequate management control to insure their needs are met. Such programs should be aimed at the highest priority habitats, but this necessarily entails ability to identify such areas. The fact that we have sometimes identified areas as key habitats and acquired or otherwise protected them only to find they were less critical than adjacent areas leads to only one conclusion. We urgently need to improve our knowledge and capability of wildlife habitat classification, particularly in the coastal zones.

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Questions and Responses

QUESTION: Are any of your refuges primarily dedicated to research?

RESPONSE: As far as I know, we have none strictly dedicated to research. As I said, research is an encouraged use of refuges, but I don't know of any that were specifically set up just for research. We have research stations on areas--such as the Bear River Research Center located on the Bear River Migratory Bird Refuge in Utah where the research center was included as part of the legislation that established it (the refuge) in 1928.

LAND AND WATER CONSERVATION FUND PROGRAMS

by

Robert A. Ritsch, Chief
Division of State Programs
Bureau of Outdoor Recreation

The material I want to present to you will answer some of the questions on priorities with regard to the coastal zone and programs administered by the Department of Interior. Since 1965, we have done over 11,400 projects. We do approximately 2,400 projects a year at the current rate, with the states, and we have put out over \$1.5 billion to the states, which is matched in kind, because our program approximates a 50-50 share. Our processing time, from the time a state passes a project to the Bureau to the time the Bureau approves it, is usually less than 30 days and is normally 20 days.

So we have gained a little bit of fame as having a quick and expeditious program, and I just hope we can maintain that kind of enviable record. It isn't so easy these days because you have all kinds of acts which have recently been passed, which sort of do cloud the air, so to speak. In some cases you are talking 60 to 90 days delay in processing a case because the sponsoring federal agency does have to prepare, circulate, and clear an environmental statement, for example. There are many other acts for these sorts of things. Historic Preservation, for example, is another that has strict requirements. But in spite of this, we manage to maintain, I think, a very enviable record.

I am very happy to speak before this group because the Bureau has recognized several relevant things in relation to our Land and Water Conservation Fund program. For example, it is an astonishing fact when you realize that just about half of our population lives within a hundred-mile strip of the coastal zones. That includes both the Atlantic and Pacific and the Great Lakes. On top of that, there is approximately 21,000 miles of shoreline along these bodies of water that would be suitable for recreation, and yet only about 64.4 per cent of that is in public ownership. That means there is an awful lot of private ownership in existence on these coastal areas.

We recognize, too, that the competition for these areas has been fierce. It has always been bad, but when you look at it in the light of the current energy crisis, you recognize that we have had more of an impact on the coastal and estuarine areas. We have also, in the Bureau, always recognized that

most people like to perform their recreation, close to where they live and work. And then you add to this the type of restrictions that we are talking about right now, today, reduced speed limits, no sale of gas on Sunday -- you are talking about people having to perform their recreation close to where they live and where they work. And when you consider that half of our population is within easy one-day reach -- a 100-mile zone -- of the coastal and estuarine areas, then the impact becomes even more clear.

There are a lot of you here who may not be familiar with the Land and Water Conservation Fund program. So if you don't mind, I would like to backtrack for just a moment. The Land and Water Conservation Fund of 1965 was enacted principally to stimulate new and expanded quality in outdoor recreation areas and facilities for present and future generations of Americans. I like to think it was sort of a tickler program because of the state side where we provided money to the states, it was envisioned that our input, large input, from laws, would in effect generate even more state and local money that would not be matched by our money, and would still go for recreation.

While we are talking about recreation, let me define it. We say "outdoor recreation," but perhaps we would be better off to say "outdoor leisure time," because people often tend to define recreation in a very narrow, restricted vein. The Bureau has long advocated that recreation be interpreted in its very broadest sense. We currently fund, sponsor, promote, encourage everything from wilderness areas right on through to intensive recreation areas. So recreation is not a narrow entity.

The Land and Water Fund program has two parts to the federal aspect of the program. It says in the act that 40 per cent of any amount of money that is appropriated will go to the federal agencies for the acquisition only of lands. And it pays 100 per cent of that cost. Now, this services principally poor agencies; the National Park Service -- the gentleman who spoke this morning and indicated a number of coastal and estuarine areas -- I will mention them later -- that have been helped through the Land and Water Fund, the Bureau of Fisheries and Wildlife -- both in Interior -- the Bureau of Land Management in Interior to the extent they have responsibility, and the Forest Service in the Department of Agriculture.

On the state side of the program they get 60 percent of any amount of money that is appropriated into the Land and Water Conservation Fund. At the present time that fund accrues \$300 million annually. It has some special features about it. First, it is an earmarked fund. That is, the monies that accrue to it

don't go into the general treasury. They go into a separate account marked as the Land and Water Conservation Fund. If we do not appropriate them, by and large they stay in the fund until they are appropriated. I mention this because in the current fiscal '74 program we requested and received for appropriation less than \$300 million, which will mean there will be more than \$300 million in the future that we can draw upon.

Initially the fund accrued from three sources. We had the federal tax on motorboat fuel sales, the fees collected from the sale of surplus federal properties and the uses fees from federal recreation areas. Many of you are familiar with the fact that two of these sources are practically exhausted. For example, the surplus properties are now going at about a hundred percent discount to state and local municipal elements of government, so we get very little money from that source. The federal fees after the latest amendment of the Land and Water Act can be retained by the operating agency for any bona fide purpose, particularly for operation and maintenance of the area the fees are collected in.

So we are stuck with the motorboat fuel tax which sounds bad when you recognize that in 1969 it was realized that even when all three of these resources were up to their full capacity we weren't getting as much as we really needed to operate this fund.

So the Congress in its wisdom raised the fund to a guaranteed \$200 million. In doing this, they gave us access to the offshore oil receipts that are collected by the Bureau of Land Management. And again, about 1970, they increased that to \$300 million annually, again using the offshore oil receipts and allowing us to use the general treasury if necessary. Now, the receipts from the offshore oil drilling have always been more than sufficient to bring us up to that \$300 million. So we have no problem with accruals to the funds. Again, this is important in talking about coastal and estuarine areas, because the principal source for our fund is coming from the very sector of the coastal zone you are talking about.

I will give you some examples of what has been appropriated from the fund and utilized to date. About \$2,007,000,000 was appropriated through fiscal 1974. And \$1,005,000,000 of that was for the states so you can double that, and make it \$2 billion and \$10 million, and \$698-some-odd million for the federal agencies I mentioned, for 100 percent acquisition. There was \$33 million for administration of the program. That is only 1.9 percent for administration -- not a bad figure. And of course the Land and Water Fund Act was assigned to the Secretary of Interior and the

Bureau of Outdoor Recreation administers that for the Secretary.

The money that goes out to the states is provided for in the basic act. Forty per cent must go equally to all 50 states but the balance is left up to the discretion of the Secretary of Interior. Here is the way we split it as of today. The Secretary saves 5 percent, which is to meet unforeseen needs. Frequently we find that the states cannot plan 100 percent effectively and land will come up for sale on an emergency basis -- I think one of the former Secretary's expression was "under the blade of the bulldozer" -- and we can move in very fast if the state doesn't have any portion of its money left, and make a direct allocation to them from the Secretary and buy that land. We had a very recent example of this in the State of Virginia where we bought a large tract on the Potomac. It was in the last year or so, about a \$2 million acquisition. That is an example where a developer was getting ready to develop a chunk of land that should have been preserved. The state didn't have any of their remaining apportionment available and we moved in with the Secretary's fund.

Then we give 30 percent to states -- including three territories, the Commonwealth of Puerto Rico, and the District of Columbia -- on the basis of their general population, and we gave 25 percent to these same 55, "states" on the basis of the population they have residing in standard statistical areas -- that is the urban centers. So you can see the fund is definitely slanted to some degree towards states that have population, and particularly urban population. This again is an important factor when you consider how much of the population is within a hundred miles of the coastal zone.

We have also tried to gear this program so the states themselves can operate the program as far as possible. For example, the governors must designate an individual or individuals who are state employees, whom we call state liaison officers, to act as the primary liaison between the Bureau and the states. This varies from state to state. Some have three and some have four, some are appointed by the legislature, some by the governor. But at any rate, they are state employees. They run the Land and Water program at the state level and I don't see a project in the Bureau for approval unless that state submits it to me.

Also, and probably the most important feature of our act, each state must have a Statewide Comprehensive Outdoor Recreation Plan, which we call SCORP. Some people think it is a scorpion and it does sting occasionally. They must have this plan in order to be eligible for money under the Land and Water Fund. But that is simply a tickler to make sure that they develop a comprehensive plan which will not only utilize the money but will utilize other funds that may be available to them, whether it is

privately donated, state money, or whatever. This plan must be approved by the Bureau. The plan has to recognize a broad spectrum of needs, the demand and need for recreation and the needs that the state has. Special groups, including urban and rural, other special groups like the handicapped, etc., must be recognized. Obviously, the plan must be very comprehensive.

When the program first began in 1965 there were only two states that had what you could really call a comprehensive outdoor recreation plan. Now all 55 of those "states" have such a plan that has been approved by the Bureau.

Over a period of nine years these plans have increased in their comprehensiveness. The Bureau has encouraged this through several avenues. At first we only gave eligibility to a state based on our review and analysis of how effective that plan was in meeting the state's needs, and we gave them a fixed period, two years, three years, up to five years. We found we had made a bad mistake because you cannot encourage a state to keep a continuous planning going, a staff on board, funding for that staff, if you are planning on a periodic basis, because at the end of three years they will either call together two or three people and put them in the hot box and say, "You will come up with a plan in two weeks," or go out and hire themselves a consultant -- which is all right, too. I have nothing against consultants. But the point is that a planning effort, no matter whose, for coastal zone land, has to be a viable, ongoing planning process that produces a document that decision-makers can use to set their priorities, legislative programs, and to move a state's program forward.

We have now experimented with a number of states. Those that have plans that are of sufficient quality, we will put on what we call continuing eligibility. They also have to guarantee that they have certain staffing on board and that that staff level is funded and will be funded on a continuing basis. They have to sponsor regional base meetings to draw input from all interested state, local, and private individuals that would be concerned with their statewide comprehensive plan. And they have to print that plan at least once every five years, and distribute it to those decision-makers who should have that plan in front of them. I have a strong aversion for plans that go on the shelf for five years and then you have to knock the dust off so you can revise them. So I think this revitalized planning program will prove to be of great benefit, not only to the Bureau but to the states and the nation.

The Land and Water program, the federal support of coast and estuarine areas, was touched on by the Park's representative, Mr. Sudia, this morning. All of these have been cited for

acquisition by the Land and Water Fund. The Park Service and all the agencies seek their own money for recreational development.

The National Park Service has lakeshores and seashores -- Sleeping Bear, Indiana Dunes, Voyages, Apostle Islands, Biscayne, Assateague, Cape Cod, Cape Hatteras, Cape Lookout -- and these go on. In the Bureau of Sport Fisheries and Wildlife, we have some interesting areas, ranging from Sanibel Island in Florida to Mason's Neck in the State of Virginia, where they were on a cooperative program with the State of Virginia, to San Francisco Bay, a salt marsh area you may be familiar with that is in sad need of protection. The Forest Service has even gotten into the business. They are dealing with the dunes in Oregon and, I hope, making good headway.

I think you can see from what I said about the plan that the state establishes the basic thrusts that we follow in the Land and Water Fund program, i.e., the protection of all sorts of resources, including the coastal and estuarine. For example, in Maine the Planning and Research Division, in cooperation with the state's coastal planners, is undertaking an inventory and mapping effort of outdoor areas on their coastline. This is being done with Land and Water Fund assistance and the final product will become an integral part of their plan with the goal for having a balanced approach, with emphasis on those fast-disappearing coast and estuarine areas. The Florida State plan establishes priority for acquisition of shoreline beaches. The Michigan State plan establishes as their priority for the next five years the acquisition of harbors of refuge. California's plan stresses local and state responsibility for preserving important coastline acreage. They also stress the use of surplus coastline properties as part of this effort, and that is underway, both with the state and some federal agencies, the National Park Service with Gateway West. Rhode Island is under a very ambitious program of promoting the acquisition and preservation of Barrier Island, similar to the barrier islands of Virginia.

There have been a number of significant acquisitions, for example, there have been vast cooperative efforts with the Bureau of Fisheries and Wildlife, to preserve the Mason's Neck area. In Illinois we have the acquisition of major areas by the State of Illinois for addition to their Beach State Park, part of which will be intensively developed for recreation. In Texas there is the Galveston Island acquisition. California and Florida both are under intensive programs to acquire ocean front. But again if this is where the state wants to put their priorities, the Bureau of Outdoor Recreation is in support of that program. That is sort of a thumbnail sketch of the Land and Water Conservation Fund program. A number of you may be interested in getting more detail.

There are catalogs of federal and domestic assistance which are covered under Codes 15.400 and 15.401 for our acquisition and planning programs with the states. That is an annual subscription item, \$7, from the Superintendent of Documents in Washington, U. S. Government Printing Office, 20402. For those of you who are interested, the Bureau of Outdoor Recreation has prepared a document covering grant programs in technical assistance, research, information, grants for land acquisition or development, credit, coordination, etc. And it is a comprehensive document, briefly describing the program, the sponsoring agency, legislative background, where you can obtain additional materials on it, and so forth. This document is available from the Government Printing Office.

Discussion

QUESTION: You said you are hoping to get \$300 million this year?

RESPONSE: Actually fiscal '74 is the first recent year we have not appropriated the amount available to us. In fiscal '73 we appropriated exactly \$300 million. In '72 we appropriated \$357.4 million. This was using up a small carry-over, so it ran actually over \$300 million for a couple of years. But the actual position of this administration has been full funding of the Land and Water Fund. The '74 budget reduction was due to a catastrophic internal budget situation. It was reported we would have carry-overs in the fund both on the federal and state sides of the program. And so we requested only the new money that would match that carry-over money. We said we wanted to do that as a part of the internal adjustment of the budget and then return to full funding after that period of time.

QUESTION: Has BOR spent everything that has been appropriated?

RESPONSE: No, and there is a very good reason for it. Obligations trail what we appropriate and allocate to our federal agencies and states fairly closely. The lag there is usually several hundred million dollars. For instance, we carried over in the state program from '73 into the current '74 program \$136 million. On the state side we carried over something in excess of a hundred million. Now, unfortunately, when you start talking about expenditures it is something else again because you have to remember two things: One, the money is available to the state for three years; second, an awful lot of their projects are construction projects, multiphase, several construction seasons. So it could drag out three, four, five years before an actual dollar expenditure occurs against money allocated three or four years before, and it is not anybody's fault, but simply due to the nature of the beast.

MASSACHUSETTS OCEAN SANCTUARIES

BY

Robert C. Blumberg, Director
Division of Mineral Resources
Massachusetts Department of Natural Resources

Chapter 132A, Sections 13 through 16, of the Massachusetts General Laws contains the provisions for the Commonwealth's ocean sanctuaries. The first of these, entitled the Cape Cod Ocean Sanctuary, was enacted in 1970 and is contiguous to the Cape Cod National Seashore.

The intent of the bill, as stated in the second paragraph, is to protect the sanctuary area from "any exploitation, development, or activities that would seriously alter or otherwise endanger the ecology or appearance of the ocean, seabed, or subsoil thereof, or the adjacent Cape Cod seashore." As in all our sanctuary legislation, the mandate to protect the Cape Cod Sanctuary is given to the Massachusetts Department of Natural Resources. The following activities are expressly prohibited: 1) The building of any structure on the seabed or under the subsoil; and 2) the removal of any sand, gravel, or other minerals, gases, or oils, with the exception of sand and gravel extraction for the purposes of shore protection and beach restoration provided that such projects are limited to public beaches adjacent to the sanctuary.

The reason sand and gravel received a lot of attention in 1970, when this sanctuary was created, was a Massachusetts Port Authority proposal to dredge 22 million cubic yards of sand and gravel from various locations in Massachusetts and Cape Cod Bays, and the fact that one of them was the Governor's favorite striped bass fishing area. Also prohibited within this sanctuary is commercial advertising and the dumping of any commercial or industrial wastes.

The following activities are expressly allowed: 1) The laying of cables, 2) channel and shore protection projects, 3) navigation aids or improvements with appropriate federal and state approval and 4) harvesting of fish and shellfish. Contemplated here were aquaculture enterprises which would require placing structures on the seabed. Finally, permits for temporary educational and scientific projects are expressly permitted.

The second sanctuary entitled "The Cape Cod Bay Ocean Sanctuary" encompasses the water mass of Cape Cod Bay. It was enacted in 1971, one year later, and it contains many of the

same prohibitions as the legislation just discussed. It expressly prohibits the building of any structure on the seabed or subsoil, commercial advertising, the extraction of minerals, gases, soil, and sand and gravel. Sand and gravel is again excepted for purposes of beach restoration with one difference. There is no requirement that the sand and gravel be used only on beaches adjacent to Cape Cod, so theoretically, sand could be transported to other areas for the purpose of beach restoration.

There is a new prohibition in this sanctuary against the dumping of industrial or commercial waste except such quantities of industrial liquid coolant to be dumped by the Massachusetts Division of Water Pollution until the passage of a specific date shortly after enactment of the bill. There is another new prohibition against the incineration of solid waste on or in vessels within the sanctuary. This provision was intended to alleviate a serious problem created by several refuse companies burning garbage in large barges adrift in the ocean. After the fire died, they would dump the residue into the ocean.

As in the previous legislation, there is an express provision allowing for cables, channel and shore protection projects, and navigation aids. There is a new provision allowing projects deemed to be of public necessity and convenience if they are conducted by municipalities, governmental districts, or the federal government and have the appropriate federal and state licenses and approvals. Once again, there is an express provision allowing aquacultural ventures, harvesting of fish by any means, and educational and scientific projects.

The third piece of legislation entitled "The Cape and Islands Ocean Sanctuary" was also enacted in 1971 and encompasses Nantucket Sound and Buzzards Bay. Expressly prohibited, in language similar to our other sanctuaries, is the building of structures, refuse incineration on vessels, extraction of minerals, gases and oil. Parenthetically, there was a lot of interest about marine gas and oil in 1971, but our petroleum geologists tell us there is no gas or oil within Massachusetts territorial waters as they are presently constituted. However, this verbiage made the drafters of this legislation feel a lot better. The prohibition of the discharge of industrial coolant in conjunction with electrical power does not have any data as it did in the previous legislation, and is allowed within this sanctuary by permit from the Massachusetts Division of Water Pollution Control. The power lobby was quite strong and was successful in having this included. Again, there is an express allowance for cables, channel and shore protection, and the activities allowed in the other sanctuaries.

The last Massachusetts sanctuary was enacted in 1972 and is entitled "The North Shore Ocean Sanctuary." This encompasses the area from Cape Anne north, to the New Hampshire border.

The North Shore Sanctuary is exactly the same as the others I just discussed with one significant difference. The extraction of sand and gravel and other mineral resources is not prohibited. It is allowed if the Department of Natural Resources grants a permit or license. The Department felt that mineral resources might be extracted without a significant biological effect or conflict with other users. We were at that time, conducting, in conjunction with the National Oceanic and Atmospheric Administration, a project to determine the extent of harm caused by marine mining of sand and gravel. Although the project was terminated the Department felt at that time, that it was unwise to continue the trend in the previous legislation toward a complete prohibition on mineral extraction until more elaborate and precise scientific information had been obtained on the subject. We were able to have language reflecting this policy included in this sanctuary, which leaves everything north of Cape Cod Bay to the New Hampshire line open in terms of mineral extraction assuming that the appropriate permit can be obtained from the Department. I might add there is a moratorium in effect that was proposed by our Department and passed by the legislature against any type of marine mining until we do obtain more precise scientific information. It is an open-ended moratorium and can be lifted at such time as we feel we have obtained sufficient information to properly assess the situation.

Enforcement of all four of these sanctuaries is left to the Massachusetts Attorney General. Jurisdiction lies with the Supreme Court in equity, therefore making injunctions possible. As a practical matter, injunctions are the only effective tool in that there is no fine or penalty provided in any of the sanctuary bills for violations of their provisions.

It will be quite interesting to see how these sanctuaries are used, amended and interpreted in the years to come. Within the past two weeks, our Commissioner of Natural Resources has interpreted the provision in the Cape and Islands Sanctuary relative to the dumping of commercial or industrial waste as including dredge spoil. We are moving at the present time to prohibit the Corps of Engineers from dumping any more of spoil within the sanctuary areas. You can imagine the Corps is quite unhappy about this and we expect some serious conflict with them since they have been dumping dredge spoil for many years. This will mean they have to go a much longer distance.

Also the Pilgrim Power Plant, which is located in Plymouth, Massachusetts, is planning an expansion of two more units within the next few years. It would seem that they will have to have the Cape Cod Bay Sanctuary amended if in fact they are going to be able to expand. The effluent going into the Bay would certainly violate the sanctuary prohibitions.

Finally, it should be noted that two other sanctuary bills were introduced at the same time as the North Shore Ocean Sanctuary, but failed to pass the legislature. There was a general feeling

at the time that these proposed sanctuaries, which would have included the Boston Harbor and the remaining portion of our coastline not included in the other sanctuaries, would go too far. The entire Massachusetts marine area would have been one giant sanctuary. I think there was a feeling that we have enough sanctuaries at least of this type.

Discussion

QUESTION: Do you think it was a misnomer for the State of Massachusetts to characterize these separate little marine areas as sanctuaries? In effect, it seems as if they have broken up the coastal area into small management units and somehow the word "sanctuary" came out. Do you agree it might have been a misnomer?

RESPONSE: There was no coastal zone plan at the time and no federal or state coastal zone act in being.

I think, as a matter of fact, some of the scientific and environmental groups argued against the last two sanctuary bills that did not pass for that very reason. They wanted an overall coastal zone management type of plan rather than this segmenting of the coastline.

As it turned out, the legislators who were strongest and most vociferous at the time were able to get sanctuary bills passed for their areas. I am not happy, as you are not, with this type of approach, but it does cover a lot of the waterfront, so to speak.

QUESTION: Do your sanctuaries only include territorial waters of the Commonwealth?

RESPONSE: No, more. I should have explained that. There is some conflict as to whether the middle of Nantucket Sound is under state or federal control. We have legislatively claimed it under the historic bay principle and we haven't been disputed yet. We may be challenged on that at some point in the future. In addition there is some area included that is not within our territorial waters. I suppose that also could be open to challenge. The sanctuary boundaries were drawn this way to obtain straight lines.

Massachusetts has claimed federal territory several times in the past and we didn't feel this should be an exception.

QUESTION: In terms of the '53 Submerged Lands Act and the sovereignty that the Commonwealth has, I would have assumed that you would almost have all those rights and regulations and so on in territorial waters.

So is it fair to say that the main impact of that state act would be to extend it to Federal areas?

RESPONSE: No, I don't agree.

A single state agency, such as the Division of Water Pollution or some other agency, might have reacted placing specific prohibitions such as those stated here. But this was an over-all prohibition of many activities within that area enacted by the legislature.

QUESTION: Could you describe just briefly, the nature and extent of your collaboration with the neighboring New England states?

RESPONSE: Virtually none, in terms of the sanctuaries. We have tried to reach some agreement in terms of our lateral boundaries with Rhode Island and New Hampshire. We have established a boundary with the State of New Hampshire. We have not yet established one with the State of Rhode Island, although we are working on that.

QUESTION: How much of Massachusetts territorial waters are excluded from the sanctuaries?

RESPONSE: Precentage-wise, I couldn't tell you. The majority of state waters are within sanctuaries.

QUESTION: Did they say the territorial sea in the bills? Because Massachusetts has extended jurisdiction at least for fisheries purposes and perhaps others.

RESPONSE: No.

QUESTION: Wasn't it defined?

RESPONSE: It was defined by metes and bounds specifically, from a line and a point.

QUESTION: They didn't want to take into consideration you have extended 200 miles to sea and therefore you could have a much larger area?

RESPONSE: That is only extended for fisheries purposes.

QUESTION: Could you discuss for a minute your plans and what you are going to do with dredge spoils in your sanctuaries and also the jurisdictional limits of where these things are going to go?

RESPONSE: That is a very good question. I am not sure how that is going to be handled and I expect that some compromise will have to be worked out in that regard. But, as I mentioned, two weeks ago our Commissioner ruled that dredge spoil would no longer be acceptable under language prohibiting commercial and industrial waste. I suppose it is open to interpretation, whether dredge spoil falls within that category. But assuming that it is commercial or industrial waste, the Corps is going to have to go a long way farther out to sea to dump. Now, there are other dumping areas in Massachusetts Bay that are not included within the sanctuary area, but for Nantucket Island or Buzzards Bay it will be a long haul beyond our three-mile limit and beyond the sanctuary areas.

COMMENT: I think the only two dumping areas left in the state are the two outside of Boston Harbor.

RESPONSE: Right. They are the only two dumping areas left that are not included with a sanctuary.

MARINE SANCTUARY PROGRAMS IN CALIFORNIA

by

John P. Harville, Executive Director
Pacific Marine Fisheries Commission

I would like to extend a note of commendation to the people organizing the conference for the background material they sent us. It has been a great help for all of us to arrive here with a reasonable grasp of goals and an excellent briefing on essential background information.

I am happy to share with you some of California's experience over the past eight years, which I think may contribute somewhat to Phases 1 and 2 of the "game plan" that was presented. In a sense I am perhaps paralleling the views of a speaker earlier this morning, who noted that we could learn a good deal from the experiences of the National Park Service where many of these issues have been faced before. Similarly, some of the questions we are exploring today have been debated extensively in California over some eight years of trying to solve coastal zone problems in the state which probably has had the greatest loss of estuaries of any state in the Union, with up to 50 percent of our estuaries already destroyed.

I would like to review briefly with you the efforts of a state-level ocean advisory body to move California into action toward a coordinated marine sanctuary program. The essential failure of that effort may be instructive, since it appears that certain factors we then lacked may be working for us now at the national level. In California, at that point in time, there simply wasn't the political will to act. At the present national level, I think we are moving with legislation which constitutes an already-declared political will, and it is part of our job to shape the directions that will be taken.

I would like to outline for you the rationale developed for identification of an array of different kinds of marine reserves or sanctuaries, essentially to meet the needs of California's universities and colleges, but useful to us here as an elaboration of sanctuary types which somewhat parallels the five described in our background information paper.

In 1965, and this is where the 8-year element comes in, the very prestigious Institute of Marine Resources of the University of California completed and published a landmark study entitled

"California and Use of the Ocean," under a contract with the California State Office of Planning. This comprehensive document dealt with all phases of ocean resources, their development for benefit to the state and the nation, and their protection for the future. The 1965 date is significant, by the way, because this was the period during which many of us will remember a hard press throughout the nation for expansion of government and industry into ocean affairs and ocean development, with the hope that perhaps exploration of the earth's inner space might parallel our efforts in outer space. We are all aware of the fact that that was a very short-lived and abortive hope, although some major gains were made.

The University of California's Institute of Marine Resources urged preservation of typical habitats and natural populations, particularly in critical nearshore or intertidal areas including bays and estuaries, to fulfill the following important needs:

- "1. To maintain large heterogeneous natural gene pools, it is desirable to maintain a diversity of genetic materials in order to preserve the options for mankind in the future, to be able to manipulate these genetic materials for his benefit, under ecological conditions and human requirements that may be quite different from those presently existing.
2. To maintain public areas for observation by nature lovers-- that is, to maintain outdoor museums for education and public enjoyment. The development of intellectual and esthetic appreciation of natural communities is an important part of our culture, which is under strong adverse pressure by the unprecedented growth and urbanization of our society.
3. To make possible research and education in outdoor laboratories consisting of typical habitats and their biological communities. This is important, not only for the further advancement of knowledge respecting the basic organization of nature, but also in order to provide the opportunity in the future to conduct research and education on wild organisms in their natural habitats for comparison with managed, cultivated, and utilized organisms of the same or similar species."

The University of California began to implement this recommendation by establishing a Land and Water Resources Committee to seek these types of reserves adjacent to their own campuses. That committee identified some 11 key areas in California as priority candidates for reserve status.

This California effort has parallels to the procedures or recommendations advanced by the United States Department of Interior's Federal Committee on Research Natural Areas at about the same time. Our conference background materials pointed out that that committee is largely defunct as an organized entity, but that happily the members of it are still hoping to see action. The California recommendation added the important dimension of public education and recreational uses not included by the Interior Committee. The similarities, however, are more than coincidental. The Director of IMR and chief author of "California and Use of the Ocean" was Dr. M. B. Schaefer, who later was to serve as a Special Advisor on ocean affairs to the Department of Interior.

Because of the impact of this 1965 document on California's political leadership, Governor Pat Brown in 1965 created the Governor's Advisory Commission on Ocean Resources, a body charged with advising the Governor's Office on the directions California should take with respect to ocean development and protection of marine resources. This body was reconstituted and reappointed by Governor Reagan in 1966 and then by legislative action in 1968 it was broadened to report also to the Legislature and include major emphasis on coastal affairs. Accordingly, its title was broadened to the California Advisory Commission on Marine and Coastal Resources. We soon abbreviated our label for working purposes to California Marine Commission or CMC. I had the pleasure to serve on that body almost from the beginning.

In June, 1966, this Commission, at its fourth meeting, reaffirmed and further specified the marine reserve recommendations in the IMR publication, "California and Use of the Ocean" in two general areas:

1. "The Commission recommends that the state government accord high priority to the immediate establishment of reserves in certain bay and estuary areas that are rapidly being irreversibly modified by man's action." The areas to be included can be identified by the State Department of Fish and Game and by the University of California Land and Water Reserves Committee studies I mentioned earlier.
2. "With regard to outdoor recreational resources, the Commission recommends that some marine environments should be maintained by the state for low density use and should be protected from excessive human interference."

Low density use recommendation constituted a considerable departure from the existing State Parks program which was essentially for high density use. This new emphasis on undisturbed reserves reflected particular concern for maintaining gene pools as noted earlier from the IMR recommendations. CMC urged immediate development of ways and means for acquisition and protection.

Over the years--and this is where frustration set in for us from 1967 through 1969--the Commission repeatedly stressed its high priority for establishment of marine reserves for low density use, particularly in California's estuaries and bays, which were rapidly being consumed for other and irreversible developments. The Commission urged establishment of a cabinet-level body to coordinate all of California's ocean-related activities. This Interagency Council on Ocean Affairs was established, but never became truly active or effective. However, in 1969 the Interagency Council did initiate development of the California Comprehensive Ocean Area Plan, designed to serve as guideline for coastal zone management in California. The California Marine Commission was assigned certain responsibilities for review of that plan. Again, the date of these changes was significant, for 1968 to 1970 also was the time of development of strong activity in coastal zone management at the federal level.

In 1968, the California Marine Commission recommended three major objectives for development of the Comprehensive Ocean Area Plan. One of these emphasized maintenance of environmental quality generally. Another emphasized balancing conservation and wise use. You don't just protect marine resources; you also must use them effectively. The third spoke indirectly to the need for reserves as follows: "The objective is to insure the continued existence of sufficient population of all living organisms for recreation, scientific, and educational purposes."

I pointed out earlier that CMC was largely unsuccessful in stimulating the need for a state approach to the need for marine sanctuaries. The political climate was changing; there was not any real political will for such action. We are all aware that throughout the United States there was a retrenchment in ocean development by government and by industry. However, within California's infrastructure, four separate entities moved toward establishment of varying types of marine reserves.

Two of these efforts at marine reserves are reported in the conference background paper. First was a series of underwater parks, largely under local or university control but with some coordination of efforts by the State Parks Commission and by an active committee of advisory groups, which included strong leadership from scuba organizations. The second was a fairly extensive marine sanctuary program designed to exclude oil and gas exploration. Other than that specific prohibition, these might be considered multiple-purpose reserves. A third program, by California's Department of Fish and Game, established a series of relatively small preserves to protect certain endangered species--certain fishes and salamanders, for example.

I already have called attention to a fourth reserve program by the University of California's academic community. Related to that

effort, and most important in terms of applicability to the present task, California's institutions of higher education, through the Coordinating Council for Higher Education, in 1968 undertook a comprehensive statewide inventory of need for marine and estuarine reserves for educational and research purposes. More than 150 tideland sites were proposed, and 47 designated as of highest priority. Categories were developed for defining their functions and characteristics and mechanisms proposed for their management.

The California Marine Commission provided its support for this effort as the best available mechanism for implementing its recommendations for preservation of selected estuarine and marine reserves. I must note here that these plans have not yet been fully implemented. However, with strong pressures from the University of California, the California State Universities, and the community colleges, as well as private institutions, and with the cooperation of the State Lands Office, the program is moving.

I would like to describe these reserve categories briefly and close with a few comments on implications as I see them for our consideration here. The 47 highest priority locations for marine reserve status were well distributed along California's 1,200 miles of coastline. Reserves do tend to be more frequent in regions having high concentrations of colleges and universities such as near the San Francisco and Monterey Bays and Los Angeles. Generally each was chosen to include a particularly unique land or water feature. In total, the 47 encompass the largest possible number of different coastal and estuarine habitats. Many include extensive offshore portions. Many are closely associated with existing parks and recreational areas--another of our general recommendations because we stressed the need to tie them to units that could manage them. In each case there were metes and bounds established and these usually do not include an entire bay. In the time I have I am not able to cover it in detail. A very important source of such details would be Appendix IX of the California Ocean Plan which provides some 200 pages of detailed assessment of these reserves.

Because California has a very long and diversified coastline, we divided the coastline into a series of six regions built strategically around the major seaports and educational institutions. Each recommended reserve included an assessment of the kinds of habitats available (e.g., offshore areas, estuarine conditions, rocky shores). Some of the reserves were designed to be set aside for research purposes only, not to be modified.

As a specific example, let me cite a proposed reserve to include portions of Monterey Bay and Elkhorn Slough. Elkhorn Slough is one of the few relatively unspoiled estuaries still left on the California coast, and it opens directly into one of the greatest underwater canyons

in the world which bisects Monterey Bay to the westward. Less than a mile from the city of Monterey, this submarine canyon is a mile deep. We argued that these physiographic features constituted unique natural wonders which should be safeguarded in perpetuity against destruction. We also argued--and this brings up some of our earlier discussions--that there are very few uses not compatible with permanent protection of the Monterey Submarine Canyon. If one were to build a major berthing area for tankers offshore, this conceivably could damage its unique values, but most fishing and extractive processes can and should continue without threat to the integrity of the Canyon.

By contrast, Elkhorn Slough as a fragile estuary would need a far more restrictive type of protection and management. This illustrates a major point I hope to develop out of my discussion here today. After some 8 years of wrestling with this matter in California, we became totally convinced one must consider multiplicity of types of reserves, and not become trapped within the "either/or" categories and philosophies which result from simplistic restriction of thinking to only a single type of sanctuary.

I should add a point concerning organization for selecting and managing marine sanctuaries. The California Council for Higher Education, with input from many sources, established a series of working committees drawn from institution of higher education. (There are about 120 community colleges in California, 8 or 9 branches of the University of California, and some 18 state universities--a huge array of educational institutions, many of them strongly field-oriented in their programs.) With input from these committees, a statewide survey was conducted and data collected as basis for establishing criteria for marine reserves and selecting specific sites of highest need and priority. It is significant that leadership for this effort came from the academic institutions; and this may be the direction we should look for continuing leadership as we move into a national program.

Three types of reserve uses were established as necessary to serve California's needs in higher education:

1. Areas to be used exclusively for research; however, other non-consumptive uses could be allowed in some cases.
2. Areas for general field instruction, in which limited joint use or use-sharing generally is allowable. We might call the first type a research reserve and the second an instructional reserve. I emphasize that we must explicitly differentiate between true research needs and those instructional needs which may have certain research connotations at the secondary research level. Operationally these two uses may require sharply different criteria of reserve selection and management.

3. The reserves set aside not primarily for their intrinsic ecological value but rather as a base for technological education: mariculture, experimental modification of the environment, serving and berthing for seagoing vessels, etc. We needed to think of this kind of reserve area also in overall planning for the coastal zone.

We also stressed that there are three levels of instructional and research use to which sites may be put. These may be thought of as levels of consumption of those sites. One is observations and measurements only--the kind of activity possible in a wilderness area with only very minimal disturbance by man. The second might be collecting and selective sampling, under careful control and management but still with some inevitable modifications of the ecosystem. Third is manipulative use, to determine what may be the impact of changes in the coastal zone by controlled experimentations which may very drastically modify the ecosystem.

These three levels are applicable to any three of the types of functional reserves. It is important therefore, that they be thoroughly understood and their differential impacts considered. As noted earlier, therefore, when we consider sanctuaries on a national level, we can best avoid an "either/or" philosophy by recognizing this multiplicity of types and functions.

Let me close by reviewing several elements of California experience which appear to relate directly to our considerations at this national workshop. First, as just now emphasized, a comprehensive system of marine and estuarine reserves should serve several functions and be put to varying levels of use in terms of allowable modifications and development. Some reserves, or portions of larger reserves, should be held exclusively for research, probably used for observation and measurements only. These research reserves will serve as baselines for comparison with developed areas, and as gene pools to hold in perpetuity a diversity of living organisms. For obvious reasons these reserves need to be relatively large to encompass reasonably complete ecosystems and to provide the most effective and extensive interdependence of organisms. Ecological interactions can best be studied in areas sufficiently large to be reasonably cohesive and self-sustaining; thus separable from adjacent areas. This is the low density usage stressed earlier by CMC and others.

Other reserves should serve broader educational purposes, which should include enjoyment of natural areas. This use is exemplified by most of our state and national parks. As our speakers from the National and States Parks could testify, the presence of people is, itself, a consumptive and modifying use of these areas. In such reserves, controlled collecting of specimens may be permitted. Still other reserve areas should be set aside as bases for technological

purposes, including education. These may include docks and shore facilities for oceanographic activities, and areas for experimentation with mariculture.

Let me stress again the three levels of consumption and modification implicit in this array of use types: essentially no consumption for wilderness-type areas, but observations and measurements only; limited consumption in other essentially educational areas; and manipulative use in still others, which could result in virtual total consumption.

In my view, a national plan for marine sanctuaries must take into account all three types of need and all three levels of use. This suggests multiple criteria for planning and clearly requires an integrative overview of the whole effort. Here we failed in California except in our educational use plans, which have never been fully implemented. Perhaps we can succeed at the national level. Some sanctuaries must be large, in order to include a significant slice of a particular ecosystem. At the heart of such a system might be a wilderness type area preserved against all but minimal human impact. This wilderness-type research reserve might be buffered by a zone having multiple-use characteristics for educational or recreational purposes or even for manipulative development. Sanctuaries where possible should include unique natural elements.

Certain of the recommendations developed by the Coordinating Council of Higher Education with respect to marine reserves have cogency for us in our consideration of national needs. Three deserve particular emphasis:

1. Reserves should be attached to existing parks or other government facilities where possible, to facilitate administration.
2. Educational institutions might assume a caretaker role in management of sites adjacent to them, and their scientific staffs should play a major role in development of use criteria that will lead us to a national plan.
3. A full range of pristine or near-pristine habitat types should be encompassed in the system, with every geographic segment of the coastline represented.

In this last context, we should look especially to existing facilities, public utility installations, petroleum reserves and others, in which sites primarily set aside for another purpose may serve a multiplicity of needs including observation and education. I was

impressed, for example, during our discussions in California to discover that many of the petroleum development areas, particularly those having marine installations such as towers and well completions, present a considerable array of possibilities for recreational and educational uses. We can make an initial mistake by assuming automatic incompatibility where it may not necessarily exist--or can be avoided by intelligent planning. Let's look to see if there aren't ways our vaunted technology can bring about compatibility, once we insist it is part of the bargain for use of the area. At the same time let's remember there are some areas which must be reasonably large, which must be set aside in perpetuity as baseline permanent reserves.

MARINE SANCTUARY PROGRAMS IN FLORIDA*

by

Ney C. Landrum, Director
Division of Recreation and Parks
Florida Department of Natural Resources

Extensive areas of Florida's tidal water bottoms, probably 10 per cent of the total, have been formally set aside by the State as parks, preserves or sanctuaries of one type or another. Of the vast area thus reserved, some 100,000 acres (actually including 48,000 acres outside the presumed territorial boundary of the state) comprise the Key Largo Coral Reef Preserve, a part of the John Pennekamp Coral Reef State Park. Other large acreages are contained in the 31 units of Florida's Aquatic Preserves System. In addition, efforts are now underway to incorporate adjacent submerged lands into 31 more state parks located on Florida's tidal waters.

John Pennekamp Coral Reef State Park

Growing out of a 1957 conference to consider problems threatening the natural resources of the Everglades National Park and environs, the Key Largo Coral Reef Preserve and the John Pennekamp Coral Reef State Park were established by coordinated actions of the state and federal governments in 1959 and 1960, respectively. The object of the preserve/park, of course, was to provide needed protection and management for a prime part of North America's most spectacular living coral reef. This was done by the promulgation of new rules and regulations by each of the two levels of government and by the regulatory efforts of the state park staff.

Time has demonstrated that a 120-square mile area of submerged tidal land, possibly overlain in part by the "high seas", cannot be managed along the lines of a typical upland state park. Many problems of overuse and misuse have arisen which not only have detracted from legitimate visitor enjoyment of this extraordinary park but also have seriously degraded the prime resource itself, the coral reef.

Reaction by the State of Florida has been primarily along two lines: a) the promotion of needed research work by various entities to

*Mr. Landrum's talk was presented by Mr. Bruce Johnson, Chairman, Florida Coastal Coordinating Council.

throw more light on the nature and causes of the indicated problems of resource deterioration, and b) the implementation of new management measures for the state park by the Department of Natural Resources, Division of Recreation and Parks. With respect to the latter line of action, a tentative effort was made earlier this year to institute a number of new management steps, especially the licensing of commercial dive boats operating within the Coral Reef Preserve. Unfortunately, this move was complicated by certain questions which arose over the relative jurisdictions of the State of Florida and the United States of America, and had to be suspended while additional legal exploration was undertaken.

At this time, no entirely satisfactory solution to the complex management problems of the Coral Reef Preserve is apparent. Much depends on exactly where the state's territorial boundary in the area might lie. Within its territorial limits the state would seem to enjoy a greater degree of jurisdictional authority than the federal government has either inside or outside that boundary. One hopeful possibility for creating a workable jurisdictional entity for this vulnerable area is the Marine Protection, Research and Sanctuaries Act (P.L. 92-532), and this is currently being investigated through the National Oceanic and Atmospheric Administration.

Florida Aquatic Preserves System

Management of Florida's submerged lands generally is the responsibility of the Board of Trustees of the Internal Improvement Trust Fund. Through the years, it has become apparent that the most effective means of insuring protection for a particular area of submerged lands is to have that area formally dedicated by the Board of Trustees for certain acceptable purposes. This was the technique used in 1966 for the establishment of the Estero Bay Offshore Preserve, in Lee County, which became the prototype for Florida's Aquatic Preserves System.

In 1968, an ad hoc Interagency Advisory Committee on Submerged Land Management was created by the Board of Trustees, and one of its assigned tasks was to consider and recommend, if feasible and desirable, a balanced statewide system of aquatic preserves. Out of this effort developed a general concept for the aquatic preserves program, which was eventually adopted by the Board of Trustees. This in turn led to the formal dedication of 30 areas of submerged land as aquatic preserves. Other aquatic preserves may be established at any time by action of the Board of Trustees.

Obviously, the dedication of a given area of submerged land as an aquatic preserve does not presently provide absolute protection for that land. There are far too many legal complexities at work to enable the Board of Trustees of the Internal Improvement Trust Fund to take blanket action which would guarantee a successful and legally defensible

management program in each case. The principal advantage in giving the subject lands the status as an aquatic preserve at this time is to raise a red flag against the possibility of other ministerial actions by the state or other cognizant authorities which would not be in keeping with the purposes and objectives of the aquatic preserves program. In time it should be possible to improve upon the system by reinforcing the legal status of the aquatic preserve and by providing for each preserve a specially tailored, positive management and use program. Thus, each aquatic preserve would eventually take on a status similar to that of the Coral Reef Preserve at John Pennekamp Coral Reef State Park.

Florida's extensive estuarine and marine submerged lands are unquestionably one of the state's most significant natural resources. While all of these lands deserve careful, scientific management in a general sense, there still are those exceptional areas which must be singled out for special treatment--just as parks and preserves are established for exceptional parts of the upland environment. The measures briefly described above serve to illustrate Florida's early recognition of and response to this urgent resource management need.

FLORIDA'S PLANNING FOR SANCTUARIES

by

Bruce Johnson, Coordinator
Florida Coastal Coordinating Council

Mr. Landrum's paper addressed the existing aquatic preserve and park systems in Florida. I would like to take a few minutes now and indicate how Florida is integrating the present program within its overall coastal zone management program.

First, let me say a word about the Cabinet System in Florida, because we are the only one of the 50 states that has this system of government and it makes life rather complicated in some ways. It also makes the government more accessible to people in other ways. The Governor is the chairman of the Cabinet and there are seven members. The Governor has one vote out of seven. The other six have their own political constituencies. They are elected on their own. They serve high-level posts in the government. One is the Attorney General, one is the Education Commissioner, one the Agricultural Commissioner, one the State Comptroller, one the Secretary of State, and one is the Treasurer and Insurance Commissioner.

Now, as we analyzed the Florida laws that might be useful or necessary to know about to put a coastal management system together, we came to the conclusion that roughly two-thirds of the authority and powers lie with the Cabinet and one-third with the Governor. The Cabinet established the aquatic preserve system by administrative act and therefore these preserves, or some of them, could be abolished by a future Cabinet. I feel these aquatic preserves should be permanently established by statute and not subject to administrative change. Fortunately, we have now in Florida a vehicle to accomplish this in the State Wilderness System Act, which I will discuss next.

The Wilderness System Act was passed in 1970, but it has not been implemented as yet, other than that rules have been drafted and approved by the Cabinet. These rules allow for three different types of wilderness systems: biological, esthetic, or scientific. We think this act has a great potential to use in designating and affording greater protection for we found in our work that if you can find an agency or a law that is almost usable, you can modify it to your purposes much easier than you can go out and start over and create something brand new. So I think it is a plus on the side of the coastal management of Florida to have this law, even though it hasn't presently been fully activated.

A word about how all this ties in with our planning. The Coastal Coordinating Council has created a classification system which has three primary categories, "preservation", "conservation", and "development". "Preservation" to us means no further development of any kind except in the overriding public interest as determined by the Governor and the Cabinet. It is an area you do not develop. On the other side of the coin are "development" areas either already developed or vacant lands that are suitable for development with minimum ecological disturbance. In the middle is a "conservation" area, a buffer zone, a caution area, where the resources can be developed to some extent but with caution and controls.

Now in implementing this classification system, we have mapped the entire coastal zone of the State of Florida on a county-by-county basis. So for any one category, you can see the distribution on the maps, and we have a publication available from the Council, which will give you the square miles or acres of those items in any given county. So when Dr. Lynch said he found some states who didn't know what they have, I think we know what we have. We aren't sure what we can do or can't do with it. These maps are in an atlas containing 173 maps which is available from the Council for \$40 (Florida Coastal Zone Management Atlas). For the coastal zone of each county, there is a "preservation" map, a "conservation" map, and a "development" map. We have also put this all together in a composite map in color. These composite maps are colored like traffic lights. An example is Duval County where the City of Jacksonville is located, and basically it is red for "stop (preservation)", yellow for "caution (conservation)" and green for "go (development)". These maps represent a development and growth policy because they indicate where you can develop and why and where you shouldn't develop and why. The governor and legislature are extremely interested this year in developing guidelines for a state growth policy. We have made presentations to the legislature and there is some evidence there is support for this kind of system.

We also have a publication called "Recommendations for Development Activities in Florida's Coastal Zone" and that is keyed in to the Coastal Zone Management Atlas. So if you are a landowner or developer or speculator, you can look at the maps and see what the classification of your land is, and go into this book and it will tell you what is recommended that you can do and can't do.

As an aside, the Coastal Coordinating Council has been designated by the Cabinet and the Governor to coordinate all coral reef research in the Keys. We will promote needed research work by various entities to throw more light on the nature and causes of the indicated problems of resource deterioration. The Coastal Coordinating Council will be getting started on this as of the 1st of January, 1974. Right now, we are trying to use the latest in aerial photographic techniques to identify the living coral reefs, the dead reefs, and the damaged reefs (the ones under stress). This photographic coverage and classification of reef "health" will become part of Florida's coastal management plan when completed.

Discussion

QUESTION: I noticed that you had portions of hurricane flood zones located in each of your three categories, preservation, conservation and development. What kind of development is anticipated in such zones?

RESPONSE: They naturally occur in all of those categories but we deal with it as an entity in the conservation area, the conservation maps. And we have mapped the probable limit of the once-in-a-hundred-year storm as used in the federal flood insurance program. We get the hurricane flood data from either NOAA or the Corps of Engineers on maximum flood surge, and ground elevations have to be at that level for residences, and commercial buildings flood-proofed to that level. There is a certain set of recommendations for everything in the hurricane flood zone and that is why we put it in the "conservation" zone as a caution item. It is described in detail in the CCC booklet "Recommendations for Development Activities in Florida's Coastal Zone."

QUESTION: In your three categories, do you know roughly what percentage of coastal lands are in each of the categories?

RESPONSE: 30.4% of the coastal zone is in the "Development" category, 49.6% in the "Conservation" category, and 20% in the "Preservation" category. The coastal zone as defined in Florida is 27.4% of the total area of the state.

Let me translate this into Florida's growth options. In the "Development" category, 15% is already developed. 6% is vacant land with no physical problems for development. (That is a real estate speculator's delight.) 8.2% is vacant land with only minor problems for development. Then, 11.1% is developable land within the hurricane flood zone, provided the development is flood-proofed. In the "Conservation" category, 22.5% is what we call "marginal land". It is land that has to have extensive physical modifications to sustain development. So what we recommend is planned unit development (PUD). In other words, you put a high-density unit in so you can get your money back because you have higher construction costs, and leave plenty of green space around that. 16% is already used for parks, wildlife refuges, and other "conservation" purposes. And that leaves us the last 20%, which is now undeveloped, and we recommend that it should be left untouched as a "preservation" zone. We say leave it alone. If you are going to be able to go out and catch a fish and have seafood or any of the marine resources, leave that 20% alone.

A LOCAL SANCTUARY PROGRAM: SOUTH SLOUGH, COOS BAY, OREGON

by

Holly Hall, Commissioner
Port of Coos Bay

One of my collateral responsibilities as a Port Commissioner is Chairperson of the Estuarine Sanctuary Research Committee. It is in this capacity that I want to discuss a local program to establish a sanctuary in the South Slough, an arm of the Coos Bay Estuary.

South Slough is an area that a lot of people in the neighborhood like just the way it is. It also happens that the County Commissioners delegated zoning responsibilities--not the authority but the responsibility--to a neighborhood planning group. This group proposed that the South Slough be set aside as a natural area with no development permitted within a quarter mile of its perimeter. This area is in very close proximity to Coos Bay and North Bend with approximately 30,000 people.

Coos Bay has now been extended so that it surrounds North Bend, making essentially one urban area. The respective political bodies have not consolidated although there is a joint Chamber of Commerce.

All of the other sloughs on the Coos Bay Estuary have been developed. Because of a fortunate circumstance, i.e. the lack of passable roads, the southerly portion of South Slough has been left fairly natural, with logging, farming, and oyster growing the only signs of man's activity.

Coos Bay proper is said to be the largest lumber shipping port in the world by the local Chamber of Commerce and the Port Commission. I don't know if it is the largest, but it is big. The Bay is in the shape of an inverted U. In the urban area of Coos Bay-North Bend, we have pulp mills, an airport, a shopping center in one filled slough, and some illegal spoil islands placed by the Corps of Engineers--many years ago. Along the southern border of Coos Bay is sprawling development and farmland on reclaimed land which is subject to flooding. In another of the nearby sloughs is extensive log storage. The South Slough area, which the planning group proposes for a natural resource area, begins at Valino Island and Long Island Point and extends for one quarter mile out into the water. The natural resource zone would permit logging, but would prohibit building permanent structures.

The South Slough is a tributary to the Coos Bay Estuary but has a separate watershed in the county forest. The tidal action is such that pollutants from the upper bay bypass South Slough on their way to the ocean. When the tide does come in, it is fairly clean. Since the Slough is so close to the ocean, there is a strong tidal surge with good flushing action. South Slough is the only part of the estuary that the State Health Department has approved for commercial oyster growing.

Just recently, a timber company purchased Long Island Point, bordering one portion of the Slough, and announced they would cut the timber. There was quite a hubbub over this with the end result that the company only cut a small triangle from the southerly portion, leaving a large buffer strip so that the cut portion isn't visible now except in one place where a few big trees were cut out of the buffer.

At a recent public hearing held by the neighborhood planning committee, the zoning in the area around the Slough was approved with one exception. The majority of the area is in a natural resource zone although there is some R-1 development (one house per lot) in one small area.

The slough area itself is isolated with no powerlines or roads. The best way to see it is by canoe.

One potential problem is Valino Island which is within the natural resource area. Natural resource area zoning allows very few uses and there is some concern that placing this island within the area may be considered "taking" of this particular piece of land. This island has a lot of local color. An old gent named "Crazy" lived out there. Every week he would paddle his canoe to the store in Charleston, dragging his clothes behind him to wash them. When in town he always wore a kilt. After leaving the island he moved out to the sand dunes and began living between two logs, but he left and moved south to California.

Another interesting local legend concerns a man (now on the citizens planning committee) who has been in the Charleston area for most of his life. The legend says he operated a still during prohibition days in the Slough. He doesn't admit it, but says revenuers could never catch him, and they never could figure out why. He says the reason is that there is a heron rookery in South Slough, and he only travelled to his still at night. The Great Blue Herons stand in the mud and talk to each other. Whenever a revenuer would come up South Slough, the herons would talk louder and faster. This way he could always tell when strangers were around. I guess it pays to rely on your environment.

There are also some tidal marshes in the Slough which house many ducks. One part of the Slough, where I was canoeing last week, is

called Mine Bottom. The mine bottom comes from some estimated 200 million tons of coal under the Slough. Fortunately (for the environment) the coal is very poor grade, but if the energy crisis, if it is real, the oil shortage might have us mining up there.

At the upper end of the Slough and on some parts of Valino Island, there are traces of former logging activity. Much of the Slough, however, is in virgin timber.

A recent 250 acre subdivision in the sanctuary area was recently turned down because of poor soil conditions and lack of a sewer. God blessed Oregon with a lot of rain, poor soils, and poor taxpayers who don't vote for sewer lines.

The only tool available to the neighborhood planning group to protect South Slough is the Natural Resource Zone. Permitted uses in the zone are day-use recreation, management and harvest of forest products, and oyster farming. Conditional uses in the zone are solid waste disposal facilities, sanitary landfill, libraries, public museums, piers and boat houses, commercial riding stables, and accessory facilities for outdoor recreation such as climbing, hiking, fishing, and horseback riding. This type zoning doesn't guarantee preservation of the area.

The Estuarine Sanctuary Research Committee, with the support of a number of other people, have explored funding possibilities for purchase of the land, unfortunately with little success because funds for purchase of areas like this usually require that something be done with the land. For example, if the land were purchased by the State Highway Commission, they would build a nice big paved highway with feeder roads, park benches, and trails.

The planning group identified one goal as retaining the quality of the experience of South Slough. This is hard to describe, but this is what they are trying to save. There are already some state parks and county recreation areas in certain places along the bay, but nothing like South Slough.

The entire planning process which resulted in the natural resource zoning of the slough area involved a lot of public participation. The residents themselves said basically that they wanted to retain this area as it is. They are pretty firm about this. They do not want this area to become a residential area. Among other things, they fear development will cost them a lot of money for more schools and sewer lines.

The citizens actually did the planning. At the meetings, a person would say, "I want my land zoned this way." Someone else would say, "Let's look at the soil maps and power lines," etc. The group turned

themselves into planners and did a good job of it. At least it was acceptable to the people in the area.

There is one problem. The rural area which wants to stay rural is in some conflict with the professional city planners in the city which would like to annex the undeveloped watershed areas for future development.

To conclude, I would like to say that South Slough is a protected area because the local citizens wanted it protected. Various groups are trying to obtain a better degree of protection than is possible with zoning and I feel confident this can be done.

Discussion

QUESTION: What criteria did you use for delineating your natural resource zone? How did you come up with it? What process did you use?

RESPONSE: It came up from the Citizens Committee. They took a look and said "This is the only part of the Coos Bay Estuary that is not developed now. Is there any way we can save it?" And the local planning group recommended to the county planning staff that the planning staff come up with a zone that would save the area. The county planning staff had to work very closely with the county legal staff to make sure it didn't constitute a take-over of land.

The basic criterion was: How can we zone out development but still retain some uses for the land that would be compatible with, say, saving it? It is a unique area. It is one of the unique areas on the coast--Oregon only has 52,000 acres of estuary and this represents 2,200 acres of it here. It is unique. And their concern for saving it is what basically brought about the zone.

We are a small community and everybody does a little bit of everything. I have about 14 hats to wear. Dr. Lynch had to call all over to find out which hat I would be wearing here. Also, I might add that the University of Oregon's Institute of Marine Biology is located in close proximity to this area. They have been studying the Slough. They have been using it as a research area. I have a pretty complete list of creatures that have been sighted there by the students. It is just a beginning, including green algae, red algae, brown algae, birds, ducks, skunks, and things like that.

THE INTERNATIONAL BIOLOGICAL PROGRAM,
CONSERVATION OF ECOSYSTEMS ACTIVITIES

by

Rezneat M. Darnell, Director
Conservation of Ecosystems Program, US/IBP
and
Professor of Oceanography and Biology
Texas A & M University

The State of Wisconsin in 1951 passed a law establishing a system of natural areas within the state. They empowered, through the legislature, a Wisconsin Scientific Areas Preservation Council. I have been associated with that program since the early 1960's. In the beginning we defined our goals to determine precisely what we wanted to preserve: What is there of ecological value in the State of Wisconsin that should be in the public trust? Fortunately, we had a very good survey of the ecosystems of the state, and we decided that we should make sure that we had at least one representative of each of those ecosystems so that they would be protected in perpetuity.

In 1966, when the International Biological Program was getting underway, we decided to model the National system of ecological preserves after the Wisconsin plan, at least to include in it the basic essence of the Wisconsin plan. We decided that we wanted to obtain descriptions of representative ecosystem types throughout the United States so that when the plan was complete we would minimally include a representative of every major ecological type.

Now, we did not have detailed surveys state by state like we did in Wisconsin, but we had enough to go on. Had we been well funded, I would be standing in front of you today talking about the completed National system. We did, however, get a little bit of money. Through the years we have had a total of something less than \$200,000. But with this \$200,000, we now have descriptions of nearly 3,000 areas throughout the 50 states. These include terrestrial areas, freshwater areas, and some coastal and marine areas.

Operationally, we established an Advisory Panel consisting of the various branches of the federal government which might be interested, in one way or another, in a natural area system, or interested in information which could be derived therefrom. We also developed three task forces, one for terrestrial ecosystems, one for freshwater, and one for marine systems. A portion of our program was the Federal Committee on

Research Natural Areas which was charged with the responsibility of looking over the federal lands and making sure that prime examples already preserved on federal lands should become coherent parts of the system.

We are talking about a single, coherent national system of ecological preserves. Whether it should indeed be a single national system or fifty state systems is a matter for debate, and eventually we will debate it. In any event, by whatever means, we must make sure that important areas do not fall between the cracks.

The IBP program is sponsored by the National Academy of Sciences. This has permitted us access to some of the best scientific talent in the country to carry out this program so that the information we are obtaining is the best that can be obtained. Now, a great deal, in fact, most of our effort, has been devoted to this vast inventory which has already been largely placed on computer tapes. However, it has become apparent as we have proceeded that it is not enough just to develop this inventory of areas already preserved or those yet to be preserved; we need more than this. If a piece of landscape is legally preserved, is it also ecologically preserved?

We need to establish the scientific basis for preservation. We do not have a big backlog of experimentation to tell us how to do this. Fortunately, however, there is a fair background of scientific knowledge which bears on this topic. Therefore, in Houston, Texas, on December 27, 1973, at the annual meetings of the American Society of Zoologists and certain affiliated societies, there will be a symposium which is entitled "Toward a National System of Ecological Preserves, the Genetic, Systematic and Ecologic Basis of Natural Area Preservation." Proceedings of this symposium will eventually be published as a book.

In other words, if we dot across our landscape a series of little preserves here, there, and yonder, we will come up with a series of island ecosystems surrounded by vast seas of human disturbance. Are we really preserving things in the strict ecological sense by doing this? If the groundwater table level goes down, if the atmosphere deteriorates, if someone is using land next door that might modify an area, if someone is introducing pollutants upstream, are we really indeed preserving things? So we need to get at the basis of what should be considered from the best scientific information available.

It has recently become clear that if, indeed, we do develop this system, it is of more than passing interest to the average citizen of the country and to the various agencies of federal and state governments. This is not just an academic endeavor. This is a system which has great potential utilitarian value. I will just mention a few of these points very briefly in passing. We will elaborate upon them in greater detail elsewhere. For one thing, as we pass towards a national land use

program, one of the categories of land use is going to be preservation. Where will the Nation find the preserves? Fortunately the IBP has already been working at this for six or seven years. If we are talking about management of our marine coastal resources and even to some extent the inland ones, we also need to know about the role of preserves in relation to resource management strategies. Where are the spawning and nursery areas that must be protected? How are they important in maintaining the biological resources?

If we are really concerned about the quality of man's environment, it is possible to monitor environmental quality using chemical and physical parameters. But clearly, the most sophisticated monitors are biological, i.e., ecological. If we have judiciously spread around the United States a system of preserves which have been studied, on which there are established long-term study sites, we can indeed evaluate the effect of acid rains and other environmental disturbances. We can monitor very subtle effects upon the vegetation, upon the animals, upon the ecosystems, that could not be picked up by individual chemical gadgetry and so on.

If we are interested in really doing a sophisticated job in our environmental impact statements, we should have systems of local ecological baselines, yardsticks against which we can measure the damage done or against which we can predict the potential damage from a given course of environmental action. Preserves which have been analyzed can clearly increase the quality of impact statements and undoubtedly reduce the long-range cost.

Industry really has a great stake in what we are attempting to do, and for this reason we have included industry on our Advisory Panel. It has become clear that industry is quite concerned--at least large industry is quite concerned--about their public image in relation to the environment. We only wish that a few of the dollars that go into environmental advertisement would go into environmental study and inventory, so that we can get on with what we are attempting to do: to locate the ecologically critical areas, and say, "Leave these be. Modify the others, but do not encroach upon the preserves. The others, then, become more negotiable." This will be of tremendous advantage to American industry if we can show where development should take place and where it should not.

Specifically in relation to a comment this morning concerning Gulf Oil and others, it would be highly desirable if we could have a few dollars to survey the Continental Shelf or the coastal zone, to examine the places and say, "These are the areas of ecological importance. Do they interfere with areas where you want to drill? If so, let's see if we can find alternative sites but let's get our heads together."

Industry does not want to foul up the ecology completely, and I don't believe most ecologists want to stop industry. I believe we have been setting up false images and fighting these images. I don't think we have been talking to each other; we have been talking at and about each other. We must talk together. To give you an example, on the Northern Gulf Coast, at the edge of the Continental Shelf, there is a series of hills, technically known as diapirs, some of which come to within six feet of the surface, even though they arise in 300 feet of water. One of these, about 120 miles southeast of Galveston, Texas, is the so-called Flower Garden Reef which is capped by a beautiful living coral reef, the only one within hundreds of miles, and certainly the only significant one in the northwestern Gulf. It is growing, and it is beautiful. It has been thoroughly surveyed recently by the oceanographers of Texas A & M University and a report will be coming out shortly. Interestingly enough, most of these hills that arise at the outer edge of the Continental Shelf probably contain petroleum deposits, or at least natural gas. Now, is there going to be a conflict or not? The Flower Garden Reef is listed as one of the areas that has to be protected. I can imagine, with the energy crunch, it is an area which should be drilled. What we must do is come to an agreement about how it should be drilled, not whether. Indeed it is undoubtedly possible to obtain the resources within the dome without spoiling the reef. So what we need to do is talk about these things.

I will point out only this before I turn the chair over to the next speaker. There will be four speakers in our program here to provide the background information in relation to the IBP Conservation of Ecosystems Program as it specifically concerns the coastal and marine areas. The three task forces which are the heart of our program have made progress. The Freshwater Task Force now has descriptions of critical areas and is about two-thirds complete for the entire United States. The terrestrial inventory stands roughly a third to a half complete for the 50 states. Fifty states is an immense chunk of landscape when you are really trying to inventory for ecological values. The Estuarine and Marine Task Force has really just begun to get underway because there have been personnel problems and also because we didn't have the money to do the entire job that had to be done. But now we are beginning to move here, as well. It's turning out that one does not preserve marine areas in the same way that one preserves a piece of landscape on the land. There are other considerations which must be taken into account. The marine and coastal ecology is much more complex. If we really want a comprehensive ecological system, if we want to preserve the real coastal and marine ecological values, then we have got to take into account other things than simply parcels or tracts of coastal land or submerged land.

I don't wish to take the entire afternoon for the Conservation of Ecosystems Program, but it is important to demonstrate in a very clear way that the time has passed when biologists can speak only with each other. We now in the Conservation of Ecosystems program are beginning

to put together the connections which must be made between the biologists and the legal community, between the biologist-legal community and the governmental agencies and private interests in order to really bring these preserves about. We have been working on the preserves system for seven or eight years, and we are now getting to the point where we can exercise responsible leadership in the science-government arena to achieve common goals of social responsibility.

Next year we will slow down on getting new areas into the inventory. Nineteen seventy four will be a year of analysis to determine exactly how the information we have been gathering can best be used to establish a system which will, on the one hand, preserve our environmental options and, on the other hand, permit the Nation to develop its economy. We need help, and we are willing to help others. We have stimulated a symposium in Houston in December. We have stimulated a workshop in Miami in early 1974. There will be more down the road. Some will be perhaps mostly legal, some perhaps mostly managerial. There is more to environmental preservation than biologists getting together and wringing their hands in despair. There is directed responsible social action.

PLANS AND ACTIVITIES OF THE IBP-CE TASK FORCE
FOR ESTUARINE AND MARINE ECOSYSTEMS

by

G. Carleton Ray, Chairman
IBP-CE Task Force for Estuarine and Marine Ecosystems
Associate Professor of Pathology
The Johns Hopkins University

What we are really concerned with in our program is not counting every natural area that needs to be identified, but rather first examining the theoretical basis for natural area preservation. I just wish to mention some pretty strong feelings I have about this word "ecosystem" we bandy about. I can't think of one single ecosystem that is going to be protected in the sea--not one! So we have to be very careful about protecting things and calling that preservation in the long run.

I personally am of the belief that the word "sanctuary" and its definition is pretty irrelevant. The real question for us is: "How do we preserve the biological basis of our productivity -- not just the presence of an animal -- but the biological basis of the productivity of a system, while at the same time we use that system." There is no way to do this aside from setting up research areas of some kind. And these research areas, I think, do not have to be research natural areas, but research typical areas. They may be natural; they may not. I don't think we can follow the wilderness philosophy in just identifying those areas that are pristine, because some places that we will need to know about are not pristine.

Now, Rez Darnell mentioned how marine ecosystems differ from terrestrial or freshwater ones. The most obvious difference is size. How do we protect a piece of the ocean, a piece of the Continental Shelf, a piece of the Gulf Stream? Another thing is that the plants and animals of marine ecosystems are in physiological continuum with the water that surrounds them. This is something you can say over and over again, but people who are used to terrestrial environments simply have a terrible time wrestling with it, because we are not in physiological continuum with the air, really; the air is dead, water is alive. The other, and most important, thing is the so-called "downstream effect." The downstream effect has to do with what happens in one area, maybe far removed from what happens in another area.

Now, I would like to mention one other bit of motherhood, and that is that we really have to be concerned in our thoughts here not with the homocentric, and for heaven's sake, not with the economic point of view. I don't mean to say that in a negative sense. I think we have to start with a base that is called a biocentric point of view. We have to find out what ecosystems are all about so that we can use them without destroying their biological basis of productivity or even without limiting their biologic basis of productivity.

There are two examples, one of which came up this morning. The Florida Coral Reef, the John Pennekamp Park is in serious trouble. You can read Gilbert Voss' article in the latest Natural History Magazine. It is not in trouble because it is a badly managed park; it is in trouble because of things that are happening outside the park. Exactly what, is not known. A much larger scale problem that I would like to mention, and one of great interest to the United States, is my own particular bailiwick, the Bering Sea. I think anything much above freezing is slightly immoral as well as deadening. But at any rate, the Bering Sea is the world's largest fishery area. It is the world's most concentrated collection of marine mammals. It is probably among the world's most productive seas, and it is relatively under-utilized at the present moment, at least the northern part. The question is: How do we use it? Should we allow oil development there? And I emphasize the word "allow." There is no way, in spite of what you read in the newspapers or in the PR, to develop oil in an ice-covered sea -- I mean ice-covered, not just some ice around -- no way; no one knows how. How can we risk the productivity -- this is a population at risk up there -- of the Bering Sea, at the same time getting out the oil which we probably need? We don't know how right now, and we don't know enough about the Bering Sea to know exactly where its biological basis of productivity lies. About 40 percent of it probably lies in the diatoms that are under the ice and that is exactly where the oil will flow if it gets loose. If there were an oil spill up there it would make Torrey Canyon look like a tick on an elephant's rear end. It would really be something.

So what will be the approach to this question we have got? I emphasize the whole business of the theoretical approach. We have to identify ecosystems, and we are doing our rather small part and rather faltering part at the beginning of this whole marine thing. At least that is the way I look at my role. We are developing first a classification system for marine ecosystems and for marine habitats. Where are the dividing lines between various ecosystem types, and where do they lie on the coast. What are the habitats within those systems and how do they relate to the ocean? Secondly, we have to identify the kinds of areas

that belong to each system and find out, thirdly, which areas are already protected and which are left out. There are some areas that are of great scenic value that will not be of great biologic importance, and they might be preserved for another reason. We are looking for biologic reasons. So our first task is to identify these regions, and that is about where we stand right now.

I think at this juncture there has been an awful lot written about coastal zone management, coastal zone environment -- all the terms of motherhood are there for us all to read, and what we have to do now is to get down to specifically saying, "Here is an area that's important to the system. It is important to this system because -- and here is how we want to manage it" -- right down to each area -- and these areas will all be different; they'll all have different guidelines. We are looking at several states right now: Florida, California -- Alaska is beginning in a small way -- the State of Washington is doing a lot; Texas, North Carolina and others are already beginning to identify and catalog some of these areas that are already protected or in our theoretical scheme ought to be protected.

THE FLORIDA COASTAL PRESERVE STUDY:
A MODEL FOR COASTAL STATE PRESERVE PROGRAMS

by

Richard Bader, Director
Sea Grant Programs
University of Miami

I will be very brief and just give you a few thoughts of my own which happen to coincide with everybody else's who has been up here. The most immediate problems in the gross concepts of marine preserves have been discussed by the previous speakers. We know that there must be various types of preserves, but we also know that we must consider each one of these preserves quite separately. In the process of considering them separately, we also have to consider them together as part of a system. They cannot be sitting here by themselves with no connection to the next one and no reasonable way of management.

We must have research sanctuaries, which have been mentioned by practically every speaker--at least research sanctuaries should be relatively limited in their use in comparison to a sanctuary that is manipulated to a great extent to find out what is man's long-range effect or what is his long-range impact.

We have problems in Florida on dredging fill, very serious problems, and we are going to have more of them. The research on dredging and the research on filling in the mangroves in the Florida area have been haphazard, not organized. There is no way of doing it in an organized manner because we get there after the fact and not before. It would be very nice if we were able to carry out environmental modifications ourselves under controlled conditions and find out what really happens. We need preserves where the environment can be manipulated to provide constructive answers.

We also need the kind of preserve that is essentially untouched, and we leave it untouched. We look at it and observe it, but we do not manipulate it.

There are others problems in an area like Florida. Man has had an effect because of population growth. To some extent industrial, but primarily municipal and agricultural, pollutants are being released. We have no way of examining the effects of pollution under controlled conditions because we have no place that we can control.

In an effort to probe into the selection and management of coastal and marine preserves, we are going to hold a five-day workshop in early 1974 in Miami, under the auspices of the University of Miami, Sea Grant, American Institute of Biological Sciences, and the International Union for the Conservation of Nature, in cooperation with the Florida Coastal Coordinating Council. This workshop, stimulated by the IBP Conservation of Ecosystems Program, will be entitled "The Florida Coastal Preserves Workshop." We hope to use the State of Florida as a model program for the other states. Briefly, we will consider the development of criteria for the selection of preserve areas, recommendations for site selections, and we will consider research and conservation needs, buffer zones, rare and endangered species, and habitats for species and genetic materials. The development of a coherent system of preserves, and the structure of such a system will also be topics, and finally, attention will be given to the means of establishment of such a system and its management.

LEGAL ASPECTS OF THE FLORIDA COASTAL PRESERVE STUDY

by

Dennis O'Connor, Director
Ocean Law Program
University of Miami

In our Ocean Law Program, we have a number of graduate law students who are working on the legal aspects of preservation and conservation. Some of the material that Dr. Darnell has developed, natural area preserves and legal problems for situations in which they are located, as well as some of the additional materials that are coming out of this workshop, are being looked over with the idea of developing a legal aspects component for the early-1974 conference in Miami. The point I want to make is that we have lawyers working together with the scientists, and I think this is a very important step forward.

Now, to make a couple of very brief remarks on some of the major types of legal problems, we first have the question that has to be answered really for each state as well as for the federal areas. This conference is making good headway on this, but I think more work will have to be done. Namely, who are the decision-makers, and what authority do these decision makers have to set up, detect, and manage conservation and preservation areas?

We have seen a number of federal agency and state programs. We are interested not only in what authority they have but also the limitations, the international rights of navigation and fishing, for example, which certainly converge in the Flower Gardens Reef area that Dr. Darnell spoke of. But there are also very complex problems of federal and state jurisdictions and the relative powers of jurisdiction at these levels and also correlation of these with what happens at the local level.

We are also interested in the effective process of ecological preservation. There is an important role for private groups, private associations, which through ownership of a Key in Florida, for example, can have a very significant role in a total system of preserves even though they have no formal governmental authority. The description of these authorities and processes is quite important.

Second, a very key problem in this whole area, particularly for marine preserves, as was pointed out by Dr. Ray, is the matter of what happens outside the area which is designated or set aside. The downstream

effect or the consequences of activities outside the area can obviously have an important and sometimes detrimental effect on the conservation and preservation policies we are talking about. There is a significant legal question in terms of the regulatory authority, in terms of the various agencies of the government, to control activities outside a preserve area which can have a real effect on the internal integrity of the area.

Thirdly, an important area for consideration in the legal realm is the specific management rules which will be applied both within these areas and outside--rules for access, access for research, perhaps manipulation, certainly enforcement, and access of the public for recreation. They will require for any coherent system of preserves a rather thorough and detailed set of legal regulations to cover what happens inside as well as the external activities which can have an effect.

Fourth, and finally, I think important in our considerations is the provision for change in the future, as development patterns emerge, as patterning of use changes, as the ecology changes. It is obvious that any legal system for management must have a strong component to take into account changes from year to year and to adapt to the new situations in light of the desired policies of preservation and conservation.

NATURAL AREAS PROGRAM

by

Stephen L. Keiley, Director
Center for Natural Areas
Smithsonian Institution

I am delighted to be here and to have the opportunity to share with you some aspects of our program which I think will be of interest and of relevance to your particular concerns. Perhaps it would be useful to start by telling you about the Center, since it was established just two years ago and is still relatively small.

Funding for the Center is primarily private with some federal allocation. We are interested in the biological and ecological aspects of the utilization and disposition of land. More specifically, we are concerned with 1) what should be protected, 2) why it should be protected, what are the priorities, and 3) what are the strategies and approaches to achieve this protection?

Perhaps another way of viewing our interests and concerns would be simply to say that in a scientific sense we know a great deal, yet there seems to be difficulty in the linkage between what we do know and how we transmit this to the decision-making communities, whether it be public or private, and the administrative process that makes decisions relating to land. In fact, in some ways it seems incredible that a nation, which can put men on the moon and judge distance between here and the moon within a matter of yards, is still fumbling with some of the basic questions about land and its utilization.

I think four programs would be of specific interest to you this morning. One has already been mentioned by Ted Sudia. We are in the process of assisting the National Park Service, Landmarks Program, in the study of the Atlantic Coastal Plain by determining and delineating those ecologically significant areas that should be considered for national landmark status or perhaps eventually for a park. We are in the process of working on this right now. I would commend to you the approach that Dr. Sudia was mentioning earlier. The Park Service indeed has been a student of this kind of thing for generations. The procedures, approaches, and definitions they have worked up for biological theme studies are excellent.

One particularly interesting aspect of the study is the information on rare and endangered plant and animal species. Some of it updates the work done by the Department of Interior and the International Union

for Conservation of Nature and Natural Resources. We find that 50 of the vertebrate animal species on the Atlantic Coastal Plain are endangered. This compares to a total of 86 nationwide. We are saying something in the vicinity of 60 per cent of rare and endangered or threatened animal species reside on the coastal plain, and most of them within a mile or so of the water.

A second project of interest to you is the work we have just recently completed in Chesapeake Bay. This is a study of the immediate land mass comprising the Bay Region, approximately 12,000 square miles. This was funded by ourselves, The Nature Conservancy, and the Chesapeake Bay Foundation. The thrust of the study was to assess locations that are ecologically significant which should be considered for protection or some form of preservation. Our conclusion at this point is that there are 232 locations comprising about 342,000 acres that qualify as candidate natural areas or ecologically significant locations, which should be considered for some form of preservation or protection.

One aspect of the study which perhaps should be discussed in the next several days is the question of assessing priorities. In the Chesapeake Bay Study, we put together a rating system with a numerical base that might be interesting to consider in a workshop such as this. The Conservancy has taken the material we have provided them and is currently, together with the States of Maryland and Virginia, and other private agencies, putting together an action program for the preservation and protection of what represents about 2 per cent of the land mass within the study zone, or looking at it another way, a program to double the size of the area already under some form of protection, whether it be park, refuge, military, or whatever.

A third project is our study of the coast of Maine. This looked at the entirety of the coast, an area of just 3,300 square miles. The focus here was a bit different. We indeed were interested in the ecologically significant areas. Yet we also were concerned by and interested in the man-induced stresses on that land. This broadened concern has led us to the problem of how to define conservation priorities for an ecologically important coastal zone that is under increasing pressure for human use and development. Here again we found it necessary not only to define specifically what had to be looked at, but then in turn to develop some sort of priority ranking system. In this instance, not only did we attempt to measure the ecological features but also the man-induced stresses, and we combined both, so we could make a more formalized assessment in a quantitative sense to determine which locations were most important for purposes of preservation.

Our conclusion in Maine was that 328,000 acres should be lumped into 32 conservation zones. These would be multiple-use zones as contrasted with Chesapeake Bay's natural areas. These zones include land to be used for man's living and recreation as well as for outright

preservation. Together, these zones amount to 15 per cent of the study zoning, which is significant when you consider that only two to three per cent is at this point set aside under federal, state, or private auspices. The state government has adopted most of the recommendations that were put forward as a matter of state policy, and a private citizens' coalition has been incorporated and is currently underway in developing strategies for the preservation and protection of locations within each of these 32 zones.

The fourth project, still underway, is being done under contract with the Army Corps of Engineers. Several years ago, the Corps decided to take a close look at the environmental factors needed for inclusion in their project planning process and initiated four reconnaissance inventories. These are complete and are landmark steps both for the Corps and also for this kind of inventory. The Corps asked us to both critique these inventories and to take a look at the whole process of environmental inventories with an eye to suggesting improvements in their methodology.

In conclusion, let me distill several points of particular relevance to you. My assessment of the state of the natural areas inventory situation is that an adequate information base already exists, but that it is not coordinated sufficiently for any but the most piecemeal conservation program. Ecological and land information is not in a format that is easily used by the people who make the decisions. So a major job really needs to be done in putting the information into a manageable form, extracting it from those nooks and crannies that the scientific community tucked it into and making it available to the public as well as the private processes that need to act on it.

Secondly, the process through which you go is as important, perhaps more important, as the product. As a nation, I think we tend to be product-oriented and consider that satisfactory. And I would submit for your consideration that it is not, that it is going to be the process through which you go to achieve that end that it ultimately going to be the most significant aspect in arriving at your criteria, your priorities, your definition, and your support.

Thirdly, I think it is quite clear that the management systems we currently have to resolve traditional problems simply are not adequate. I think it is quite clear in the recent legislation on coastal zone management and land use policy that we need new, different, or reshaped institutions, both on a major federal level and equally well on the local and state levels. New institutions are going to be necessary to begin to grapple with and manage these complex problems, using not so much the vertical or hierarchical relationships which we have been good at, but more the horizontal, interdisciplinary interrelationships and linkages. It is the fabric, the network, the intercommunication that is going to be important. And further, recognizing that we can make

decisions of a staged or sequenced nature. I believe we should assemble the knowledge we now have, incomplete though it may be, determine what decisions can be made based on it, and not wait until all the results are in before we make the first decision towards preserving sanctuaries.

Discussion

QUESTION: When are these reports going to be available?

RESPONSE: On a draft basis, the report from Maine is available for limited distribution. The one from Chesapeake Bay should be available in the early part of the year. For anybody that would like either or both, we would be happy to respond to you and provide what we can. I simply suggest that you send me a letter indicating what is of interest to you.

THE PRIVATE ROLE IN THE PRESERVATION OF
MARINE AND ESTUARINE SANCTUARIES

by

W. Brian Bedford, Director
Natural Area Programs
The Nature Conservancy

I will try and talk about the private role in a broader sense than just that of The Nature Conservancy. However, I will use the Conservancy as an example, and I think many of my remarks will apply to the other private and federal agencies in an action sense.

As we are all aware, the private sector in land preservation exists mainly because of a void. The job wasn't and isn't being done, at least to the satisfaction of a group that is willing to put its time, energies, and money into seeing that a certain job is being done, that is, the preservation of certain natural areas. In addition, we exist because of the tolerance of governmental structures, private empathy, political climate, and favorable tax structures. In the overall scheme of things, we are serving as a holding action until this country develops a land ethic.

The private sector has some notable advantages over governmental land preservation. The first and probably the most significant is that it can act quickly and quietly to get the job done. It can also enlist the aid of organizations or individuals that are reluctant to cooperate with federal or other governmental groups. There exists a serious antagonism, especially in some parts of the country, against working in any way with governmental entities. We have been able to acquire some significant natural areas just because of this factor.

There are also some serious constraints in private land preservation.

1. Funding consideration. You can't buy land unless you have the money. Funding is often dependent on special interest groups, for example, groups that identify with a particular species or a specific geographic location. Also, private acquisition is limited unless the potential exists for either public interest or public use in some way--something that the public can relate to.

2. Private agencies mostly lack the power of condemnation which poses serious acquisition problems in that strategic areas may not be available for acquisition. Some interests may not sell no matter what you offer them. This may result in in-holdings that you just can't get rid of. Of course, this points to an area of cooperation between governmental agencies and private groups. If we can get together on some projects, as we have done in the past, we may be able to do the most effective job.

3. Also, the management consideration for those areas you acquire--Are you as a private entity going to be able to provide a responsible stewardship program? If there is no management endowment or other management funds, which are very difficult to acquire--(a foundation is happy to provide money for something they can put their hands on, take pictures of, and so on, but, often when you ask them for management money it is an uphill battle)--you are going to be forced into a public use program to pay for the area, or you transfer the area's ownership out to some other agency, perhaps a governmental agency. Here, there is often a shortage of good agencies to transfer to. We have had trouble getting guarantees that a natural area will be treated as a natural area and that it won't be subject to exploitive use. Exploitive use often dictates management procedures--note the United States Forest Service lands. Multiple use is a difficult concept to work with in actuality.

An important consideration in any preservation activity, whether it be private or federal, is that unplanned preservation goes hand in hand with unplanned development. You cannot just go around and buy up any old area that looks pretty. You may be displacing development and it is going to relocate some place else and may relocate in an area that actually should have been preserved. You may have just done the worst thing possible. Thus, those agencies that are involved in land preservation, conservation, and research should know what they are doing, why, and have a plan.

I have several statements conceptualizing on and defining sanctuaries which I won't go into now other than to emphasize Dr. Bader's point that a uniform system of management within the system we are talking about is imperative if these sanctuaries are to be important as environmental baseline sites.

There are only two national private agencies with significant programs in natural area acquisition. One is the National Audubon Society and the other is The Nature Conservancy. However, many state and local groups are involved and many more are developing a capacity

for land acquisition. For example, in this region the Chesapeake Bay Foundation has now located significant monies and is planning to acquire some natural areas in the Chesapeake Bay region according to a plan developed by the Smithsonian that Mr. Keiley talked about earlier this morning.

My talk will concentrate on The Nature Conservancy as an example. One, because it is the organization that I am most familiar with, and, two, it probably has the widest spectrum of activities in natural area preservation. However, as the experiences of the Conservancy are of high transferability to other private groups and to many governmental agencies, these comments should apply to the broad concept of natural area preservation in the coastal zone. For example, one of our developing programs is a cooperative program with state natural area groups. Here, we are providing an experienced staff man from the Conservancy to help the state develop its natural area system and state program of acquisition of lands for conservation purposes.

Both the Conservancy and Audubon are private, not-for-profit, tax-exempt organizations receiving their support from the public. Audubon engages in a variety of activities, among which is an impressive, highly significant sanctuary program. Approximately thirty of these sanctuaries are marine or estuarine related. They range in size from just a few acres to many thousands. In fact, Audubon and the Conservancy have worked together in several areas, and a few of the sanctuaries are now in joint ownership between the two groups.

The Conservancy's goal is preservation of significant, viable examples of the natural biological communities (note the word "community" here instead of "ecosystem". I agree that "ecosystem" is erroneously used in a lot of discussions of this nature.) It is chartered for research and educational purposes and works in four basic ways:

- 34% by direct land purchase,
- 49% by accepting gifts of land,
- 11% by pre-acquisition of areas for governmental agencies, and
- 6% by assisting other private or public conservation agencies.

The Conservancy arose out of the Ecological Society as the Committee for the Preservation of Natural Conditions in 1917. People were very concerned about these things then, as they are now. In 1946, this committee became the Ecologists' Union and in 1950 was incorporated as The Nature Conservancy. Since that time, 1,070 projects (about 640,000 acres) have been completed--of all degrees of size, significance, and type. We are now approximating 200 projects per year. Sixty per cent of these areas are being kept under the Conservancy's ownership and management. This represents a considerable management burden and

we are very conscious of our stewardship responsibility. About 145 are marine or estuarine preserves; 64 in the North Atlantic, 46 in the South Atlantic, Gulf and Virgin Islands; and 33 in the Pacific, including Hawaii.

I am going to present some examples of private action using primarily Conservancy examples to 1) demonstrate the techniques used and the possibilities, and 2) to gain some perspective as to the significance and the role of private agencies in this area we are talking about.

1. Acquisition through private purchase and retention in a private organization's ownership and management.

Turtle Island. This is a 140-acre island off the Maine Coast, primarily covered with mature spruce and fir forest and is a fine example of the rocky intertidal habitat. It was purchased and is still owned and managed by The Nature Conservancy.

Virginia Barrier Islands. Approximately 30,000 acres of barrier islands extending along the Virginia eastern shore or peninsula. Includes both salt and fresh water marshes, barrier beaches, dune systems, coniferous and deciduous forests. These islands are vitally important nesting habitats for a wide variety of shore birds and water fowl and represent almost the complete range of diversity found in the barrier island systems of this region. The total package of the Virginia Barrier Islands represents millions of dollars in acquisition funds. Present plans are to conduct an 18-month ecosystem and management study for these islands and to determine the feasibility of management by The Nature Conservancy. It is very likely that this management effort will evolve into some type of a cooperative arrangement with state or federal agencies.

Waldron Island. This is one of the San Juan Islands in the state of Washington. This project represents an exceptional complex of terrestrial, fresh and salt water ecosystems. It is the first of what is hoped to be an ongoing preservation program in the San Juan island group. Priorities developed in a sanctuary system would be helpful in determining where the Conservancy should act in the San Juans.

Cascade Head. A 300-acre headland on the coast of Oregon presenting a variety of estuarine and marine intertidal habitats, owned and managed by The Nature Conservancy. There are relatively few estuaries in Oregon and they are one of our highest priorities on the Oregon coast. We feel we can affect the preservation of a few intact estuarine systems including most of their watersheds.

2. Gift acquisitions retained in private agency ownership and management.

La Verna Preserve. A part of the Conservancy's Rachel Carson seacoast system and was a gift of a 118-acre island to The Nature Conservancy. It is representative of the Maine coastal systems and is used primarily for research activities.

3. Private acquisition through purchase and then transfer by sale to governmental agencies.

St. Vincent Island. This was a government co-op with the United States Fish and Wildlife Service. That is, the Conservancy purchased the area and then transferred it to the Fish and Wildlife Service. It is a 12,400-acre island off the coast of Florida. Live oak and palmetto hummocks, fresh and salt water marshes, and an exceptional diversity of habitats due to a number of low sand ridges running the length of the island. Purchase price of this island was over \$2 million.

Wolf and Egg Islands. These two islands representing some 4,000 acres off the coast of Georgia which exemplify the Georgia marsh systems were purchased in a government co-op to form the Wolf Island National Wildlife Refuge.

4. Private purchase and then a transfer by gift to governmental agencies for management purposes.

Wassau Island. This nearly pristine 11,000-acre island off the coast of Georgia was purchased for approximately \$1 million in a bargain sale (estimates for fair market value were as high as six million dollars) and was given to the Bureau of Sport Fisheries and Wildlife by the Conservancy to be managed as a natural system.

5. Private agency assisting in governmental purchase.

Lignumvitae and Shell Keys. Lignumvitae Key represents one of the last viable stands of the lignumvitae forest and should be classified as a rare and endangered community. In this project, the Conservancy acquired a purchase option (and \$200,000) for the state of Florida. The actual purchase price by the state of Florida was \$1,950,000 for the 545 acres. It is obvious from this discussion that these sanctuaries are going to be expensive.

Buena Vista Lagoons. This is a good example of how private and governmental cooperation led to the acquisition of the 130-acre state Buena Vista Lagoon Ecologica! Reserve

in San Diego County, California. The Conservancy donated 73 acres to the state and the state used this donation to match BOR federal funds to acquire the additional 57 acres. The area represents a unique series of fresh water lagoons formed by sand bars at the mouth of an estuary.

6. Purchase acquisition by private agency and leased to university for management purposes.

Lower Tubbs Island. This 330-acre island near San Francisco is important as it is one of the last viable marshland habitats in this area. It is leased to the California College of Arts and Crafts for scientific and educational use. The college also fulfills the management responsibilities.

Elkhorn Slough. This is a large relatively undisturbed estuarine area between San Francisco and Morro Bay. This area has a permanent resident population of the endangered California Clapper Rail. The Conservancy acquired a portion of the slough. This area is managed and used by the Moss Landing Marine Lab and the University of California in conjunction with the California Department of Fish and Game for research and educational purposes.

7. Joint acquisition by private and governmental agencies.

Rookery Bay. This well known representative of the southern Florida mangrove systems was acquired through the cooperation of several groups--the National Audubon Society, the Collier County Conservancy, and The Nature Conservancy. In addition, 338 acres are leased by the Conservancy from the state of Florida. The entire area of some several thousand acres is managed by the National Audubon Society.

8. Private manipulative research acquisition.

Hambleton Island. To experiment in the field of marshland restoration, the Conservancy acquired Hambleton Island in the Chesapeake Bay. On this site, techniques are being developed for the restoration of damaged or destroyed natural habitats. This program has since gone independent from the Conservancy and has expanded its operations to include fresh water intertidal habitats and has worked in a variety of systems along the eastern seaboard.

Earlier I alluded to some brief statements conceptualizing sanctuaries. These statements are presented below and offer a digest of ideas relating to sanctuaries by a person in the private sector of sanctuary establishment and management.

Marine and Estuarine Sanctuaries, A Definition

The goal should be a defined set of sanctuaries representing the full range of estuarine and marine habitats both from a community and geographical standpoint.

The Primary Purposes of Sanctuaries

--To serve as baselines for understanding and predicting environmental change, i.e. ecosystem analysis, monitoring programs, educational programs, etc.

--To serve as representative natural communities in the face of man's continual modification of natural systems.

--To serve as a reservoir of both species and functioning natural systems.

Selection of Sanctuaries

--Should be large enough to be viable, defensible, and to provide for a good margin of safety in management (the size will depend on the system in question).

--Should be as representative of the natural community as possible.

--Priorities for acquisition should be drawn up and based on three integrated variables: 1) need of the area for a complete representation in the system, 2) degree of endangerment of the area in question, and 3) the availability of viable and defensible systems.

Use of Sanctuaries

--The primary rule should be to allow that use which does not conflict with, nor impair, the functioning of the natural system being preserved. This, of course, does not apply to those sites that are set up as manipulative research areas and not as natural areas. However, this would apply to manipulative research on the natural areas as it is foolish to conduct research that destroys the system under examination.

--The areas cannot be subject to exploitive use. Otherwise the exploitive uses will dominate management practices, i.e. National Forests for timber production.

--A uniform system of management is imperative if the sanctuaries are to be valuable as environmental baselines.

--It is often from the scientific information standpoint that management is a serious issue. From a preservation standpoint, the system will mostly take care of itself if man is excluded. The defensibility from outside influences, i.e. pollution, will have to be a site selection criterion.

Discussion

QUESTION: Does your organization have any kind of educational program for wealthy private and corporate owners of these sensitive lands as to telling them what their options are as to income tax law?

RESPONSE: Yes, this is how we get our dollars to a great extent. We mostly convince them by telling them of the economic advantages, tax advantages, public relations, and so on. These corporations may have well-meaning individuals in various locations but the company operates on the bottom line. You've got to show them how they can come out economically to effect land preservation. It may be public relations--a combination of things. It may be some thinking, concerned individuals.

COMMENT: In Florida you mentioned you had Lignumvitae Key, very expensive. We have found for an acre of mangrove it is not unusual for the Keys to be assessed at \$15,000 an acre. The income tax law says you can take half the appraised value today off and as our Coastal Atlases are getting distributed, lending institutions and so on are downgrading the value. As time goes on, they are not going to be able to sell it for \$15,000 an acre because in actuality they can't get permits to develop it. When this is presented to corporate individuals, they begin to see the advantage of getting rid of it, and, as you say, a lot of them will make a deal with you and write it on their income tax and come out a lot ahead.

RESPONSE: This is very true. We have been paying \$200 to \$300 an acre for marsh in the Chesapeake Bay. We recently picked up some for \$20 an acre because of this very point. People recognize they have to get rid of it because they are not going to be able to do anything with it.

QUESTION: How do you make your decisions as to how you allocate your money?

RESPONSE: Thank you. I missed that point. We have operated opportunistically for many years. We are now starting on a series of planned acquisitions. The Virginia Barrier Islands was one. We do have a large scientific constituency among our membership, our Board, and so on. We have scientists working with the organization. I am one of the staff ecologists. We solicit the advice of many individuals; we conduct inventories. The Chesapeake Bay Inventory, done by the Smithsonian Institution with the sponsorship of the Conservancy and the Chesapeake Bay Foundation, is an example of this. We have just established a prairie inventory to determine where we are in prairie preservation and where we need to go, and how we can best effect that. We are hiring an ecologist to do that and he will be working with a great number of other people. In the past, we picked up prairies helter-skelter to some degree and we know we were not doing the best

job. We have a lot of money to buy prairies, if we can find big, significant prairies. Also, it is hard to manage a hundred-acre prairie, but easy to manage a hundred thousand-acre prairie.

QUESTION: What are you doing about tying in with the states in protecting the offshore areas around your marsh areas?

RESPONSE: This is one of the best examples of private and governmental cooperation, or should be. We, like any private owner, are subject to the laws of the state. Unless we have a King's grant, specifying ownership to low tide like some of the Barrier Islands, we don't own that area or have any control over it. This is sometimes why we turn over many of our marine and estuarine areas to state agencies, because we can't effect proper management due to lack of control because of the things mentioned--riparian rights and submerged lands. For example, on this Barrier Island system, if we could cooperate with the state in setting up an offshore ecological preserve, we would have a much better package than we have now.

QUESTION: Are you working on that type of approach through the state legislatures?

RESPONSE: To a limited extent, yes. The primary lobbying and legislative work we do is on those matters that affect our lands directly. We are not very expert at it now because things change so fast, but it is this area that I view as the area of greatest cooperation between state and private and federal programs.

QUESTION: To what extent does public concern and involvement influence your thinking? How do you crank it into your decision-making program? I am thinking in terms of areas such as the Barrier Islands. Do you take this into account? Is it of value to you to have citizen groups concerned about a particular area?

RESPONSE: From a fund raising standpoint, it is essential, if we have to raise funds. In the Virginia Barrier Islands, for example, we had a foundation support the entire program. They were convinced of its value. We could not have done it without the general public support. In one area, we had and needed public support in purchasing mineral rights under a National Forest area. Yes, we are very conscious of it. Endangered species preserves are very easy to establish, especially if you have a vertebrate like the bald eagle. If you have a blind salamander, which is kind of ugly, it is a little bit harder. We try to do things that are significant biologically, but to operate we do a few other things. We do some backyards. We do some open space. However, the great majority of our programs result in significant natural areas.

THE NORTH INLET ESTUARY, A FUNCTIONING ESTUARINE SANCTUARY

by

F. John Vernberg, Director
Belle W. Baruch Coastal Research Institute
University of South Carolina

The North Inlet estuarine-marsh complex, Georgetown, South Carolina, has essentially been serving as an estuarine sanctuary for a number of years. Most of the land surrounding this remote area is owned by the Belle W. Baruch Foundation and before that Mr. Bernard Baruch was the owner since the turn of this century. The total land holdings of the Foundation is 17,500 acres, while the marsh area associated with North Inlet Estuary is about 7,000 acres. The land area adjacent to the marshes is essentially undeveloped.

Since 1969 when the Belle W. Baruch Coastal Research Institute was established, with joint funding from the Belle W. Baruch Foundation and the University of South Carolina, an active program dealing with gathering baseline data and making studies of the operational mechanisms of relatively undisturbed marshes has been in progress. In this four year span, the 30 faculty associates and the graduate students of the Institute have published in excess of 80 scientific papers and books, and more than 90 papers have been presented at state, national and international meetings. Our total grant funding from various private and public sources has been approximately \$1.6 million. In addition, we have initiated a series of international symposia dealing with estuarine and marine problems. The proceedings are published by the University of South Carolina Press. Volume 3 will be published this spring. Our physical facilities at the coast include a recently constructed 5,000 square foot laboratory, a boathouse, and pier. Housing in association with the laboratory is being planned but does not presently exist.

The essential point of my previous remarks is that we have a program currently in existence whose goal is to function as an estuarine sanctuary. The property is available, some laboratory and supportive facilities are at the site, and a small interdisciplinary scientific staff is studying estuarine processes.

To briefly describe our program would have relevance to this week's discussions as it might serve as an "embryonic" model on how one type of sanctuary might function. On the other hand, we will benefit by having many of the ideas presented here incorporated in our management program.

Our main objective is to utilize the North Inlet Estuary as a unique site for scientific research and education. The area is sufficiently large (approximately 7 miles long and 3 miles wide) to permit studies on undisturbed areas as well as allowing some investigation of the consequences of environmental manipulation. To date because of insufficient time and money the manipulative studies are chiefly in the planning stages. Baseline data are being collected on the following components of this estuarine ecosystem:

1. Primary production: Spartina production is being determined. Phytoplankton and attached algae have been studied by Dr. Zingmark.
2. Meiofaunal diversity and energetics are being analyzed by Drs. Coull and Vernberg.
3. Zooplankton is also being studied by Drs. Coull, DeCoursey, and Vernberg.
4. Various phases of ecology and physiology of macroinvertebrates are being studied by Drs. Dame, DeCoursey, Chamberlain, Vernberg, and Dean.
5. Secondary production estimates are being collected by various investigators.
6. Fish production and seasonal abundance studied by Drs. Dean and Freeman.
7. Marsh insects by Dr. Davis.
8. Oyster population by Drs. Dame, Lawrence, and Burrill.
9. Chemistry of marsh waters by Dr. Gardner.
10. Sedimentation process by Dr. Hayes.
11. Hydrology by Dr. Kjerfve.
12. Geology by Dr. Colquhoun.
13. Microbiology by Drs. Cowley and Stevenson.
14. Marsh water chemistry by Dr. Gardner.

We are attempting with the assistance of ecological modellers to develop the capability of predicting the response of the intact estuarine ecosystem to natural and man-induced environmental perturbations. To do this successfully, long term studies are necessary and these require the need both for an estuarine sanctuary and long term financial support. Both of these features are inherent in a national system of estuarine sanctuaries.

HARD MARINE MINERALS

by

Ezra Sensibar, President
Construction Aggregates Corporation

I would like to amplify the statement that I would be talking about hard minerals. I would like to discuss the positive rather than the negative of what we have been talking about all day. We have made a passing bow, I think, to multiple uses of the seabed, but now I want to talk about them in earnest. I would like to make some input of facts from the present, and some from the past, and hopefully make some valid predictions about future multiple uses of the seabed. These uses all have a physical and biological impact, of course, but I won't comment on them. I will try to present the facts to you and leave you to draw the conclusions.

It seems to me that in the formulation of management programs for the seabed, there is no greater challenge than to attain the greatest social good. It is the total social cost which has to be determined. Otherwise, we come out with a lopsided program which may turn out to be no better than no program at all. Let's look for a moment at the past.

The uses of the seabed were the same for the 7,000 years ending in 1850. They consisted of harvesting shellfish, some kelp, bringing up a few pearls, and in general using the coastal zone as the final dump for human waste, for industrial sewage, and for the erosion which resulted from our agriculture.

In 1850, things began to change with the invention of modern dredging. For the first time the coastal zone began to be dented with channels for navigation. It is hard to realize that this happened only a little over a century ago. Until that time, for example, the amount of water available for ships entering New York Harbor was only 17 feet at high tide.

Fifty years later, about in 1900, we began to extract sand and gravel from the seabed. This began really on the Great Lakes, in the vicinity of Detroit, and slowly spread to the coastal zone. Fifteen years later, in 1915, the first land reclamation started in this country at Chicago. We took sand from the bed of Lake Michigan and spread it hydraulically along the shore of Chicago to widen the land available for public use.

In 1920, Holland initiated its great reclamation project at the Zuider Zee. It is hard to realize that all of this happened only a half-century ago. About the same time we began in this country to extract shell from the coastal zone, using it to make cement and as aggregate. It was not until 1937 that we began to bring sand from the ocean for land reclamation. That started in New York City with the construction of Orchard Beach.

In 1953, just 20 years ago, the sand island was invented. It was used for the first time in Chesapeake Bay for the protection of the piers and cable anchorages of the suspension bridge across the bay at Annapolis. Ten years later a further development of this rock-enclosed island was devised which was the perched island. I will talk about that at greater length in a little while.

So much for the past and the present. The future begins, I think, with next year, when for the first time the deep sea may be mined for manganese, cobalt, nickel, copper. The outer coastal zone and possibly even the deeps of the Great Lakes may be mined for hard minerals for the first time. Whether this will prove commercially successful, what the thrust of it will be, it is much too early to tell. Also, in the future, the use of the seabed to provide aggregates for concrete and for asphaltic pavements, also material for cement, for producing glass, for foundry sand--all of these uses and more will increase very rapidly.

Now let's look at just a few of the physical effects of these operations. Channel dredging causes a limited turbidity confined to the period of the actual dredging. It exposes new strata which may be the same, may be different, from the surrounding strata. The by-product of dredging channels is spoil, a seabed material that has to be disposed of. If it is sand it may be a useful by-product. If it is mud or clay, most likely it has to be wasted. If it is wasted alongside the channel, then it covers some seabed with earth which may be the same or different from what was there before. If it is hauled out to a dump far at sea, then it most certainly covers some strata which are different than the material placed over them. If the material is sand, it may be used for the replenishment of nearby beaches or for widening them. It may also be used as a fill behind docks to build wharves, and in that case there may be a change in the current pattern caused by the new structure. In some cases this has resulted in either erosion or accretion at more distant points. These things have to be considered in the planning state. Later is too late.

Channel dredging is but rarely related to an industrial use. Almost always when sand or gravel is extracted from the seabed for industrial purposes, it is a special operation not

coordinated with the deepening or widening of a channel. The choice of where to dig is almost always based on technical, economic and legal considerations. It is a question of where the sand or gravel is, the depth of the deposits the depth of the water, the sea conditions, the particle size gradation, the quality, the market, competition, and more recently, the difficulty of securing permits and the royalty which the state may collect or impose on the extraction.

Shell, which has probably reached the peak of its production and use, is in relatively small quantity. The vast quantity of useful aggregate on the Continental Shelf is sand. It is presently being excavated in the United States and brought inland at a rate of something like 20 million cubic yards a year. It is used for beach widening, for reclaiming land, for building highways, for building islands and for limited industrial purposes. Its use as aggregate for concrete and asphalt is quite limited in comparison to its use as a fill material.

I would like to make a few predictions about our future needs and point the direction in which I believe our various industries are moving. This movement will be very greatly influenced, perhaps absolutely determined, by legal structures and by the conservation and ecological considerations that we have been talking about. But it is not hard to predict the trends.

First, the question of aggregates. We consume about five tons per capita, about a billion tons a year of sand and gravel. This presently comes from hillsides, from river valleys, from glacial deposits, and when it is extracted it leaves scarred hillsides, useless lands, and a general despoiling of the countryside. It has to be transported considerable distances--by land as much as 200 miles; by water as far as 1,000 miles. It is expensive, and the supply is limited. The best deposits near the cities, near the centers of use, have already been exhausted. There are vast deposits in remote regions such as the Rocky Mountains, for example; but the cost of transporting gravel from Wyoming to Chicago would be staggering.

There is another consideration, and that is trucking--the use or abuse of our highways in carrying these heavy materials. That economic cost is more than a question of maintenance. It goes to the capital cost because the highways have to be built to carry this kind of traffic. In Michigan trucks carry 55 tons, about what a railroad car carries, and the highways have to be built to resist the impact and the weight of this form of transportation.

All of this is a part of the social cost that we have to consider.

On the other hand, we have the possibility of extracting these aggregates from the sea. If you will reflect for a moment that a single bargeload of 25,000 tons of aggregate brought in from the sea replaces a column of trucks 60 miles long on the highway, you can make, I think, a rough comparison of the social impact of the two methods.

The Continental Shelf sea bottom with its huge volumes of sand is large, and only a small part of it would have to be mined at any one time. Also areas of great biotic value could be avoided by being designated as sanctuaries in the sense that we are talking about. There might also be a possibility of improving the biota through the systematic dredging of the sea bottom for aggregates. It is a possibility that needs study, needs examination. It is not to be assumed, I think, that the inevitable result of this kind of exploitation is damage.

These huge marine deposits on both coasts and in the Gulf are available to water transportation, which is the cheapest form. They lend themselves to the economy of scale in a way that land deposits do not. And fortunately, many of these huge deposits are close to centers of population. They are close to the 40 percent of our people who live on the two shores of the continent and on the shores of the Great Lakes. I have to say a word of caution. I am enthusiastic about the use of the ocean bed for this purpose, but we have to consider it carefully.

The Geological Survey has estimated that there is a volume of 500 to 5,000 billion tons of useful sand offshore between Cape May in New Jersey and Cape Cod. This is a very rough estimate. It is not based on a thorough drilling program and it takes no account of the quality of this sand and gravel in commercial terms. The production of sand and gravel is a sophisticated business. It is not just a matter of digging it out of a hillside. And whether this supposed 500 to 5,000 billion tons is really suitable or not remains to be determined. If it is, at present rates of use it would take care of our needs for 2,000 years or perhaps 20,000 years.

There are many, many problems involved besides the question of quality and quantity, and the feasibility of extraction. Who owns it, who should control and manage it? How is its use to be financed? Where does the private sector come in? How is industry to be encouraged to invest the money necessary for these large-scale operations? How is monopoly to be avoided? And what benefits or what damage results from this extraction? A great step forward would have been taken if the NOMES project had continued, but unfortunately it was killed. I hope that at

some time in the future, the near future, this or some similar project will be carried out on a sufficient scale to derive baselines and guidelines. We must determine and not guess at what the benefits are and what the harm is that results from this type of operation.

So much for aggregates from the sea. Now let us consider fill sand. Some reference has been made here to sand islands and we have been shown pictures of sand islands made by nature, and I think, one or two sand islands resulting from dredge spoil. I believe that the use of the seabed both to furnish the materials for and to support sand islands is one of the great needs and opportunities of the future. Perhaps I should say a word about how a sand island is built. If the location is in very deep water, say 200 feet, a sand shoal is first created by transporting sand and dumping it on the sea bottom until the top of the underwater hill or submerged island comes up to a depth determined by the height of waves rolling in. The depth has to be such that the fingers of the waves reaching down will not erode and transport the material.

Let's imagine an extreme example. Let's take some place like the Cape Hatteras area where you might have storm waves 40 feet high. The sand shoal would be brought up to about 60 feet below sea level. Below that point the wave effect would be nominal, and no erosion would take place. Beginning then, at that elevation, a series of rock dikes would be built underwater, circular rock dikes, each about 15 feet high. The first one is placed on top of this mound of sand and then is filled with sand. On top of that layer, another similar rock dike is built underwater, about 15 feet high, and that is filled; and so the island is tiered up like a layer cake. Finally it comes out of the water and can be built up as high as one needs. Then the area where the wave attack is the greatest is covered with heavy rock riprap. The stone used for the dikes doesn't have to be heavy. It can be either quarry run or crushed stone, whichever is the cheaper.

This kind of island has the advantage of the economy of scale. The most costly part of it is of course the riprap, which costs from ten to twenty times as much as the sand. Consequently, the larger the island, the cheaper the cost per square foot of surface, because the rock volume increases only as the diameter, while the sand content increases as the square. Such islands have been built. We have been building them for twenty years. We have built them in 90 feet of water. Four of these islands form the anchorages for the two tunnels of the Chesapeake Bay Bridge Tunnel crossing. There are four islands at Long Beach, California, from which 640 oil wells have been driven.

We think that islands of this type cause the least ecological damage. They are permanent. They don't rust away as a steel structure might. There is no danger of collapse. They are collision proof. The disaster at Santa Barbara could not have occurred if the wells had been drilled through sand islands, as at Long Beach, instead of from structural platforms.

Large islands will have many uses in the future. One that is now being seriously considered is for a deepwater port to berth the very large crude carriers which will require 100 feet of water. Another current use is for the siting of nuclear power plants offshore. Sand islands have been designed for airports at Los Angeles and in Chicago. They might also serve in the future as a site for heavy industry, because in the vicinity of the greatest need of the products of heavy industry there is simply no room on shore to build large plants.

I would like to make a suggestion in the direction of economy, which might make it feasible to use such an island for recreation and for housing, so that people could play and live in a pleasant ocean atmosphere instead of in the crowded cities. The suggestion is the island polder. It is a variation of the Dutch idea of using the seabed below water level by surrounding it with an impervious dike to exclude the water. This idea is actually in use in Chicago. The North Side Water Filtration Plant in Chicago is built on the bed of Lake Michigan, about 20 feet below lake level. It is protected by a clay dike around the area. A sand dike could similarly protect an area if it had an impermeable membrane down the center. The most involved would be that of building this circular dike, pumping the water out of the inside, and treating the seabed as required. The space below sea level could safely be used for garages and for storage. Habitations would be built above sea level with ocean views.

You know, sand has had a bad name as a building material for a long time. It started, I think, with St. Matthew, who put these words in Jesus' mouth. "A foolish man built his house upon the sand, and the rain descended and the floods came and the winds blew, and beat upon that house and it fell, and great was the fall thereof." But that was 2,000 years ago, and I think we have learned something about the use of sand since then.

What we lack, really, is adequate technology. Nature has shown us how to use sand. The Continent is protected from Cape Cod to the Panama Canal by a series of sand reefs and bars, which resist all the ocean powers. What we need are the mechanics and the mathematics and the model basin studies, so that we can project and predict adequate designs. We need to know how to structure these sand islands, how to orient them, how to make them permanent with or without rock protection. I think the ecological impact

of adding to our social assets by this means would be a minimum, because we would not be fighting the ocean. We would be using nature's forces. We would be mounting something on the seabed, on the Continental Shelf, which is organic to it, rather than trying to impose structures of a foreign nature.

I have tried to outline some of the facts of today's situation and some of the needs which I think we must face in the near future. To harmonize these with conservation and ecology poses a tremendous challenge to social management, so that we may attain the greatest good for all of us. Meetings like this one and the kind of work which the Institute has done through the last year may make a significant contribution to determining how we ought to manage this great resource that surrounds our country.

Discussion

QUESTION: I have been pondering what the greatest social good might mean exactly. I think you have given a very good argument for the economic yardstick from the homocentric point of view I tried to caution against. This leads to a question and a statement.

The statement is that the history of the mineral use of ocean resources has almost always been considered apart from, and not a part of, the superjacent waters and biological productivity. It is clear that the use of the ocean bed is not considered productivity of the ocean bed. Those of us who looked at strip mining on the land consider possible exploitation of the ocean no different. It is only out of sight.

The question I have for you then, is: What research or precautionary measures do you see your industry taking right now to protect the productivity or support ecological research at the present time?

RESPONSE: I regret to say I can't be very optimistic about it. The composition of the industry I am discussing here consists in the United States of over 6,000 units. Only a handful of them are businesses that do more than a million dollars gross a year. I don't think that the industry as such is well enough organized to support any extensive research. If it is to be done, it will have to be done in the public sector.

QUESTION: Under the laws of the United States we must have environmental impact statements on the impact, let's say, of dredging or filling or something like this. And taking that into account, would it not be incumbent upon a university to support its own in-house or out-of-house research on the impact of dredging which has had some very deleterious effects on the

biological productivity of the waters in which the dredging is occurring?

RESPONSE: I can only repeat what I have said before. We evidently have a different view of the facts. I don't believe that the industry is well enough organized to support this kind of extensive research. There are, perhaps, a half-dozen companies, no more, that could be considered large businesses. These are conglomerates for whom the aggregate business or the building material business is a tiny fraction of their activity. I doubt very much whether from the point of view of self interest any one of these firms would be willing to spend the many millions of dollars required for research on a project which is really basic research, which might or might not result in any economic benefit to them.

COMMENT: I would like to address this. The Corps of Engineers have just started a research program to determine what the effects of dredge dumping are on the marine environment. This is a program that has been in being since about last April. It is being sponsored through the Waterways Experiments Station in Vicksburg. They have currently made a survey of the waters surrounding the United States and looked at areas where the Corps has been doing extensive dumping. They plan to do extensive ecological studies in those areas and determine exactly what the effect has been. They will check both inside and outside a baseline, this type of thing. It is a brand-new program. They are just getting under way. So I think part of this, may be answered by this program if we lean on them carefully and make sure they go in that direction. They are very receptive this way.

COMMENT: The Corps of Engineers hasn't been able to figure out how to build those sand islands any higher without them sloughing off to the side, In Oregon a \$50,000 house on a rock protected by sand fell into the ocean in one storm. I don't know if the technology is there to build sand islands in the deep part of the ocean. We are talking about the strongest forces in nature, exposing things like nuclear power plants to such things. A sand island in a bay is not exposed to the currents and forces of the ocean. I can't comprehend the technology even being available in the near future to build anything like that, even protecting it with rock or concrete for that matter. It seems like the cost to the public for the benefits would be outrageous.

RESPONSE: I think it is too difficult for me to comment on your particular situation. I might say, however, that the four islands which anchor the ends of the tunnels in Chesapeake Bay at the crossing at Norfolk have withstood all the hurricane gales since they were built, have not eroded, and there have been waves more than 30 feet high which have displaced sections of the trestle across the Bay, but they haven't hurt the islands.

OFFSHORE PETROLEUM EXPLORATION AND
DEVELOPMENT TECHNIQUES*

by

D. A. Danielson
Texaco Oil, Inc.
American Petroleum Institute Representative

It is a personal privilege for me to attend this conference, and it is my intent to briefly review petroleum exploration and development techniques in the offshore area. Then assuming you will share some familiarity with our methods of locating and producing oil and gas, I would urge this conference to continually consider the meaning, placement, and management of sanctuaries in terms of our energy needs.

I will attempt to be brief because it is getting late in the afternoon. Before starting with the technological review, I think it is important to point out that the offshore area supplies a great amount of the energy needs of the nation. In the inland areas of the United States, many of the larger oil producing fields or areas have already been surveyed, and we have difficulty obtaining our large energy requirements in inland areas.

Offshore oil exploration started over a quarter century ago in the Gulf of Mexico. The initial efforts were in relatively shallow water and involved fixed structure rigs. Now we have progressed to using mobile jack-up rigs, routinely in much deeper water, in many areas of the world. Offshore areas are being explored in the North Sea, off the coast of Africa, Canada, Indonesia--in fact, almost everywhere.

Offshore of the United States, only 2 per cent of the areas are currently involved in production. The United States Geological Survey has estimated that there are 190 billion barrels of oil and 1100 trillion cubic feet of gas in the offshore areas. This obviously would be extremely helpful to us in the next 30 or 40 years in supplying the nation's energy needs. Currently, out of that 2 per cent, the United States offshore area, which is relatively youthful in our producing history, is already producing 18 per cent of our domestic oil and 17 per cent of our domestic gas.

*Mr. Danielson's presentation was accompanied by a large number of slides. Unfortunately, it was not possible to reproduce these slides in this proceedings volume. Mr. Danielson's presentation has been edited by the study personnel in this light. (Editorial comment)

I should emphasize here the time lag in the oil and gas industry. It is extremely important for everyone to appreciate the fact that after initiation of exploration, it takes 3 to 10 years (and usually more close to the 10 year figure) for any oil to come out of a newly developed area.

As most of you know, the offshore area is defined and controlled through government policy. As an offshore area is located, or an area is deemed desirable for oil company activity, there is a series of procedures which the government undertakes.

The first step is a request for nomination of tracts in the area being considered. At this point, the oil companies indicate which tracts within a given area they would like to see placed up for bid. I might add that it is necessary to generate impact statements at the discreet steps in this procedure, and a yes or no decision to proceed to the next step is only made after evaluating the impact of the action. After nominations are received, the Department of Interior (Bureau of Land Management) determines which tracts are to be advertised for leasing, and then, assuming natural progression, the tracts are advertised, bids are reviewed, and leases are obtained by oil companies. It is only at this time that the companies can move their rigs to the lease sites to begin exploratory drilling.

As an exploration geologist, I would like to again refer to the United States Geological Survey figure on offshore potential resources: 190 billion barrels of oil and 1100 trillion cubic feet of gas. These figures are not based on specific data. They are geologically inspired figures. These figures are empirically derived from comparison of the geological section of an offshore area to similar sections productive in onshore or offshore areas. In the actual discovery of a major oil accumulation, I believe the success ratio is one in 253 attempts.

At this point I might mention that offshore drilling is expensive, particularly when compared to onshore drilling. For example, a moderate test in shallow water would cost approximately \$600,000. That same test out in deeper water has a potential for tripling in cost.

As of early in the year, over 17,000 wells have been drilled in the U. S. offshore areas. The bulk of these, of course, are in the Gulf of Mexico.

The oil industry uses a variety of modern devices in its oil and gas exploration and developing. Prior to actually obtaining a lease, the companies are restricted to exploration techniques which do not penetrate the sea floor. Most of these are geophysical types of exploration, but occasionally we do use esoteric devices such as undersea sleds, although these are used more in conjunction with repairs and checking of producing wells and pipelines.

Our main exploratory tool is seismics. Sound signals generated by towed devices are propagated down into and through the bottom. Part of these signals are reflected back and received by devices called geophones to give us our seismic picture. I might say here that we do not use explosives to generate sound signals anymore.

Exploratory drilling and production drilling are done from several types of rigs, depending upon the depth of the water. In shallower water, drilling is done from jack-up rigs, i.e. rigs that are towed to a site and then fixed into position by means of long legs which actually rest on the bottom and serve as supports to jack up or elevate the drilling platform above the water surface. The semi-submersible rig is used in somewhat deeper water. These rigs have a large below-water structure which helps stabilize the work platform. The rig is fixed in position with anchors. The deepest wells are drilled from drill ships which position themselves dynamically.

In drilling a well, a bit is used which rotates to cut the hole in the ground or bottom. Drilling mud is used to return cuttings to the surface. This drilling mud is weighted to control fluids, i.e. water, gas or oil that are penetrated by the bit. Wells are cased, either with protective strings while drilling, or if the well is successful, it is necessary to case it off in order to produce the hydrocarbons present.

During drilling, an initial protective surface casing is emplaced. Blow-out preventers, in many cases, consisting of 3 or 4 different types, separately controlled, are tied into the surface casing. This equipment is present on all drilling wells.

The industry is continually trying to improve its techniques. One area receiving much attention and experimentation is the placement of producing equipment on the sea floor. These experiments suggest that with further study, and the desire of the oil companies to be compatible with the environment, such equipment will be designed to be compatible with the fishing industry.

The oil industry believes and thinks this has been demonstrated in the Gulf Coast area that present equipment is compatible with and does not interfere with the fishing industry, particularly the sport fishing industry.

Presently, much of our oil comes from areas far from home, but there is a potential for production closer to home. Many countries such as Britain and the other countries surrounding the North Sea are exploring and developing this area. It is obvious although the British have not proceeded to the point where they can take care of their energy needs completely in the current crisis, they will after the time lag mentioned earlier be in a much more favorable position in regard to their energy sources, balance of payments, and so forth.

We too can alleviate our energy crisis in the future if we develop some of our own resources offshore. I was quite impressed by the fact that the Land and Water Conservation Fund gets much of its funding from offshore oil and gas revenues. I am hopeful that all at this conference noted this and might view the oil industry in somewhat friendlier light.

THE OIL INDUSTRY ATTITUDE TOWARDS MARINE AND ESTUARINE SANCTUARIES

by

Keith Hay, Conservation Director
American Petroleum Institute

I am Conservation Director for the American Petroleum Institute. I dislike the notion that there is an incompatibility between conservation and the oil industry. I have worked for both groups, being some 17 years in the state and federal conservation agencies, and some 4 years with the petroleum agency. I think we have all got to work together because the decisions we make have to represent the entire public, not any segment of it. And I would like to take this opportunity to express appreciation and congratulations to the Virginia Institute of Marine Science and to NOAA for stepping back and taking, hopefully, an objective look, bringing together a lot of people with diverse background and interests to assess the concepts and the guidelines that will go into the designation of marine and estuarine sanctuaries.

Too long, I think, environmental decisions have been made without public input, and I think sometimes even in federal regulations and designs we are not getting public input, but I am glad to see this in NOAA's case.

Actually, when we talk about public, we are talking about society, and I think society is sort of analogous to a three-legged stool. One part of that stool is the environment--very much so. Another part of that stool is economics. And another part of that stool is social considerations. That stool will fall if any one of those legs fall. I think we can use that philosophy in the designation of land use, whether it be on land or in the marine environment. We must consider all three of these aspects as well.

With that in mind, the industry, I think, will try to strive during this workshop to support some of the following theses. First of all, we certainly support the principle and the concept of marine and estuarine sanctuaries, just as industry supports the designation of wilderness areas, the expansion of the national wildlife refuge system and our national parks and monuments. We support the consideration, also, of both qualitative and quantitative requirements in assessing the need for the biological and ecological disposition of land via the sanctuary designation.

As I mentioned, we cannot conclude our assessment process here alone. We must also consider the economic and sociological aspects of land disposition. And talking about the sociological aspects, I note that in the definition of an estuarine sanctuary, it means a research area set aside to provide scientists and students the opportunity to examine ecologic relationships over a period of time. Now to me, that could mean the exclusion of other elements of society. I talked to Dr. Bill Aron of NOAA this morning and I said, "You know, I am a photographer, an amateur photographer." And I said, "It seems to me this definition would preclude me from taking pictures." And he said, "You said you were an amateur photographer, didn't you?" I said, "Yes." He said, "You are a student, no problem. It is just a matter of interpretation."

But that brings up the point that these guidelines we are developing for NOAA to use are really for society, for mankind; and are not to be developed to be used exclusively for scientists, or for students, or for the oil people, or for the wilderness people. It is for mankind today and for generations to come.

We also believe that marine sanctuaries in contrast to estuarine sanctuaries should be designated under the concept of multiple use or at least limited use. Most of my remarks here are going to pertain to marine sanctuaries, not estuarine sanctuaries which I think should remain virtually inviolate.

We support the necessity for a comprehensive data base, including biological, ecological, and mineral resource information prior to judgments on the designation of marine areas where the principle of multiple use would be abridged.

We support the concept of seasonal restrictions on the multiple use of the marine and coastal environment to protect species during critical life stages or migratory periods.

We support the establishment of criteria and standards for marine sanctuary designation that embody the following policies:

1. Data-based decisions that are made within a prescribed time period.
2. Guaranteed entry for purposes of gathering geophysical and geologic data. As was just shown, that data can be obtained with little effect on the environment, probably with less effect than pulling a net through it.
3. That restrictive designations be subject to review and reclassification based on new knowledge, national need, or the passage of time.

4. We do not support the blanket designation of extensive marine sanctuaries for the sole, specific purpose of prohibiting resource development or use, unless such designation is based upon overriding safety or irreplaceable ecological conditions.

Discussion

QUESTION: Seventeen thousand oil rigs is an awful lot. What do you do when you pump the oil dry?

RESPONSE: If the well is completely dry and they don't get anything, they simply move the rig off the area and cut the pipes below the line, and pump the hole full of concrete.

QUESTION: I am not against the exploitation of oil, but how would you propose to get that oil out if you are in a marine operation in the Arctic Sea with extremely deep ice conditions? Do you have any ideas how you might do that up there from a totally sea-based operation?

RESPONSE: I don't know if they have done any marine exploration to any great extent in the Bering Sea at this point. Of course, they have a lot of operations in Cook Inlet. I would assume that in those conditions--well, I really can't answer that question because I don't think that the technology or the state of the art at this point has been developed because we haven't run into a situation where we have had to drill for oil under those conditions. We might do the drilling from the land, for example. That might be one answer. But to set a rig out there in 30 feet of ice--I don't believe that would work.

FISHING INDUSTRY

by

Irwin M. Alperin, Executive Director
Atlantic States Marine Fisheries Commission

I would like to state, at this time, that I am speaking for myself and not for my Commission, because I haven't consulted with individual Commissioners on what the relationship of fisheries is to the coastal zone sanctuary concept.

I think that most fisheries managers and most fisheries administrators will accept the concept of "sanctuaries" and I put that in quotes because I still don't know what the definition is -- particularly if it permits fishing of some kind. And you may laugh, but the point is that fisheries are managed now, and therefore there are many restrictions and there are many areas that are sanctuaries now in the sense that some fishing is restricted seasonably or permanently or in terms of species: most of the concepts and most of the kinds of sanctuaries that Dr. Lynch suggested are already being used in fisheries management.

Now, I would like to address myself to a few examples but before I do I have one very strong statement to make.

When I worked in New England as a fisheries administrator and this was before Coastal Zone Management and the bill -- the early submission in Congress of bills to establish sanctuaries scared the blazes out of the fisherman.

Their explanation of this was -- and they have the same concept that I think I still have about a sanctuary, "a sanctuary is a place where you don't do anything." And it may be all well and good for our Congressmen to file bills to restrict the sand and gravel people or the oil and gas people, but that means they can restrict us, too, and we don't want it. So therefore would they please take the word "sanctuary" away. Isn't there some other term they can use?" We are all in favor of keeping those other people out but don't use the word "sanctuary." I have some reservations about the word "sanctuary" myself and I think I like John Harville's "reserves" or "preserves" better but even then there are still some difficulties.

My experience has all been in the Middle Atlantic and North-east areas where we have very crowded, competitive conditions between fisheries, and other users and where fisheries are faring badly. If therefore I am saying things that don't pertain to other parts of our nation, it is because I am not familiar with them.

The concept of habitat preserves, if you accept this as a legitimate sanctuary area -- "sanctuaries" again always being in quotes -- is not incompatible, I think, with fisheries use. If you just want to preserve and protect the habitat I don't know that there aren't always some fisheries that may remove the excess fish (maximum sustainable yield) or part of the fish without endangering the habitat. But if you think in terms that the habitat includes the entire biomass and therefore all the renewable resources, then that is a different story. But our fisheries managers don't believe this; they would want to crop recruits to the fisheries.

There are also difficulties in the habitat concept in terms of what you do and don't remove. The finfish and some of the crustacea that are free-swimming and move in and out of an area are free to come and go. If you don't take them when they are in the sanctuary area, you take them when they're outside. But the more sessile mollusks are perhaps different, and you might affect some part of the habitat in removing them, but it would be minor disturbance in most cases.

Now, we had a mention of a particular and special species preserve, a preserve established to protect a species all the time or part of the time, perhaps during the spawning season or otherwise. In this context, one thing that is interesting is the individual states' regulation of fisheries. Virginia has, as Dr. Lynch says, a blue crab sanctuary in which they want to protect female crabs. In neighboring South Carolina, where one of the delicacies that you may buy is she-crab soup, fishermen are permitted to take egg-bearing crabs. I assume it is not detrimental to their fisheries or it would have been discontinued.

I believe that in these special cases fishing could be carried on in a species preserve area as long as it did not affect the species that one wanted to preserve. That is why a specific fishery such as a blue crab fishery, can be excluded in an area that you wish to set aside as a sanctuary without restricting other kinds of fishing -- seine or trap fishery or a sport fishery.

I am trying to visualize a sanctuary, for example, for an endangered species. I am not up to date on the endangered species list but I recall that it includes the short-nosed sturgeon, a species that runs up rivers to spawn. If you decide that the Hudson River, for example, should be a sanctuary and under the ocean sanctuaries provisions it extends all the way up to Albany, you would have to eliminate the commercial fisheries in the Hudson River to preserve the short-nosed sturgeon. Short-nosed sturgeon are very rarely taken on hook and line. It might happen perhaps on once in a thousand times. But there is no way to stop sturgeon from

being gilled in the nets that are used to take striped bass and shad. The sports fishermen would like an arrangement to eliminate the commercial fishermen and allocate all the striped bass to the recreational catch. It would not make good fisheries management.

But how do you protect this endangered species without eliminating what fish managers would consider a very legitimate use of this river, especially now that the Hudson River is being cleaned up? I read recently, for example, that shad are worth \$5 apiece. At one time, except for the roe, you would throw them away.

So there are problems that would have to be resolved in the definition of a species preserve area, to just preserve a particular species. It is relatively easy in a fishery like a crab fishery where you can specifically eliminate fishing for the protected species. But where you have a composite fishery for a number of species of finfish, it is not that easy.

There might be one area where any form of fishing might be excluded, but I believe the fish managers would object if the area were too large, and that is in the realm of the research area, the one that is left as a natural area. If it is an area that is entirely natural and you are not going to permit anyone to collect specimens for any purpose, you are certainly not going to let them collect for fisheries purposes which is just collecting in a large volume. However, in a manipulative research area, do you want the fish to be manipulated at the same time? If you are experimenting to learn the effects of this, that, and the other physical barriers of the effect of the addition of pollutants and so on, do you also want to remove some fish at the same time? Fisheries managers would like to be able to permit the harvest of fishery resources from such areas, particularly when they are productive.

Perhaps then there is a conflict in the research areas on how to handle fish resources in large productive sites. Recreational areas speak for themselves. Sport fishing is certainly one of our major recreational uses of the coastal areas and if there are marine and estuarine sanctuaries in the coastal zone, then the sport fishermen are going to want to catch fish there and I think there is nothing incompatible about it.

There are some difficulties associated with some of the areas I reviewed and I know there are conflicts between the recreational users and commercial users in areas considered by

some to be recreational areas. There has been conflict in the Cape Hatteras National Seashore area and there was conflict this past summer on Long Island Sound between commercial and sport fishing users.

I would not know how to respond if it were decided that all Long Island Sound should be a sanctuary and a decision made on whether or not commercial fishing should be allowed there. I believe that we could get to such a state appertaining areas, but there is a conflict that has not been solved.

Finally, in the multiple use area I am not sure we can consider it a sanctuary. Isn't it just a management zone? It is an area where you exclude certain things that you think are too disruptive but you permit all other types of operations and those that are compatible. You mix them up and take your pick of which groups are compatible.

Now to get back to my original thesis it seems to me that we have, in a sense, many, many sanctuaries from the point of view of fisheries right now, marine, oceanic, and estuarine.

One of them, for example, that comes to mind is an area that Bob Blumberg talked about. He mentioned that Massachusetts now has a marine sanctuary in the area from Boston north to the New Hampshire line, inside the territorial sea. Interestingly enough, although we say fisheries is compatible with sanctuaries, that area until very recently was closed to otter trawl and beam trawl fishing for 40 years. And the restriction was put on not by natural resources administrators, but by the legislature through pressure from other competing fisheries -- I believe the line trawl and gill net fisheries. Those fisheries have now disappeared to be replaced by lobstering. The lobster fishermen were pleased to have the otter trawlers restricted for this area. It made good sense to them to have this extensive area reserved for lobster pot fishing.

In recent years part of this area was reopened to otter trawl fishing so we had a reversal of the sanctuary concept there, and to no detriment to any other fisheries use, or any use of the area.

From the point of view of fisheries it will still be important to have a definition of what a sanctuary is. Does it really imply -- as it does in my mind, that it is inviolate, because I have the old concept, because I was trained with the idea that a sanctuary is someplace where you preserved whatever was the important element. A bird sanctuary is designed to preserve birds. You don't shoot them there. In fact, in some places you put up a fence and only allow those with a membership

card to come in and look at them. We also have the concept of a wildflower sanctuary, and if it happens to be a statewide statute, I assume it means that in that state you are not allowed to pick dandelions and skunk cabbage, and the whole state is a sanctuary.

In fisheries, the administrative agency, if it has regulatory power, and the statutes that are made by the legislature act to restrict fisheries in one way or another, regionally, seasonally, through gear restrictions, through size restrictions, through utilization of different life stages -- and these in a sense are restrictions that already have been discussed here as equal to, I think, some of the provisions that people would apply to sanctuaries.

I know I am going to be asked a question about the extension of fisheries' jurisdiction, and I don't really know how this relates to sanctuaries, excepting that the ocean sanctuary bill describes a sanctuary area as extending from the edge of the Continental Shelf to the tideline area. And I suppose then, if we conceive that the United States may establish sanctuaries this far to sea, why can't we at the same time extend fisheries jurisdiction and preserve the resources which I presume we are going to be allowed to harvest in the sanctuary areas if we have them -- why can't we restrict them to our national fishermen?

My only answer to that is I am in favor of it, but that may not be the prevailing National view.

I think I shall stop here because if there are any questions I will try to answer them from my experience. But as I said, it is limited to an area of intense competition for coastal zone use, and I do not conceive that anyone in authority particularly wants to eliminate fisheries from the sanctuaries except perhaps in a narrow research academic sense. If you remove fish out of a natural area then it is no longer in its pristine state. But I don't think it is anyway. At least there are none in the area I am familiar with.

Discussion

COMMENT: I didn't plan to speak again this afternoon but you seem to be hung up about this word "sanctuary." I think it is clear there are many kinds of areas coming out of this, the word "sanctuary" being, indeed, unfortunate. I think most of the presentations in here would also go this far as to say whatever areas we are talking about in whatever category should be areas in which human use is permitted which is compatible with whatever the primary purpose of the sanctuary

is. In other words, for a given area we establish what are the ecological or other values and then we see what other human uses are compatible and allow them -- fisheries, development, gravel, whatever.

RESPONSE: All I was saying is that I don't know that the fisheries managers and administrators will -- they are regulatory bodies now -- accept any old definition of a sanctuary because I perceive that they want to be included as user groups in these areas. I believe they think they have already excluded many areas from use by fishermen.

COMMENT: If we can use the shrimp spawning grounds at the time they are spawning without damaging the stock, then perhaps there should not be a sanctuary. If it is demonstrated that there is a likelihood of damaging the shrimp stocks at the time of spawning, then it should be a sanctuary at that time. This is all we are talking about.

RESPONSE: That is right, but I think this is an objective of fisheries management anyway.

COMMENT: We are talking about protecting things so they will be here a generation from now.

RESPONSE: I think this is the aim of any fishery man.

RECREATIONAL DEMANDS IN THE COASTAL ZONE

by

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Virginia Institute of Marine Science

An unprecedented demand for outdoor recreational resources has become evident. Conservative estimates of increasing demand indicate a four-fold increase by the year 2000. Causal factors in the demand for recreation include the population and its demographic distribution, level of affluence, leisure time, and mobility. Demand for recreation seems to be keeping up with increase in population. However, as the level of affluence increases, so does the demand for recreation. Shorter working hours have given people more time for leisure activities just as increased affluence has given them more money to spend for it. Better transportation has meant a decrease in the relative cost per person in traveling to and from recreational areas.

As early as 1962, the Outdoor Recreation Resources Review Commission (ORRRC) revealed major trends in recreation. The ORRRC study found a higher level of participation rates and user days in the Northeast, where there is the largest population concentration in the United States. Metropolitan areas were found to have the highest rates of participation. It appears that outdoor recreation opportunity is most needed where available land is scarcest. The heavily developed coastal areas are a case in point. The ORRRC study also found an increased attraction of water-oriented activities, including swimming, boating, fishing, canoeing, and sailing. The needs for provision of swimming facilities were found to be especially great close to demand centers, in urban areas where beaches are generally used to capacity by other public swimmers and other land users. Still another trend is the increased demand for activity and facilities close to home. Recreation is classified by time patterns--day outings, weekend or overnight trips, and vacations, and the greatest demands are for the first two patterns. For shoreline managers, the greatest pressures, therefore, seem to be on those coastal areas within a 125-mile radius (the median distance for weekend and overnight trips) from metropolitan centers.

The availability of resources to meet increased demands for shoreline recreation depends largely upon the effectiveness of multiple-use planning in the coastal zone. Problems have arisen mainly from lack of planning, waste of space, and unnecessary despoliation of good environments. Planners are faced with another problem, however, in attempting to allocate resources for recreation. Measurement of recreation benefits is extremely complicated and the inability to place an

accurate value on outdoor recreation hinders comparison of its importance with other uses of the same resources. Despite the inability of our present pricing system to determine and articulate the true costs and benefits of recreation to society, economists feel that monetary valuation of recreation is both theoretically and practically possible.

The National Estuary Study reported that of the approximately 59,000 miles of shoreline in the contiguous United States, about 22,000 miles have been defined as having recreational potential. Of this area, about 4,350 miles are beach, 11,160 miles are bluff, and 6,214 miles are marshland. Estimates are that the 4,350 miles of beach would accommodate about 200 million people, but these are only estimates since research is lacking in this area. These figures indicate a surplus of recreation shoreline, but to these statistics must be added the facts that 1) 92% of the 22,000 miles of potential recreation shoreline was privately owned (in 1962) and even though some of the land could be made available for public recreation, most of it is planned for non-recreational purposes, and 2) much of the available shoreline is inaccessible to large parts of the population since it is too far from urban centers for "day-trips".

Public acquisition of coastal areas with recreational potential is most likely necessary to meet growing demands, but major issues and problems are still evident. There is a general absence of information on which to plan and manage for recreation in a multiple-use setting. Even though assessment of recreational costs and benefits is difficult, some means of including recreation in economic cost-benefit analyses is clearly needed. Much of the present knowledge about recreation supply and demand is based on the findings of the ORRRC, but this study is now over ten years old and should be replicated for more up-to-date information.

It should be remembered that the potential for conflict between preservation and recreation is strong, and some means of presenting to the public the benefits of preservation of undisturbed coastal areas will be required. Even though recreation is important and necessary, it can be damaging to the coastal environment. Some forms of recreation can be compatible with preservation and areas of such compatible use should be explored. Future programs must include environmental planning and social planning in a total planning effort.

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LEGAL WORK GROUP SUMMARY

Presented by

Marc J. Hershman, Research Director
Sea Grant Legal Program
Louisiana State University

I tried to condense many different views that were set forth yesterday, and I would like to characterize the entire report as being the discussion points of our workshop, rather than any voted-upon or agreed-upon consensus or conclusions. If any member of the workshop wishes to clarify a point afterwards, I will certainly welcome that.

We would like to present the report in four parts: (1) some of the major problems we saw regarding the whole issue of sanctuaries; (2) how to establish sanctuaries; (3) the management of sanctuaries; and (4) finally, a scenario by which the process of combining the two sanctuary provisions and coastal zone management might proceed from a state's perspective.

Beginning with the problems we discussed on sanctuaries, we first saw that it was possible to characterize sanctuaries as a strategy option or a tool that can be used by a state or by the Government in a variety of ways for a variety of purposes. The first possibility is that the state or NOAA could choose not to use it at all. Maybe it is just not suited for the particular needs or purposes at the time. Secondly, in highly vulnerable areas, those where an immediate threat is perceived, a sanctuary might be used. Thirdly, a sanctuary might be used as a buffer zone between two other highly contrasting areas. A buffer zone could be used in the estuarine case for research, and in the marine sanctuary case as a buffer area to insure that two adjoining regions are not directly conflicting with one another.

In general we saw sanctuaries as an opportunity for protecting two vital values, that of biological productivity of estuarine zones and regions, and the need for open space. It was brought out by one of our group members that when you look at aerial photographs of a lot of coastal regions, the open spaces left are those that can be characterized as marsh and estuary, the areas we are concerned with quite often in coastal zone problems.

The second matter we discussed generally was a much broader question, and that is whether Congress provided anything new by creating sanctuary provisions, or was it the same

stuff with some new labels put on it? Why couldn't existing laws be used to achieve the same purpose? On the one hand, it might be conceived as a positive, creative new program where many different things go on. On the other hand, it might be characterized as a series of prohibitions. If it is a series of prohibitions, why use a sanctuary provision to do that?

After discussing this, we didn't come to any hard conclusion, but we certainly felt in two aspects there are some new things there. First of all, in the marine sanctuaries provision, there is a combination of what is traditionally state jurisdiction and waters between the three- and twelve-mile zone which are federal jurisdiction. The marine sanctuary can apply in both areas. Also, its sole purpose is, as stated in the Marine Sanctuaries Act, the protection and restoration of these areas for particular values (ecological and esthetic values, etc). We felt this was an innovation. Secondly, sanctuaries is a new concept when you think of it in context of the statute in which it was created. The Coastal Zone Management Act and the estuarine sanctuary provisions, when viewed together, give the estuarine sanctuary a very real purpose, that is, serving the overall goals of coastal zone management. Looking at the marine sanctuary provisions in terms of the basic statute, it is a tool in the general concept of protection and enhancement of environmental qualities of the marine environment. In those two respects, we felt there were innovations in the creation of these two provisions.

A third problem we discussed in some detail, one we feel is very critical, is the problem of the mixture of jurisdictions to be confronted in establishing any sanctuary. Certainly, from the international law standpoint, if you have a marine sanctuary you have quite a few problems or points to be considered with respect to international rights. A good example is the passage of ships through coastal waters, immigration laws, and things of this nature.

Probably the most difficult matter would be the relationship between the marine sanctuary provision or estuarine sanctuary provision and other United States federal laws. For example, the Corps of Engineers' permit program for navigable waters, the EPA's general laws regarding environmental protection, and the Coast Guard's regulations over shipping would all have a direct impact on marine sanctuaries and would have to be an integral part of whatever is set up.

Finally, the third jurisdictional question to be directly addressed is the mixture of United States and state and local jurisdiction. Even though in the marine sanctuary provision there has to be a sign-off by the governor of a particular state, it was pointed out in our group that this is probably not going to be just a ministerial task, but it probably is the mechanism

by which the state will come in as an equal, and perhaps determining partner in this complexity of jurisdictions that will eventually decide upon a marine sanctuary.

A fourth problem area we discussed was the question of sanctuaries and the private sector. This was not covered in great detail, but we certainly recognize that there are times in the estuarine sanctuary provisions where we are going to have, more often than not, direct dealings with the private sector. In the marine sanctuary provision, it may be less a problem. We did recognize there are some submerged lands that have been granted to private owners and are still in private hands. We discussed generally the question of acquisition of these lands for whatever purpose the state wants, versus the question of the regulation of them, which could be construed as an inverse condemnation, requiring compensation to be paid to a private owner.

In both sanctuary provisions, it would appear that you are going to have to have the voluntary cooperation of the private owner, whether you acquire the land, lease it, or otherwise use it. When a state is taking private lands for a public purpose, the eminent domain laws in the different states must be used. In the case of a marine area where there might be private ownership, we felt these same considerations would apply. If the use of the sanctuary is such that it denies beneficial use to the private owner, then compensation will be required.

Following discussion of general problems, the Legal Aspects Workshop tried to focus our discussion a little more and address more specific subjects: How do you establish sanctuaries? What do you do first, and what do you do second, and then what do you do? We didn't come up with a lengthy checklist, but we do have some points for consideration, which could be considered as criteria that NOAA could incorporate into guidelines that they promulgate to get these two programs started.

Dealing first with the estuarine sanctuary provisions, we believe that, as in the rest of the Coastal Zone Management Act, the procedures the state follows in developing sanctuaries should be what NOAA addresses, rather than the substance of what a particular sanctuary is designated to accomplish. This is the same philosophy that applies in the Coastal Zone Management Act, with the exception of the National Interest Clause. There might be a national interest in sanctuaries, too, but we didn't think that one through as yet.

So NOAA could adopt a similar procedure as in the Coastal Zone Management Act and say, "You have to show us you have gone through a rational thinking process of what you want for sanctuaries. You ought to do an inventory and establish what your goals and

priorities are, then apply those goals and priorities for particular sanctuaries, and things like this. And once you have shown us you have gone through a rational approach, then, whatever you have decided you want to do for your research area in the estuarine sanctuary provision, we have no objection if you have applied some reason and thought to it."

Another point we think is critical in the estuarine sanctuary provision is that it be tied very closely to and integrated with the rest of the Coastal Zone Management Act. They must complement each other. And although it may be possible to interpret a clear distinction between estuarine sanctuaries and the rest of the Coastal Zone Management Act, we felt that this would be inappropriate and would not serve the best interests of both. Therefore, estuarine sanctuaries should be viewed as one part of coastal zone management, and the guidelines for coastal zone management and estuarine sanctuaries should be integrated. Whether they would be an amendment to the current guidelines that have been written under section 305, I don't know, but our group wouldn't want to see them become a separate set of guidelines. Our group felt that no estuarine sanctuary money should be given to anyone until the coastal zone management program is well under way. Now, there is a problem here as to which phase of coastal zone management you are in. If you are in the planning phase, there may be a need for an estuarine sanctuary provision while you are planning, but certainly there ought to be a clear indication that the planning for coastal management is under way prior to getting any money for sanctuaries, and that the critical aspect of getting the sanctuary money is to show how it would be integrated back with the whole coastal zone management program.

We had some other specific thoughts we might set forth about the establishment of estuarine sanctuaries. First of all, we didn't feel any attempt should be made to define the type of research to be done, only that this research be bona fide and relate to the rest of the coastal zone management program in a direct fashion. Secondly, we felt that the size of the sanctuary--and we are only talking about estuarine sanctuaries now--should only be enough needed for the type of research contemplated. If you only need two acres, you don't need to acquire 102. Third, the research should be the type that requires the particular acquisition mode contemplated. That is, if you plan to get a research area for the purpose of destroying it or polluting it so you can measure the effects of high-intensity use, then you probably would need to buy it. On the other hand, if you want a particular sanctuary for the purpose of observing, flying over, perhaps taking samples of particular places, you may not need to acquire it. A lease may be sufficient, or an agreement with the land owner, or the purchase of a less-than-fee-simple interest in the property. Certainly, the boundaries of the sanctuary should be defined.

The procedures for terminating a sanctuary should be set forth. For example, we had a small discussion about whether research is ever over or not. The lawyers said, "Sure, when you get your job done, go home; you've done it. Submit your report." The scientists said, "No, a good scientist will raise more questions than he will answer, and therefore sanctuaries should exist in perpetuity." Considering that a state may wish to go either way on the definition of research needs, there is a real possibility that research priorities will change and the area in which you do the research will need to be different, and therefore you may want to abandon one research zone for another. How do you get rid of the property you acquired and go to another area? How do you get the funds that you have expended on the first -- say you have purchased it -- back if you are going to sell it or convey it to somebody else, so you can use it to buy another one? These are some technical areas that we will leave to the people in NOAA to handle.

Finally, there should be close consideration of the use of marine sanctuaries and estuarine sanctuaries together in a related fashion, so that they complement one another, rather than going separate ways on the two programs.

Turning to Marine Sanctuaries, we first talked of the procedures to be used. One could look to a model such as the National Parks Service and the National Landmarks Program, whichever is closest, and use them as models to follow. Secondly, we felt that the marine sanctuary implementation procedures should provide integrating mechanisms with state coastal zone management programs and other federal programs. The way in which these marine sanctuaries relate to other powers, authorities, and programs makes the difference. That is the crux of the whole thing. Thirdly, federal permit programs or a state coastal zone management program should be used to protect the upland areas adjacent to marine sanctuaries. For example, if the use of the shore adjacent to a marine sanctuary would result in the deterioration of that marine sanctuary and thus undermine the purpose for it, then perhaps an agreement with federal agencies such as the Corps, who could regulate the use of the shore adjacent to the marine sanctuary, or with the state's coastal management program, would be a necessary part of the marine sanctuary provisions. Finally, we felt that the guidelines for marine sanctuary implementation should clearly allow anybody in the private sector, public sector, federal agencies, or whatever, to come forth with a proposal for a marine sanctuary. The way you read the provision, it sounds as though NOAA could do its own study on a contract basis, decide its priorities for marine sanctuaries from anybody, so that the Audubon Society, the oil and gas industry, anybody at all, could propose a marine sanctuary, and then NOAA would go through the process of evaluation.

Shifting now from how you establish sanctuaries to what you do with them once you've got them, we addressed the question of management: How do you manage these sanctuaries? One point that kept coming up related to the problems that would result if the research in an estuarine sanctuary required manipulation of the environment, and what the effects of that would be. The manipulation could be, for example, polluting the area, dumping ten thousand barrels of oil in an area for the purpose of a controlled study, digging it up in a certain way, diking it off and varying water flows, etc. Certainly the negative effects outside the area that you are manipulating would have to be analyzed, and in most cases, even though you are doing a research project you would need permits if you planned to put any pollutant in or otherwise affect the environment surrounding your sanctuary area. So this would require close, regular coordination with regulatory agencies, especially if you are looking for, let's say, a variance from a particular environmental law, because you have a research variable that you want to examine. This suggested that a buffer zone surrounding the research area, if the research is manipulative, would both protect the sanctuary itself and the area outside of it, and perhaps this buffer zone could be established using the Coastal Zone Management Program. And finally, if damage occurs following this research, there should be some procedure for settlement of claims and, as was pointed out in our group, there is usually adequate state law to deal with this problem.

Another point in managing sanctuaries is the need for close integration with other state and federal programs. A third question is: Who is the manager of these sanctuary areas? This raises the question of the relationship with coastal zone management. The degree of relationship will probably correlate with the degree of closeness the manager has with those who run the Coastal Zone Management Program. And our group felt that since our primary objective or belief was that coastal zone management and sanctuaries can not be separated, then the sanctuary provisions must be administered through the Coastal Zone Management Program. Somebody said, "Why can't Sea Grant be the manager of an estuarine sanctuary or marine sanctuary? Why can't you give it to a university or research group in your state?" Then we discussed who is going to control what they do, when the reports are due, what purpose the research serves, etc. We felt that the purposes of the estuarine sanctuary will only serve coastal zone management with controls over personnel or controls over budgets.

Another point we felt to be critical to management is an educational program as to what you are doing, why you are doing it, and why it is important, and, "Come observe what we are doing." Another point is enforcement, especially if your sanctuary is one where you have to have tight controls. Enforcement of the area to insure that these controls are met is critical, and too often the management program starts off giving the responsibility

and the authority, but fails to follow up with the public relations or the educational program and enforcement program.

Well, how do we put all these thoughts of ours together? Professor O'Connor was very helpful in this and was able to help initiate a scenario as to how this whole thing might proceed. The following is a scenario from the state viewpoint.

State X starts its coastal zone management planning process under section 305 guidelines NOAA has already put forth. Once this planning process for coastal management continues, however, it is recognized there may be a highly critical need, with extenuating circumstances, where you would need to establish either an estuarine or marine sanctuary prior to the completion of a state's coastal management planning efforts. However, this would be recognized as an exception. There would have to be a very strong reason why the sanctuary provisions must be invoked prior to the completion of the coastal zone management plan. Then the state recommends both marine and estuarine sanctuaries in its proposed coastal management program. They show how these are integrated with their coastal management program, and how they complement each other.

While the state is going through this process of linking coastal management, marine, and estuarine sanctuaries, NOAA would have received sanctuary proposals from other sectors, from perhaps industry groups, from other environment groups, other federal agencies, etc.

Then, when a state sends in its coastal management program with the sanctuary provisions attached, NOAA would review the state's coastal management program coupled with the sanctuary provisions, plus marine sanctuary proposals that have come from elsewhere, and look at them all together. The first thing they would try to insure is a complementarity between the NOAA plans that have been done so far and the state's coastal management plan. The second thing they would try to insure is the integration of an estuarine and marine sanctuary provision in the state's coastal zone management plan. Thirdly, when the interagency coordination provisions under section 207 of the Act are invoked, they would apply these to the coastal management program, the estuarine sanctuary program, and the marine sanctuary program as well. Hence, you've got a package of materials as it affects a particular state, and then you can handle both the interagency coordination required in the marine sanctuaries and what is required under coastal zone management simultaneously. And fourth, if you have to put an environmental impact statement as icing on this cake, then you can do that at the same time. The last step in this would be that NOAA would approve a state's coastal zone management program and their estuarine sanctuaries program, and at the same time NOAA would designate a marine sanctuaries program that would affect that

particular state or be in that particular area.

Our group felt that unless we have some sort of meaningful integration of these kinds of efforts, with coastal management as a focal point, with sanctuaries as a tool of management applied to coastal zone management and not as separate programs themselves, then we are going to be undermining the purposes of all three of them. Thank you for hearing the Legal Workshop's report.

Discussion

QUESTION: This discussion of manipulative research keeps coming up. Did you get into any discussion of whether or not that might represent a conflict with the term "sanctuary," even though the need is there for this manipulative research? I still get bogged down in the thought: Can a sanctuary be destroyed in the interest of science, let's say? It seems to me that much of the thrust of your discussion of the type of research that might be done and the need for sanctuaries as research area focused on that aspect, which seems to me to be a difficult one.

RESPONSE: I think the way we focused on this, in one sense, was that we thought--perhaps we are in error here--that you have to acquire fee simple title to the property. After reviewing it again, this probably is too narrow a reading of the estuarine sanctuary provision. If you are going to have to acquire fee simple, it seemed to us there would be a need for fairly intensive use, because otherwise you could lease and wouldn't need to acquire. Maybe I am speaking more for myself now than the group, because I don't know whether we really got into this discussion, but the estuarine sanctuary provision uses the word "sanctuary," but the way it is defined is much more precise than the "sanctuary" word itself. So looking at it legally, we saw the word "sanctuary" could be "X", or anything, but the way it is as defined in the statute itself is the operative terms, and the ones that would make a difference as to what you do. And I think an interpretation of this provision by a court would probably result in looking to how the word was defined and used within the statute itself to understand its meaning, rather than going to a dictionary and looking at what is implied within the word "sanctuary" from other sources outside the terms of the act itself.

Therefore, we really didn't get into the question of: Does the word "sanctuary" have some special meaning? We simply looked at what it was said to be under the terms of 312 and the definitions section of the statute. This recalls a point that was made yesterday, that when you try to define "sanctuary" in the dictionary, somebody looks at how it was used in the past, and the word was used in the past, perhaps, with religious connotations, or as a bird sanctuary. And indeed, it may very well be true that fifty years from now they are going to say, "Sanctuary -- as in marine

and estuarine sanctuaries in the federal acts." In other words, we are redefining the word, because perhaps the word is used imprecisely in today's context.

QUESTION: On the question of acquisition, you seem to imply that acquisition, as used in the statute, can mean less than fee simple acquisition; is that correct? The act simply says "acquisition."

RESPONSE: It simply says "acquisition," and acquisition in itself does not imply full-title acquisition. I would say less than full title, or even a leasehold interest, or perhaps other kinds of interests in the land could be acquired. We thought the provision would not be put in there unless probably something close to a fee simple was considered, because why would you need the separate money and the separate granting, and all that? You could use the other provisions of the act. But the words that they use are not such that they would imply just fee simple acquisition.

QUESTION: Did you feel a research program was an essential ingredient in a proposal to establish an estuarine sanctuary?

RESPONSE: Absolutely.

QUESTION: Even though the words "natural field laboratory" are used, you still feel that a research program is essential?

RESPONSE: Yes. The group discussed it only in those terms. In fact, we clearly distinguished between marine and estuarine sanctuaries on that point, that the estuarine is designed to be a research area, whereas the marine is designed for protection.

QUESTION: In proposing the area, must there be a proposed program of research work?

RESPONSE: We did believe the purpose of the sanctuary was for research, and that the research had to complement the coastal zone management program of the state, and therefore, in viewing estuarine sanctuaries and coastal zone management together, you had to show how this complementary use came about, and that was through the research effort.

QUESTION: So, in other words, the main purpose is understanding, and not protection?

RESPONSE: Yes. And that is why the whole concept of manipulation was considered, because in effect you might want to destroy in one section of your sanctuary and preserve in another, for the purpose of measuring the effect of the two in a long-term manner.

QUESTION: Did you explore the extent to which you need sanctuary provisions in order to have areas for manipulative research, or whether or not you can use other mechanisms? In other words, without creating a sanctuary area, can you have manipulative research without acquiring an area? You seem to imply that you have to have the ability to acquire--to set aside an area, if you are going to manipulate the environment experimentally

RESPONSE: Somehow it has to be set aside. If it is already state land, for example, then maybe simply designating it as a research area would be sufficient for the state. If there are private interests there, then you have to make some arrangement with the private interests if you are going to use it to the exclusion of their particular preferential use. So you would have to have a contract agreement with them, or a lease, or buy a portion of it -- something like that.

QUESTION: I guess I am thinking of manipulative programs that I am aware of, where there was no sanctuary provision as such, where there had to be some assurance that the public was aware of the purpose of the experiment and was not outraged by it, and, I suppose, no private values would be damaged. But there was an experiment on the coast of Massachusetts which would be an example of this. There is an incipient experiment to dump sludge off the southern coast of Long Island by EPA, simply in ocean waters, with no special provisions. They are just simply using a regulatory permit for the purposes of a research project. It has been done with oil spills, as well.

RESPONSE: Right. The question of acquisition almost implies that you are dealing with the private sector because of the word "acquisition." So you could do any kind of research in a public area, and the controls depend upon the manager of the public water bottoms, whether it is the state level or the federal authorities, the permitting authorities such as EPA, the regulation of safety in navigation by the Coast Guard, and construction controls by the Corps of Engineers.

ECONOMIC WORK GROUP SUMMARY

Presented by

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Before entering a specific discussion of estuarine and marine sanctuaries, this work group would like to recommend that any sanctuary established within a state's territorial waters be required to be a part of and comply with the state's coastal zone management agency.

The following discussion is on estuarine sanctuaries, as distinct from the marine sanctuaries. We chose to summarize our discussion in the format of a series of questions and answers. What is an estuarine sanctuary? We believe an estuarine sanctuary should be just that -- a sanctuary. It is not a management or multi-use area. If one establishes a sanctuary and then determines that this use is allowed and this use is not, all you have created is a zoning system. In essence, a sanctuary becomes the same animal as "critical area" in the Coastal Zone Management Act. We do not feel that this is the intent of the act. Rather, a sanctuary is an area, not for management, but to be set aside for some specific purpose -- which will be discussed later.

Is there a need for estuarine sanctuaries, or can we achieve the same objective through regulation and not purchase? There is a need for estuarine sanctuaries. Zoning and similar regulations are management tools and are subject to change and political pressure. There is a need to set aside areas that are not managed but are preserved and protected. Information gained in sanctuaries will be used to manage more effectively critical and other lands along the coast.

For what purposes should an estuarine sanctuary be designated? Estuarine sanctuaries should be established for very specific purposes, that is, the generation of baseline data and for manipulative research. This is necessary if we are going to develop the information and data necessary to manage the coast adequately, and the primary reason for setting these areas aside.

What happens to existing economic activities if a sanctuary is established around them? It is recommended that sanctuaries be established in relatively undisturbed areas, except for small research sanctuaries which are expressly established in highly disturbed areas for research purposes. To do otherwise would seem to be almost asking for conflict and problems in maintaining the sanctuaries' integrity.

What restrictions should be placed on economic activity in an estuarine sanctuary? It should be remembered that sanctuaries are to be established for research and study purposes. If certain economic activities are compatible with the overall study plans of the area, they should be allowed. Otherwise, the costs to a local area of a sanctuary are increased unnecessarily. However, the number of compatible uses should not be a criterion for designating a sanctuary.

What additional review procedures should be required? A detailed assessment of the economic impact of a sanctuary should be required. This is necessary to protect the broader national interests -- NOAA will soon be able to tell us what interests are from other studies--- and local interests. (Is anybody studying local interests?) The goal should be to provide the decision-makers and the public as much quantitative information on the benefits and costs of designating an area as a sanctuary as is possible. Additionally, this type of economic evaluation would indicate possible conflicts and red flags that will be faced by a sanctuary over time in a particular location.

Turning to comments on marine sanctuaries, the marine sanctuary provisions of the act imply that the intent has to protect unusual and unique areas, rather than representative ones. As a result, we feel that marine sanctuaries should be established only for very compelling reasons that are in the broad public interests.

What should be the objective of the marine sanctuary program? Marine sanctuaries should be established for the protection of endangered species, nursery areas, unusual habitat and bottoms, and for collection of environmental data. Extreme care should be taken in the establishment of a sanctuary to prevent one special interest group from requesting a sanctuary to prevent another special interest group from using an area, e.g., commercial versus recreational fishermen.

What requirements should be placed on those requesting a sanctuary? (a) Those requesting a sanctuary should have to designate the purpose of a sanctuary and provide justification for its need, both from a biological and environmental standpoint, and for the specific geographic location. This justification should discuss alternative sites that could accomplish the same objectives. (b) Those collecting data in sanctuary areas should be required to provide NOAA with such data that can be compiled and made available for various users. Marine sanctuaries should not be set aside only for the collection of environmental data, but should allow for the collection of economic data as well.

In addition, the Economic Work Group recommended that:

1. NOAA regulations provide for the earliest possible public disclosure of marine areas under consideration for designation as a sanctuary, and that a specific format be developed to provide information on need justification and similar items.
2. Any activity that is compatible with the objectives of a marine sanctuary should be allowed.
3. No sanctuary should be established that, due to our inability to control foreign nations, discriminates against U.S. citizens.
4. In the decision to designate a sanctuary, consideration should be given to evaluating and anticipating conflicts among uses.
5. With regard to perpetuity of sanctuaries, it is anticipated that future changes in the nation's priorities, technological advances, changes in biological conditions, may require the need to reevaluate the original justification for the establishment of the sanctuary in question. For this purpose a mechanism should be included in the law to permit application for review by interested parties.

Discussion

QUESTION: Your group recommended that not only scientific but economic data be gathered. My question is: What kind of economic data are you talking about for a sanctuary?

RESPONSE: One of the items recommended is that most of these estuarine sanctuaries be in small, rather sparsely populated areas along the seacoast. There you have your county governments, small towns, unincorporated and incorporated towns. Their budgets are already strained by other measures that they have to comply with, like minimum amounts per student in school. Anyway, their budgets are pretty tight. They don't have any other types of income except perhaps what might come out of the area. So they should be certainly considered. There may be some other area that they should go to. The local communities' attitudes should be considered before an area is taken away from them as a source of income. With regard to the marine sanctuaries, we anticipated that sometime in the future, if we discovered something of commercial value in an area adjoining a sanctuary we should be permitted to enter the sanctuary to do non-destructive geophysical type surveys.

QUESTION: Was there any discussion of buffer zones and effects of adjacent activity, and limiting activity within a buffer zone?

RESPONSE: It was not discussed.

SCIENTIFIC WORK GROUP SUMMARY

presented by

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Definition

Sanctuaries are defined, for the purposes of this Working Group, as specifically delineated areas of estuaries, contiguous lands, and marine waters which are set aside for the primary purpose of controlled use for scientific research and education at all levels. This requires the ability by those responsible for the sanctuary to preclude or regulate any use which is incompatible with primary purposes. Estuarine sanctuaries appear to be adequately described in the law. Marine sanctuaries include specific areas of open ocean waters and their bottom substrates designated for the purposes of preserving and restoring the integrity of ecological subsystem types for scientific, aesthetic, recreation and conservation uses.

Recommendations

In view of the urgency and high human value of improved comprehension of the rich and useful estuaries of the nation and of the critical global processes of the oceans, and in view of the unique and essential value of protected sites as research tools, we recommend:

1. That the sanctuary provisions of P.L. 92-532 and 92-583 be implemented promptly to create natural field laboratories for scientific and educational use.
2. That the primary and controlling purposes of each sanctuary be clearly identified, since every decision on size, on prohibited or permitted activities, duration of protection, and on management should be guided by those purposes.

* This summary for the Scientific Work Group is a compilation of written summaries prepared by Brian Bedford, L. Eugene Cronin, Chm., Rezneat M. Darnell, M. Grant Gross, G. Carleton Ray, Gordon W. Thayer, Barry S. Timson, F. John Vernberg (Editor's Note).

3. That the total predictable costs and benefits of establishing and not establishing each proposed sanctuary be expressed and considered in advance of establishing each. These should include losses and gains in every possible sense - economic, aesthetic, intellectual, and other human and ecological effects.
4. That the rigorous requirements of valid scientific research be given absolute primacy in decisions about scientific sanctuaries. These may involve size, necessary prohibitions, duration, buffer areas, administrative and advisory activities, and every action which might affect the sanctuary. Research to improve understanding of complex ecosystems and guide man's activities in them is among the most difficult of human activities and requires exceptional protection from destruction by interruption.
5. That the classification system incorporated in this report be used as a primary reference in developing a national system of areas for research and education. Subsequent improvement of the classification system should continue, provided that the system is published and widely distributed at appropriate intervals.
6. That improved data bases be achieved for many attributes of the estuarine, coastal, continental shelf and oceanic regions. Urgent need exists for better description of existing areas, for reasonable standardization of methods and data format, and for deposition and exchange of information.
7. That reasonable and adequate guideline and administrative procedures be established by NOAA for the proposal of sanctuaries, for review and approval of sites, and for continuing management of each. Great variety and individual specificity are inherent characteristics of these areas and the procedures must be highly versatile.

8. That participation by governmental, academic and private representatives be continued in the development of scientific and educational sanctuaries since all of those participants are essential to the attainment of the best possible scientific and educational achievements.
9. That the limited funds available be carefully allocated between acquisition and operations, which should include effective support of research and of educational use of sanctuaries.
10. That effective measures be implemented to assure that a substantial national set of estuarine and marine sanctuaries is achieved and that long-term continuity of funding, absolutely essential for scientific adequacy, is provided.

The Nature of the Coastal and Marine Ecosystems

Man's role as a utilizer of marine resources is that of the pre-agricultural hunter-gatherer. As such, our code of conduct for marine exploitation is frequently in conflict with what we have come to know of the nature of marine ecosystems. This is reflected dramatically in the "res communis" approach to renewable resources such as fish versus the "res nullius" approach to minerals and in the division of the oceans into territorial waters, high sea, sea floor, and fisheries spheres of influence.

It is historically a fact that a marked recovery of some living resources has been brought about by interdisciplinary or international cooperation in resource management. It is no less a fact that oft-urged manipulations of the marine and estuarine environments for purposes of mariculture, deep-water ports, mineral exploitation, and the like raise both problems and opportunities, the nature of which we must comprehend as we begin to grapple with the health of ecosystems in actual practice.

We carry into the sea, as we increasingly enter and use it, a suite of terrestrial orientations. Recognition of the differences between aquatic and terrestrial ecosystems is crucial to effective management. Ecosystems are the largest functional units of the natural world, comprising units, with boundaries, in which recycling of nutrients and properties of homeostasis are the most critical elements.

Marine ecosystems are distinctive in several respects: Aquatic and terrestrial ecosystems differ in the nature of their boundaries. The sea is not homogeneous. Its texture varies internally with eddies, circulation cells, upwelling, salinity and temperature differences and each or all of these form boundaries, in addition to the physiographic features which form boundaries terrestrially.

Aquatic ecosystems are large, on a scale that confounds thinking based on land-derived models. The mobility of whole fractions of ecosystems can be very great and large organisms move vast distances, dependent upon their behavioral and physiological tolerances.

Life exists on land as a thin surface skin surrounded by an atmosphere containing no life permanently. In aquatic systems there is a benthic skin as well, but the encompassing medium is a hydrosphere which contains most of the life on this planet. The winds of air are used by organisms only for transport and suspended particles are attenuated by rain. The sea is a bouillabaisse or soup of organisms, of nutrients, of degradation products, of inorganics, and, lately, of atmospheric pollutants. Its "winds" are the ocean currents in which move all products.

Most aquatic life is in physiological continuum with the hydrosphere, not "sealed off" as terrestrial animals largely are, by virtue of their relatively impervious skin. Thus, foreign substances and nutrients alike enter aquatic organisms with great facility, quickly to be incorporated in the trophic structure and concentrated in successive levels up that structure.

On land, much productivity is locked into the "bottleneck of ecosystems," namely cellulose, and is relatively slowly degraded and recycled. For that reason, plants, the primary producers, comprise the greatest biomass of any trophic level. In the sea, the primary producers are not usually the level of greatest biomass. Their productivity is great, but they are quickly incorporated into the higher trophic levels. Also, in terrestrial systems it is common that certain nutrients and trace minerals become locked in organic matter. This is much less pronounced in aquatic systems where they become available through decomposition relatively rapidly.

On land, productivity of consumers may be reasonably measured by local productivity of producers. In aquatic systems, the "downstream effect" implies that these two levels may be spatially and even temporally removed. To make matters more complex, the movement of large organisms or layers such as the deep scattering layer lead to nutrient "short-circuits" for movement of enriching components of ecosystems on a large scale both horizontally and vertically. An exception exists in certain fjords

and oceanic trenches in which stagnation of bottom waters is characteristic. Dilution of wastes will not occur there. Should organic wastes be dumped, oxygen will be depleted and the result will be elimination of the biota which reside there. The Puerto Rico Trench, the Atlantic's only such feature, is already the site of dumping and the eventual consequences are predictable.

The shorelines comprise "ecotones" which do not separate the aquatic and terrestrial realms. Rather, they unite them. The lands grade imperceptibly into the seas and lakes at shores and marshes, lagoons, and estuaries, with the land providing essential nutrients and the aquatic medium modifying weather and climate. The two realms are truly one.

It is critical that we comprehend the nature of marine and other aquatic ecosystems and how the aforementioned features affect resources to be managed. Pollution from offshore mining, through aerosols, or through drainage, for instance, affects entire food chains and it is significant to note that some organochlorine pollutants are at the highest known levels in marine mammals, at exactly the trophic level of man himself. Further, the conduct of fisheries according to maximum sustainable yield has led to the collapse of many fisheries, and the reason for this is to a great extent due to insufficient consideration of the total habitat and the nature of aquatic systems. Aquatic management must derive from a knowledge of the habitat to be managed. However, such knowledge must, in turn, derive from study, under controlled conditions, of aquatic processes. This study must take place from a biocentric point of view, not merely a homocentric base, that is from the standpoint of the most sensitive organism, not only from that conceived as most useful to man.

Last, we must reinforce our viewpoint that the seas are dynamic on a scale unmatched terrestrially. By that we mean not only that whole components are highly mobile, but also that spatial and seasonal alterations are dominant characteristics. Shorelines, dunes, banks, and shoals move to change the faces of large aquatic systems. Tides and drainage from land cause widely fluctuating conditions in coastal habitats. Dredging of harbors, channelization, creation of thermal barriers and attempts to stabilize such geomorphological changes as characterize shorelines strike at the very core of many aquatic communities, the members of which have evolved to meet specifically changing conditions. For instance, both estuaries and boreal habitats are highly variable seasonally and temporally. Species evolved to fit these conditions are relatively few, but paradoxically exist in such

numbers so as to create the highest productivity rates known. Their specialization to respond to specific salinities and temperatures and their lack of diversity, however, are their Achilles heels. Great alteration of the entire system may result from loss of very few specialized and vulnerable species. Also, the creation of high-energy shorelines by coastal development without consideration of natural geomorphological flux is both economically and ecologically costly.

There is simply no substitute for comprehension of aquatic processes if man wishes to maintain productivity and esthetic values of marine ecosystems while he uses them or to achieve the greatest possible use. The problem is that man is still a pre-agriculturist, a hunter-gatherer in large aquatic systems. A part of the "marine revolution" must encompass specific sites for research and study and monitoring wherein the cause-and-effect of natural processes and man's perturbation can be assessed.

The Scientific and Educational Purposes of Sanctuaries

Coastal sanctuaries should be established and maintained for the following purposes:

1. To establish environmental baselines and monitor change.

In order that wise decisions can be made in environmental management, it is necessary that we have adequate understanding of the functioning of natural systems and their reaction to change, man-induced or otherwise. It is essential that relatively undisturbed natural areas form the basic research tool for the establishment of baselines for understanding and comparison. Thus, there is a need for a comprehensive natural areas system to be preserved, managed, and catalogued, using the full range of natural areas types in the marine and estuarine environment. The knowledge gained from this system will assist man in the understanding and proper use of his environment. Only in preserves dedicated to this purpose can this be accomplished.

2. To serve as reservoirs of biological species, physical phenomena, naturally functioning communities, and existing habitats.

The advent of civilized man and his resultant pervasive manipulation and modification of natural systems has resulted in the extinction (far beyond the natural rate of extinction) of many species, each a unique and irreplaceable library of genetic information. Besides the intrinsic value these species have, many may have very visible value to man. For example, many species have genetic traits of value to plant and animal breeders; others

are of value as indicator species used in monitoring environmental disturbances; and it is already clear that many marine organisms have value in medicine as well as biomedical research. In addition to providing the critical habitat of these species, the natural areas have their own intrinsic value as highly evolved functioning systems from which man has much to learn and to apply to his manipulated world, as in the biological control of populations, managing energy transfer, and controlling nutrient exchange. Many physical phenomena, such as unique marine canyons and geological formations, are irreplaceable if altered or destroyed and are worthy of protection as well as the often unique biological communities they support. Such portions of natural systems will also serve to restock damaged environment with their necessary component parts. Sanctuaries may come to provide the only assured examples of some existing populations, communities, diversity and trophic structures. Sites with endangered species or with unique biological, physical, chemical, geological, or archeological attributes merit exceptional attention for these purposes.

3. For education

There is a need for areas that have educational activities as their controlling use to provide the opportunities for educating and training individuals in the field of environmental sciences. Such training requires appropriate sites for undergraduate experience with coastal and marine components and processes, and for graduate education to train students to search for new knowledge. An understanding of functioning natural systems and research methodology will be critical for a responsible education of these people. Appropriate locations for environmental education are also essential in increasing the awareness of ecological principles for students in elementary, secondary and adult educational programs.

4. For research

Areas must be provided to establish a platform or sub-stratum for controlled research by any or all of the marine sciences. A proper understanding of system function cannot occur until scientists are allowed to apply proper research methodology to the system in question. Often this will mean the maintenance of one area or portion of a system in a reference status while another area of a similar system is subjected to a known variable such as a salinity or thermal change. Thus, some research sites must be kept as strict natural areas and some must be manipulated. Techniques such as this have long been used in agricultural research as illustrated by the experimental farms at most agricultural schools.

5. For multiple use

Areas of multiple-use are pertinent insofar as these uses are compatible with designated primary scientific and educational

uses. It is equally appropriate to conduct some types of research on sanctuaries when it is compatible with other primary uses -- as well as on many non-sanctuary sites.

Unless such areas are established, there will be no assurance that the critically important purposes outlined above will be fulfilled. Rapid present degradation of estuarine, coastal and marine systems indicates that only the sanctuary concept assures adequate availability of these areas as tools for research and education.

Types of Sanctuaries For Research and Education

The purposes for sanctuaries briefly delineated in the previous section suggest the types of specific areas of land or water that can serve the objectives. Exceptional variety exists in the pertinent sites and each possesses a unique set of characteristics. It is difficult to reduce such complexity to a manageable system, but this section and that which follows suggest a usable framework.

The following types of areas are needed:

1. Baseline Sanctuaries - virtually undisturbed areas which represent all of the natural occurring component types in the estuarine, coastal and marine system. Special consideration will be required of their best use as long-term natural reference sites and as monitoring sites for detection and measurement of large-scale changes.
2. Preserves and Reservoirs - protected examples of species, structures, communities and sub-systems. These should emphasize total preservation of unique situations and endangered species, and complete representation of existing biota, geology, and habitats.
3. Research Sanctuaries - appropriate areas for all types of research by all disciplines. Research will vary from undisturbing observation through designed sampling to planned manipulation, and the expected research uses of each proposed sanctuary must be thoughtfully included in selection and management of each site. Research requirements must, however, dominate all decisions about these sanctuaries. Both natural areas and manipulated areas will be required, and some presently disturbed areas may have value.

4. Educational Sanctuaries - selected and operated primarily for the educational functions appropriate to the site. Uses will range from visits by urban school students and the public to the intensive training of graduate scientists.
5. Multiple-Use Sanctuaries - designed to permit (a) other uses which conform to the controlling purpose of research or education or (b) research which is compatible to other primary functions of the sanctuary. Because interruption can destroy many kinds of research activity, special care will be required in planning simultaneous use and in assuring that other activities do not interfere with programs of research or education.
6. Buffer Zones - upland, upstream and contiguous estuarine and marine areas which must be preserved or managed to maintain the physical, chemical, or biological integrity of the previously defined sanctuary areas. Buffer zones will also provide fail-safe areas to protect non-sanctuary lands and waters from being affected by manipulative activities in subjacent sanctuaries.

Coastal Zone Subdivision

One step in establishing a system of sanctuaries is the development of a scheme or schemes to classify the coastal and marine environment to determine which areas have been set aside, which need preservation, and which can fall into what use and multiple use categories.

Man's use of the coastal zone, both for habitation and industrial and commercial activities, basically has evolved along a regional biological and geological basis. One useful regional classification of the coastal zone of North America was set forth in The Water's Edge: Critical Problems of the Coastal Zone (B. H. Ketchum, ed., 1972, pp. 98-99) (Table 9). These regions have different requirements for the establishment of preserves (sanctuaries) in part because of different basic components of biological productivity between the regions and in part because of the different abiotic (physical, geological and chemical) features.

There further exists a scheme for classification (or at least gaining data for classification) of environments within each region which the United States International Biological Program Subcommittee on Conservation of Ecosystems has evolved for the purpose of locating and designating specific scientifically important areas. This scheme is subdivided into four major environmental areas: coastal, coast-associated, offshore, and man-created; embodied in their scheme is the need to know, for each area and habitat type, the dominant

TABLE 9: Regional Classification of the Coastal Zone of North America (From The Water's Edge: Critical Problems of the Coastal Zone by B. H. Ketchum, ed., 1972, pp. 98-99.)

Classification	Area	Characteristics
Arcadian	Arctic to Cape Cod	Rocky, glacial shoreland and submarine topography; shoreline subject to winter icing; large attached algal species important producers; biota essentially boreal.
Virginian	Cape Cod to Cape Hatteras	Climate, topography and biota transitional between Arcadian and Carolinian regions; lowland streams, coastal marshes and muddy bottoms becoming prominent; temperate biota with boreal components.
Carolinian	Cape Hatteras to Cape Kennedy	Extensive marshes and (cypress) swamps; muddy bottoms predominate; waters turbid and highly productive; temperate biota with subtropical elements.
Louisianian	Central Florida to Tuxpan, Mexico	Similar to Carolinian but more tropical in environmental conditions and biotic components; sediments primarily terrigenous.
Vera Cruzian	East Coast of Mexico	Not applicable to Workshop
West Indian	South tip of Florida, Yucatan Peninsula, Caribbean coast of Central America, West Indian	Shoreland low-lying; foreshore and seabed with mountainous areas; substrate primarily biological in origin (oolite, forams, shell and algal); foreshore and seabed winter calcareous marls, sands and coral reefs; tropical biota.
Columbian	Arctic to southern California	Shoreland mountainous; rocky foreshore; extensive algal communities, especially offshore kelpbeds; boreal and temperate biota.

TABLE 9: (Cont'd)

Classification	Area	Characteristics
Californian	Southern California (thru Mexico & Central America)	Shoreland generally mountainous (often volcanic); rocky coasts with volcanic sand; general absence of marshes, swamps and calcareous bottoms; tropical biota.
Great Lakes	Great Lakes	Rocky, glaciatic topography with limited wetlands; cold-temperate climate; freshwater; boreal and temperate biota with anadromous and marine invaders.
Fjords	Tidal, glacial and turbid backwash, Alaska	Precipitous mountains and deep estuaries often with glacial moraines.
Subarctic	Ice-stressed coasts, Bering Sea and Arctic Ocean	Shoreline subject to icing; biota Arctic and subarctic.
Insular	Hawaii	Precipitous mountains, considerable wave action, endemic tropical and subtropical biota.

group(s) and species of special interest. The scheme (primarily set up in questionnaire form) is presented in Table 10.

The use of both of these schemes appears to be the best available approach to a national scheme to classify the coastal and marine environment as a step toward the development of a system of sanctuaries. The national system must, however, provide for two additional steps - wide dissemination of the adopted schemes of classification and provision for careful revision when emerging knowledge makes it appropriate.

Selection and Evaluation of Sanctuary Sites

Prior to the efforts to establish a system of coastal and marine sanctuaries, two major data base sets are extraordinarily desirable:

1. An inventory of existing coastal and marine sanctuary and preserve sites, together with descriptive and managerial information concerning each.
2. A reasonably definitive treatment of the ecology and environmental features of the coast, and especially of the continental shelves of the U. S.

In the search for and selection of sites for estuarine and marine sanctuaries, the purposes and types which have been cited in previous sections provide the most important general reference system. Within that framework, the following considerations are appropriate to all types of sanctuaries:

1. Priorities must be established in relation to:
 - a. Overall program operations
 - b. Site selection
2. Each site selection should be based upon the best available information and knowledgeable scientific opinion.
3. Alternative sites to achieve the same goal should be identified and compared.
4. Within the general context, sites should be selected on a case-by-case basis.
5. Matrix analysis based upon a numerical weighting scheme could be helpful in making priority site selection decisions.

TABLE 10: Classification of Environments Used by the United States International Biological Program Subcommittee on Conservation of Ecosystems.

A. Coastal Environments

1. Exposed Areas
 - a. With rocky substrate
 1. Highly calcareous
 2. Weakly or non-calcareous
 - b. With unconsolidated substrate
 1. With low organic content

a. sands	}	composition and particle size distribution
b. silts		
c. clays		
 2. With high organic content

a. sands	}	composition and particle size distribution
b. silts		
c. clays		
2. Protected Areas
 - a. With rocky substrate
 1. Highly calcareous
 2. Weakly or non-calcareous
 - b. With unconsolidated substrate
 1. With low organic content

a. sands	}	composition and particle size distribution
b. silts		
c. clays		
 2. With high organic content

a. sands	}	composition and particle size distribution
b. silts		
c. clays		
3. Delta Areas

B. Coast-Associated Environments

1. Submarine vegetation beds
 - a. Dominated by algae
 - b. Dominated by vascular plants
2. Estuaries
 - a. Mixoeuhaline (30-35⁰/oo)
 - b. Polyhaline (18-30⁰/oo)
 - c. Mesohaline (5-18⁰/oo)
 - d. Oligohaline (0.5-5⁰/oo)

TABLE 10: (Cont'd)

3. Lagoons
 - a. Hyperhaline ($>40^{\circ}/\text{oo}$)
 - b. Enhaline ($30-40^{\circ}/\text{oo}$)
 - c. Mixoeuhaline
 - d. Polyhaline
 - e. Mesohaline
 - f. Oligohaline
 4. Tidal salt marshes
 5. Mangrove swamps
 6. Drainage basins of above
 - a. Extent
 - b. Type area
- C. Offshore Environments
1. Kelp beds
 2. Coral reefs (active)
 3. Atolls
 4. Drowned reefs (on subsidiary shorelines)
 5. Insular environments
 6. Continental shelf areas
 7. Submarine canyons
 8. Sea ice areas
 9. Continental slope environments
 10. Offslope environments
 - a. Abyssal plains
 - b. Submarine trenches
 - c. Seamounts
 - d. Submarine ridges
- D. Man-Made Environments (e.g., Spoil areas)

6. Analysis of total benefits and losses should be involved in each site selection study.
7. Before a given site is selected, it is desirable to know if a similar representative already exists in a preserve elsewhere.
8. In general, uniqueness (biological or geological) and threat should be considered major factors in the establishment of priorities for site selection.

The following criteria should be considered in selection of specific sites:

1. Scientific and educational value
2. Uniqueness (is this one of a kind or is it rare?)
3. Threat (is there imminent danger?)
4. Viability (for biological sites) - (Can it be protected and if so, will it sustain itself? Is it large enough?)
5. Defensibility - (Can the area be protected from the direct and indirect intrusions of man?)
6. Naturalness - (Does the area approximate the pristine state of nature?)
7. Diversity - (Does the area contain local representatives of the ecological richness of the area?)
8. Representativeness - (Is the area the best available example of a given type of ecosystem or geological feature?)
9. Special significance - (Is the particular area of especial national, regional, or local significance?)
10. Redundancy - (Does this area add a new type or a partial duplication of one already in existence?)
11. Availability - (Is the site financially [and otherwise] available enough to justify its selection over other potential sites?)

12. Proximity to urban areas - (especially for educational sites).
13. Other considerations - (Are there other special circumstances within the concept and intent of scientific or educational sanctuaries which merit serious evaluation?)

Management of Scientific and Educational Sanctuaries

The following suggestions for management of the sanctuary programs included in the two federal acts designated as P.L. 92-583 and P.L. 92-532 are specifically developed with the needs of science and education in mind and for estuarine and coastal sites. These suggestions may not be appropriate to all sanctuaries, especially small-sized sanctuaries. Several levels of management are dealt with including Federal, State and at the sanctuary, in addition to universities and the private sector. The main objective of the management phase of these programs is to achieve the long-range goals and needs for which sanctuaries have been created and further to permit the flexibility which will be needed to explore and develop various options that evolve based on resultant scientific studies and educational activities.

Federal Level

Although two separate congressional acts establish two types of sanctuaries (estuarine and marine), the concept of sanctuaries is a unifying principle and the federal management of sanctuaries might best be handled by one administrative unit. Uniform guidelines and management procedures should result in an integrated coherent program involving all marine sanctuaries and conceivably would result in decreasing needless duplication of effort and funds.

The Sanctuary Program would benefit by having an external advisory committee appointed by a recognized scientific group. This committee should include representatives of the scientific community, private foundations, and the private sector. Annual review of the entire program should include recommendations concerning policy and basic management problems.

To insure the maximal scientific and educational benefit from this program, an interagency committee could be established involving those other federal agencies which have a vital interest in the marine environment and the Great Lakes. One example will demonstrate the need for this coordinative function; scientific studies on sanctuaries should provide data which would have comparative value to on-going research on perturbed environments. This committee can suggest specific research projects in sanctuaries which would provide a data base needed to assess the environmental

impact of man-induced modifications.

Based on the previously described needs and goals of this program, general management guidelines should be established which would apply to all of the established sanctuaries. There is need for appropriate standardization of scientific techniques and management, although it is recognized that each sanctuary will have certain inherent specific characteristics which may not require standardization.

A council of directors of sanctuaries might meet regularly to report on recent developments, to discuss common management problems, and to effect coordination in reporting data on a standardized basis.

Data from the various studies must be stored in and available from some central data bank. Since sanctuaries will be studied on a long-term basis, significant baseline data will be collected and analyzed to indicate "normal" trends in fluctuation of biotic and abiotic parameters.

Funds provided for this program should be available for acquisition of sanctuaries, the necessary development to permit sanctuaries to be operational, and to support the operation of sanctuaries. Operation is interpreted to include both routine housekeeping function and research and educational activities. The need for data and studies on sanctuaries is acute not only to interpret and understand current environmental crises but also to provide a baseline data base for future comparison.

Various types of agreements should be possible to manage sanctuaries. Marine sanctuaries would be under the immediate control of the managing agency or institution. Contractual arrangements may be necessary to permit another agency to be responsible or assist in specific management procedures, such as patrolling and enforcing sanctuary guidelines. However, as required by law, estuarine sanctuaries are funded by grants from the Secretary of Commerce to a coastal state. Hence this phase of the Sanctuary Program requires federal and state cooperation.

Proposals to establish sanctuaries should be received and reviewed by the federal Sanctuary Program Office.

Once a sanctuary is established, its program should be reviewed annually. Because of the long-term nature of sanctuary program, funds should be provided at least on a two-year basis.

Environmental data should be forwarded to the central data bank at frequent intervals. The Washington Sanctuary Program Office could be responsible for coordinating the storage

and use of environmental data.

State-Federal Interaction

It is suggested that, within a state, a sanctuary could be managed by any state agency, university or private foundation designated by an appropriate state official. Long-term leases or other contractual arrangements between private foundations or individuals should be encouraged to stimulate the private sector to provide sanctuaries without the expensive cost of acquisition.

The Sanctuary

Each sanctuary should have a stated management program which would be consistent with both the goals of the particular sanctuary and with the federal procedures. This document must clearly specify the controlling functions of the sanctuary, any supplementary planned programs, the means of accomplishing the stated purposes and the mechanisms for managing the sanctuary. Clear provision should be made for approval of projects and programs (as well as for termination of them), for resolution of conflicts and for modification of the uses of the sanctuary. A sanctuary director should be appointed who would be responsible for the operation of a sanctuary.

In sanctuaries of sufficient size and utilization an advisory committee should be appointed to assist the Director in achieving the goals prescribed for the sanctuary. This committee might include appropriate representatives from the scientific community, business, relevant state agencies, environmental groups and interested citizens. The composition of the advisory committee would reflect the nature and purposes for which the sanctuary was established.

Any proposed environmental modification in the vicinity of the sanctuary should be critically reviewed by responsible local, state and federal agencies and should be prohibited if it has an adverse effect on sanctuaries.

The boundaries of each sanctuary should be clearly marked and the region should be properly policed to insure that the guidelines governing sanctuary operation are not violated.

Discussion

QUESTION: You identified very well for my purposes the reasons for these kinds of sanctuaries, but I would like to know a little more of how that group felt about who should be doing the determinations. You talk about the federal-state-university-academia relationships here. The group that actually makes the selection and the interface of the various interests is, to a large degree, going to determine, I think, how these groups are actually set up.

So how can we work to assure the greatest input from the scientific community?

RESPONSE: We touched on several elements of this, and other members of the work group may have comments. Scientists are not easily limited by legislation, you know, and we didn't really draw our lines within these bills, because there are many other good ways of doing science.

We felt for the purpose of these bills -- and this specific suggestion is in here that NOAA is obviously, clearly and properly the focal point -- that an advisory group on sanctuaries appeared to us to have high value as a review panel for external review and as an advisory policy group for the office of NOAA.

But beyond that, there is a whole complement of options. The original proposers, whoever they are, should demonstrate competence. They should demonstrate not a work plan for daily activity, but the things to be achieved in that sanctuary. I don't care where they come from, whether it is from private industry, a state agency, or a totally private effort of some kind. The real question is to achieve quality in approach to research.

That to me takes primacy over the administrative structure, but the administrative structure should help that. It should weed out boondoggles. It should weed out false presentation of research sanctuaries when you are really trying to block something else. I don't want that sort of a masquerade. If we want to block other activities, let's say so.

In my personal opinion, it should aim its review toward quality. If excellent things will be done there, then implement it. But I am not sure that is easy administratively.

QUESTION: Are you recommending that the classification system be a requirement of the states to utilize?

RESPONSE: We didn't deal specifically with that. I think it would be most constructive if every proposal that comes in has to make reference to the classification system as a requirement, personally. The group didn't discuss that. But I think it permits the national overview in a way you can't get any other way, and also makes them think through how they fit into a scheme.

COMMENT: I think, one of the things we talked about and suggested was that there be a type of interagency liaison between NOAA and others, so that the data that would be evolved and developed in baseline studies within a given sanctuary would be useful to many groups and that people who would be interested in various kinds of data that might be developed in a sanctuary would have a direct input in establishing the sanctuary and recommending the research program.

I think all of us have experienced a number of times when people have studied an impact. The question always comes of whether you have control. Here it would possibly be a control estuary, an undisturbed one.

COMMENT: I guess my concern is the extent to which the national interest is influencing the criteria for the selection of an estuarine sanctuary versus the state criteria.

RESPONSE: I think it is a very important question. I think Marc Hershman made the comment that in the context of the Coastal Zone Management Act, sanctuaries under that would be considered part of the state's coastal zone plan.

Now, this is very good, and administratively it looks to me to be effective. But there are national interests here; there are important national interests. If a unique situation exists off the coast of New Hampshire, it is more than a state coastal zone management problem; it is a national concern. I think it is most important that a way be found to implement that as well.

COMMENT: I think the question raised is of enormous importance and, of course, it is one that is difficult to resolve. I am pleased, too, that you called attention to Mr. Hershman's report earlier, because I find an ambivalence in view there which I think is not an ambivalence in purpose.

But I am concerned about it in operation. I agree with the legal group's point that the coastal zone or the estuarine sanctuary should definitely be designed to support the coastal zone needs. But I am concerned about the fact that placement of authority for decision in bodies that are primarily concerned with coastal zone management may not accomplish the objectives you call for, either at the national or, more particularly, at the state levels.

In the states that I know something about, the degree to which scientific judgments influence the actions of coastal zone management bodies is questionable if it exists at all, and in my view, action by the federal entities, by NOAA, certainly, as the key agency, but by others, such as Interior and other federal bodies concerned with the same objectives, in working out some mechanism for participation by the scientific community in these decisions, still within the framework that the legal group presented, for example -- that the thrust of the objective must be in terms of coastal zone management.

In my view, that may be one of the key interfaces that has to be developed. I suspect that your committee fully was concerned with this. I am curious to know whether you or any of the governmental people here can see a mechanism for doing this.

Let me go just one step further. It can be by virtue of the advisory body that you recommended, but advisory bodies may or may not be affected.

RESPONSE: I agree with every point you have made.

The specific suggestion in that part of our report speaks this way:

"The sanctuary program would benefit by having an external advisory committee to it, appointed by a recognized scientific group. This committee could include representation of the scientific community, private foundations, the private sector. Annual review of the entire program could include recommendations concerning policy and basic management problems."

Well, these are nice words, as you well recognize.

My personal opinion is that the tone that NOAA sets in approaching this implementation is going to decide whether or not good science is emphasized and is required in scientific sanctuaries. They are in the position of telling the states, "The scientific portion of your program is important to us. It will be reviewed by competent personnel, experts, and we will respond to what they say."

If NOAA chooses to do that, they can emphasize this part. If they leave it to the states, I quite agree it will be variable in the first place, and very often in the day-to-day rush of management decisions it will not get very much attention.

LAND USE WORK GROUP SUMMARY

presented by

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I would like to start off first by thanking both VIMS and NOAA for the opportunity to participate in a workshop like this. I think the concept of gathering together people to talk about some ideas and issues that are associated with a particular piece of legislation is quite a good one. I hope the workshop will be some help to NOAA, and I know it is of great help to folks like me, to help me appreciate some of the issues involved and some of the different points of view that have been expressed in the last couple of days.

Along the same lines, I might say that a number of different kinds of agencies, my own included, take a cue from these kinds of ways of expressing points of view, both verbally and in workshop occasions like this. If nothing else, they are a rather humane way of getting people together and ironing some things out.

The workshop I was involved with was the Land Use Work Group. It was a rather disparate group, without a great deal of commonality, either in language or concept as it would apply to land use. Our work group was made up of representatives from the Texas Land Office, the National Sand and Gravel Association, Conservation Foundation, International Association of Game and Fish Commissioners, Department of Interior, Georgia State Planning, North Carolina Department of Administration, and Exxon Oil. So you can see it was rather a disparate group. And I'm afraid that the kinds of thoughts we had were probably not so specific as those, for example, in the scientific work group but I'm afraid that's the nature of our beast.

I have to make a rather liberal interpretation of what it is we talked about, and that being the case, I don't want to infer that our findings necessarily reflect on some of the organizations that I just mentioned. Indeed, in many cases, they don't.

I'll start off with the notion of estuarine sanctuaries. We went through the usual ritual of defining terms in the sense of both trying to expand and narrow down what constituted an estuarine sanctuary. A couple of notions were brought up. One was: Could a sanctuary apply to a situation such as the following? There are, along the coast, certain communities that have a high degree of fairly identifiable cultural identity that is associated

with an extractive industry, such as commercial fishing. Some of these communities are isolated and are either unable or unwilling to adapt to change. Is the sanctuary concept broad enough to include these sorts of communities as a focus for a sanctuary?

There seemed to be a general feeling that these sort of communities were not meant to be included.

Another point of view expressed in a more general sense was that the concept of estuarine sanctuaries might conflict with some existing management areas. As I recall, waterfowl preserves was one such area. To give an example, I would assume that if an existing management unit was proposed under the sanctuary concept and manipulative research were suggested, there might be a conflict here. I think there was a strong point of view expressed by one individual that existing management units be excluded from the sanctuary concept.

Since we were called a land use group, we brought up the notion of whether or not an estuarine sanctuary can be used as a land use tool. In other words, can a sanctuary concept be used as a tool in the planning process? Can it perform an open-space function or a buffer function, such as those that a planner would tend to use? By and large it was the feeling of the group that sanctuaries could not be used as a tool for these kinds of active direct land use purposes. I think that these sanctuaries are going to be tried to be used for this purpose, and I think this is natural. I think some consideration ought to be given as to how to respond to this sort of use.

In our discussion of sanctuaries, instead of expanding, we contracted which I think was philosophically within the nature of our committee, we viewed the estuarine sanctuaries rather narrowly, that is that they ought to be used only for research and associated educational purposes. Furthermore we recognized that there is relatively little money involved in this program. There will be many demands on this money, and we need to establish some priorities in the selection of these areas.

I think it was unanimous that the selection of research sites and the selection of the kinds of research that would be performed there ought to be very much management-oriented. And by that I mean Coastal Zone Management oriented. Let me explain this a little carefully. We did not mean to exclude basic research, manipulative research, habitat preservation, a whole range of things that could be carried out in an estuarine sanctuary. But we gave the highest priority in both the selection of sites and selection of the kinds of research to be performed to their being management oriented, and although it wasn't brought out, the inference is that the selection of the sites and the research would be a joint

proposition between the scientific community and those persons who are responsible for coastal zone management. By inference it was also suggested that the kinds of research that would be carried out in these areas need not necessarily be limited to ecological research; they could include socioeconomic and legal work as well.

If I can give an example of what I thought we were getting at, we could imagine some very isolated ecosystem -- and I am not an ecologist, so I can't explain what that might be -- that might exist in one area only. And there might be a temptation to study that area for its particular ecological value. I think our position would be that if that area was not fairly widely representative of the coastal zone and did not pertain specifically to high-priority coastal zone problems, then we would rank it as a low order of priority for acquisition. A corollary to this point of view is that the selection of sites need not necessarily be an isolated or undisturbed area. They might very well be in urbanizing regions or other areas that are highly disturbed. A related aspect would be that sites closer to centers of population would probably have a high value for educational purposes.

We talked a little bit about the problem of how surrounding land use affects the integrity of an estuarine sanctuary. In those cases where surrounding land use or changes therein could affect the integrity of a sanctuary, it seemed obvious to us that the application to acquire such a sanctuary would have to include an indication by the state and local governments that they would have the tools, the will, and the money necessary to effectuate appropriate land use controls. Along the same line, there may be areas that are selected because one wants to study change associated with human activities. And it would follow, then, that there ought to be enough flexibility that unusually strict controls ought not to be necessary or desirable if one is studying change.

A final point was raised. We could not determine whether monies spent for operating a facility also meant money spent to support research. And it was our feeling that monies under this act could be used to support research, and that the notion of research is included in operating a facility. I realize that is a broad interpretation.

We talked very little about manipulative research, and I will just throw in one comment from the chairman, and that is, it has been my personal experience that the general public, and particularly the local public around such a research site, has a hard time understanding what research is. They have an even more difficult time of understanding why you disturb a research site. Thus I think it is absolutely necessary that the adjacent and surrounding community and the general public have an understanding of what is going on in the research area. And that means going out to them, as opposed to waiting for them to come to you.

Turning to marine sanctuaries, we acknowledged the need for marine sanctuaries to provide a mechanism to rationalize between competing uses in marine areas, and we also recognized the common-property nature of some marine resources. But frankly, there wasn't a sense of urgency or high priority expressed for the establishment of offshore marine sanctuaries. We asked a couple of states what their position was, and at least with respect to their waters, the three-mile limit, it did not seem to be an urgent need. We did recognize, however, that where sanctuaries are established inshore and affected by land use processes, the implications of establishing these sanctuaries are rather enormous.

I will point out one specific area where we saw a clearly identified function that the marine sanctuary could play, and this was the esthetic or scenic function. The example we used was a national seashore or a national park, where it seemed to us that an esthetic preserve, for instance, off Point Reyes, would be very much compatible with the national seashore. And by this we would mean certain kinds of uses from the line of sight of Point Reyes or Sleeping Bear Dunes, or whatever lakeshore you want to suggest, might be a very appropriate way of utilizing the concept of a marine sanctuary.

One commercial use that was specifically brought up as, in some areas of the country, being compatible with people's view of an ocean or marine system, was commercial fishing. But I recognize there are some areas of the country where a commercial fishing boat is not the most desirable thing to look at, so this, of course, varies. But I think the principle is that in defining the kinds of uses that would be compatible with esthetic marine preserves, one would want to have some input from the local community.

Also, concerning the land use implication of marine preserves, we felt that in those kinds of sanctuaries which required certain land use controls to maintain their integrity, the establishment of those preserves should again, as in the estuarine sanctuaries, be accompanied by appropriate land use plans or the establishment of an appropriate land use planning process, including the availability of funds to carry this out.

It was at this point that we brought in a planner and threw out to this planner the notion of inshore marine sanctuaries. And this planner thought for a minute and he said, "I know just where I want a marine preserve. I want it in Lower New York Harbor. And I am going to build an island there, or build an artificial marsh, and I am going to put in a few oysters, and I am going to call this an oyster sanctuary. I am going to require that the City of New York and Albany and all the way on up, upgrade their sewage treatment facilities so that I can preserve the integrity of this oyster-producing area which I have identified as a marine sanctuary."

The reason this planner did this was that he was a rather aggressive person and could see some of the implications of establishing marine sanctuaries in inshore areas. And I think we were aware of that, too. This kind of far-fetched example, I think, points out the need to fairly carefully consider the criteria which govern the use of inshore marine sanctuaries, and to think through the kinds of implications they might have for upstream land use and for environmental quality questions.

Lastly, there was one philosophy brought up a number of times with respect to marine sanctuaries, and that is that one would want to protect against results, not uses. And since this was brought out so strongly, I felt obligated to mention that point of view.

Discussion

COMMENT: I wonder what Dr. Cronin would say about the effects of all these man-made activities on the coastal zone where we have criteria and have some good reason for the complications.

DR. CRONIN: This is a personal opinion because our group didn't address that question, but this kind of research must be done, and there is exceptional urgency, in my own opinion. I am not sure it requires sanctuaries. There is no reason in the world I can see why it can't be done in a sanctuary if the sanctuary is properly planned for it. I think it is completely compatible, and of a high priority. I would object a little bit to exclusive use of this sanctuary concept for identified management problems. I don't think we ought to be excessive in that direction, either. Because the basic research is putting the money in the bank against which we are going to have to draw sooner or later. There are so many basic questions we can't answer that we need that component as well. I am saying we need an order of magnitude increase in research in both the management problems and fundamental problems.

COMMENT: I would like to propose there be a one-day session entitled "The Scientist's Strategy for the Establishment of Marine and Estuarine Sanctuaries," because what we touched on before, in my comments to Gene Cronin and John Vernberg was that the needs in basic research that the decision-makers faced with these coastal zone management problems or inland problems are so remote that the urgency or the necessity of that kind of research is not coming across in terms of the dollars available to do it. However, for the scientific community there are other sources of funds from the national levels. And so the question would be, in the Coastal Zone Management Program, to what degree could or should

national research funds be oriented more to state, regional, and national zone needs? What kind of mechanism is necessary to integrate that research, simply with the wide variety of funding agencies at the federal level, going down to the various research elements? There is imposed in between a state organization which is going to want to draw upon the results of that research and has no access to it by established channels.

So I believe the real crunch here is the strategy for the utilization of a cumulative scientific information in reaching resource allocation decisions and for assuring that that kind of research, as well as the basic research which we in the estuarine field feel is essential, be continued, and the relationship between the two better understood, and consequently supported.

COMMENT: I would like to make a few comments on this, and I am going to use as a case history the Chesapeake Bay region. Several years ago, we put together a long-range program. It was a very ambitious program, and it was a combination of fire-fighting money and basic-data money.

One of the real problems that management faces is how to put out a fire. There is no agency that is providing firefighting money. It is not in their mission. The other problem comes in putting together the long-range environmental data base to handle the fires of the future. There is no agency that is willing to put money into that kind of research. And it is not their fault. They have to justify their budgets to the Congress or their own internal administrator, and they have to be able to show a product. A big, accumulated data bank is not a product. Answering a single problem of a state agency or local agency on what to do in this place or that place is not a product. Now, until we can redefine what the valuable products are, we are going to be faced with this problem.

I heard several agency people yesterday urge the scientific community to take an interest in doing some of this base-line data or accumulating this information. The scientific community is willing; they just don't have the funds for it. In addition, if you go to some universities you have an entirely different problem. They are project-oriented or grant-oriented, for the most part. An investigator will do a small project, sometimes, as part of his own long-range independent work, but there is no mechanism within many of the universities -- and I say "many" because there are some that are exceptions, particularly those that tie in closely with state regulatory agencies -- for accumulating and building on the material developed from a particular project or proposal. There are attempts being made now to try to do this by various agencies. The Environmental Data Service is attempting to do this with their Environmental Data Base

Directory. We happen to have a small contract with them to do some assessment in the Chesapeake Bay region. We are finding there is a lot of information out there that has never been put in a coherent package, because the person who got the information was not in a position to do it, or had no interest in it.

These are some of the problems that are being faced, and it requires a redefinition somewhere along the line of what our priorities are going to be.

COMMENT: I think we are at the point where, given the responsibilities that NOAA has in the Coastal Zone Program and the responsibilities the Interior Department will have, to provide, perhaps, a new mechanism or an examination of ways to integrate existing mechanisms to get a focus on both long- and short-term needs. We have had numerous university groups coming to us, seeking to get our money, which we don't have, but an endorsement of the concept of their undertaking research that would be of benefit nationwide might be of benefit. And we are asking them, again because of our increasing orientation toward the land use designation set up by the governor, how that research would be integrated or used to apply to their state's needs, and the extent to which they had discussed this in the state. And by and large, there is no discussion within the state.

Now, again there is a great pool of information and a great pool of talent. It seems that here is a great opportunity for NOAA to lead the way, and when it does, we will see how it was done.

COMMENT: (NOAA) It seems to me four different points have been raised in the last five minutes: The problem of support in a fire-fighting sense to meet the short-term research needs; getting a system for supporting needed long-term research; data bases and data available; and a coupling between the state needs and the university system. These are all parts of the problem I think we are confronting here.

Just speaking briefly to it, thinking about the short-term problem, in some cases the Sea Grant program has provided some help there. For example, Rhode Island's Coastal Zone Council was supported by a Sea Grant-funded coastal resources laboratory at the university. That is a beginning. But I don't think the Sea Grant program is aimed squarely at the purpose.

I would hope when states have a management program on the line in the coastal zone and are able to fund the operation of that program, that clearly a technical support group that does have a quick turnaround and does respond in a fire-fighting sense to technical questions, would be an appropriate component of that federally-supported program. It would seem to me that would be desirable.

Clearly, we are limited by the total amount of resources available and can't support long-term efforts, but this could be one component of the operating program. It could also be a component of the initial grant we let to most states. But here the funds are even more limited than in the operational sense.

On the long-term part, we have the RANN program supporting some activity; we have Sea Grant supporting some activity; we have HUD supporting some activity; we have certain parts of the Interior Department supporting some activities; and then the internal programs of the Federal Government. I think there is a real need to pull these things together in a coordinated fashion.

OMB is asking us questions about our MESA program. We are talking about why we should go to Puget Sound with a research program, and they are going to ask us how it relates to the RANN-supported efforts in Chesapeake Bay. We need a rationale.

On the question of data uniformity, Interior is working with USGS on the concept of resources and land information. I think we need to understand what the data needs are going to be in the coastal zone and try to relate those data needs to this other system, to see to what extent they are compatible. There's a lot of work that has to be done in this area that hasn't been come to grips with at all.

On the coupling with the universities and their research inclinations and desires, and what the state managers need, I think a lot of work has to be done there. When a state coastal zone management group comes to us with an application for a work program, we want to see some reflection that that program is not creating new centers of competence when existing centers of competence exist in a state; that it takes account of currently supported federal research activities going on in a state.

Similarly, we are working with our Sea Grant Office to insure they approve a Sea Grant program that purports to be supporting state needs, that in fact there has been this dialogue between the state people and the Sea Grant-supported researchers. Sometimes we find there has been, and sometimes there has not been. And the researchers' views of states' needs

and the states' view of state needs are sometimes quite different. I think it is our business to see that this dialogue takes place in an effective way, and we intend to do it as well as we can.

COMMENT: If you can accomplish that very last item, if you can see that there is a better grasp of each other's viewpoints between the researcher and the manager, then you will have accomplished 95 percent of the battle.

COMMENT: I think it should be emphasized that this conference has an opportunity to come up with a vehicle of use to the manager in applying what we already know.

As a wetlands manager, the manager of estuarine areas for National Audubon, I have to manage today, not five years from now or ten years from now. We are fighting a big battle over Hilton Head, and down at Rookery Bay in Southwest Florida. The Rookery Bay Sanctuary is threatened by development of a red mangrove zone in which the Deltona Corporation has already sold \$12 million worth of lots without permits, illegally. If we are going to beat them in court, I have to say that we already know enough about the effects of bulkheading, of dredging, filling, to be able to say that economically and ecologically this is an unsound project. And I think the points made by the last two speakers emphasize the need. I would urge this conference to come up with some vehicle whereby the manager who is out there on the firing line today could apply whatever information is available, the baseline data that has been gathered and is still being gathered. It must be put in a form that we can use when we go to court against some corporation which has \$12 million already at stake, and we have a little old 4,000-acre sanctuary that is going to be ruined.

COMMENT (NOAA): I agree with you completely on that point, too. There needs to be a consolidation of what we know, and it needs to be made available to the people who have to manage today. Clearly that will be a growing body of information as research results are in.

But in that connection, we have a modest effort going on between ourselves and the Conservation Foundation, whereby a handbook--I'm not sure we have the title decided on, but the authors are here -- a coastal ecology handbook which we have contracted to produce. And that will be a primer on not only the principal features of the coastal zone and how they work ecologically, but also will go into detail on how developments of one type or another should be handled in the coastal areas. We will be making this available to state managers and others involved in the management business in the next four months. John Clark is master-minding this effort.

QUESTION: You said your group decided that sanctuaries could not be used as a management tool. Was that only estuarine, or was that both types of sanctuaries?

RESPONSE: It was the feeling that it was not within the spirit of the act to use the estuarine sanctuary as a land-use planning tool.

QUESTION: Did you address that question to the marine sanctuaries?

RESPONSE: We felt the marine sanctuary had the potential for being used as a land-use tool, particularly in the uplands. And we did not establish any criteria for determining how it would be used, but I think we felt it was in the nature of the beast that that was the way it was going to work out.

QUESTION: What about consideration of sanctuaries as a tool of management in offshore areas?

RESPONSE: That didn't have an awful lot to do with land use. There was some discussion on whether or not use of the bottom was a land use, whether land still submerged is considered in land use. But the group felt we were dealing with land so we didn't discuss it.

QUESTION: For estuarine sanctuaries you said you felt the definition should be narrow, but what about the definition of what marine sanctuaries can be?

RESPONSE: We took the tack that as we read the act, the definition is fairly broad. And we didn't directly address ourselves to the various uses which might be made of a marine sanctuary, only the implications of establishing various uses which then might be used as a tool to affect land use and associated processes.

QUESTION: Did you discuss the state relationships in setting up estuarine sanctuaries, both estuarine and marine sanctuaries?

RESPONSE: Mainly from the standpoint of the implications either of these would have on land use, and therefore the implications that these would have for the role that local communities and state governments have in land use. And so it was our feeling, for example, that if a marine sanctuary was dependent for its integrity on surrounding land use, but that the local communities were either unable or unwilling to move towards an appropriate land use pattern that would maintain the integrity of the area, and would not support the notion, then perhaps that marine sanctuary is in trouble right from the beginning.

COMMENT: A comment about marine sanctuaries as related to land use only on bottomlands. I don't think probably you considered that the Great Lakes are eligible for establishment of marine sanctuaries, and we don't have the problem of having jurisdiction only to three miles offshore and then another jurisdiction beyond. In Michigan we go until we run into either Canada or Wisconsin or one of the other states. And I think that the establishment of a marine sanctuary under a broad definition here has some very strong land use implications, whether it is water quality control, recreational impact, or things like this. And I think that should be considered in any kind of definition of what a marine sanctuary should be and how it should be used.

POLITICAL WORK GROUP SUMMARY

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It sounds as though the Political Work Group closely paralleled the Land Use Work Group. We spent considerable time talking about generalities and certain definitions or key concepts in the legislation, so unfortunately we didn't get too far in coming up with specific recommendations as to how the act should be implemented or how NOAA or the states should manage these areas once they are set up.

Nevertheless, I think the discussion was important in the same manner Dr. Sullivan said his discussions were important, in that it clarified for us, at any rate, certain ambiguities which are inherent in almost any piece of environmental legislation that I have come across. It seems to be a fact that Congress will pass quite vague legislation and then leave it up to the administering agencies to figure out what they meant in the first place. So from that standpoint, I think this type of discussion was quite useful. It certainly was for me, who does not have a very expert background in coastal zone management.

Also, I wanted to point out that I think it is a worthwhile procedure to hold conferences like this one, if only to acquaint some members of the public with key features of the new legislation. I think it is a very good vehicle for doing that, and the fact that our group had quite a number of representatives from various states was a very important factor in what we subsequently discussed. In other words, these types of conferences get at the very real need to inform and educate people about existing legislation.

We began our discussions by focusing on the estuarine sanctuary provisions in the bill, and we started out with the basic question of whether there is a need for them. We came up with almost unanimous support in our work group for a system of estuarine sanctuaries. Most of the discussants felt a real need existed for estuarine sanctuaries, and this need was justified principally in terms of scientific and research needs. This is probably not a very startling revelation because it is in the legislation, but the fact that our work group did feel almost unanimously that the justification for estuarine sanctuaries was for scientific and research and educational purposes is, I think, quite important. Some of the justifications expressed were that there was insufficient knowledge of estuaries, that there were

relatively few left. For instance, Dr. Harville pointed out on the first day, and also in our work group, that 50 percent of California's estuaries are already destroyed, and they are going fast. So there is a definite need to study them now. And that was a very generalized observation that our work group came up with.

Still on the topic of estuarine sanctuaries, some of the representatives of the states' interests in the workshop were in favor of this provision of the bill because it left management in the hands of the states, and also because of the 50/50 matching grant program. In other words if I can sum up the feelings of those individuals who represented the states, the estuarine concept was sufficiently delineated in the legislation so that the states knew what they were getting into, and they weren't giving undue or unnecessary responsibility over to the Federal Government. In other words, they could protect their own interests. Therefore, out of this discussion of the estuarine sanctuary program came a recommendation that the administering agency, NOAA, should give first priority to the acquisition of and the funding for section 312 of Public Law 92-583, which is the section specifying the estuarine sanctuary program.

With respect to selecting those areas for inclusion in the estuarine sanctuary program, there was considerable discussion, and we came back to it time and again in our discussions, never really hitting it with full force, but sort of skirting the issue. And this is not, I think, very unusual, because it is a difficult concept to grapple with.

The criteria used for selection are a very political decision, and the fact that the ten or fifteen of us who were in the room expressed certain different viewpoints on this subject almost reinforces my existing prejudices with regard to the political process, that the political process is that process which translates private interests into public values, and you are not going to get total agreement on that. In other words, what I am trying to say is that our discussion of criteria for selection was vague for very good reasons. However, one participant suggested a threefold typology to be used for selecting estuarine sanctuaries. First, a pure or pristine type of sanctuary, or as close to that as is possible in this day and age, where there would be no recreation and/or development allowed, and there would even be severely limited public access to what might be called pristine types of sanctuaries. The second typology is the middle type, and this was called nursery sanctuaries. It is an intermediate type which would allow applied research and certain controlled recreational use, recreational in the sense of educational as well -- I think recreation and education overlap considerably in some respects, and I think this is what was meant when we included the controlled recreational use in this type of sanctuary. The third type would

be what is called manipulative research sanctuaries. This is where scientists and other interested individuals could manipulate the environment, even up to the point of destruction, in order to study the estuarine processes. One of our participants felt that this was a very new and innovative idea, that it would probably be politically difficult to get this across, the idea that we would set up estuaries in order to destroy them, but we felt in our work group that this kind of concept and idea should be discussed openly, rather than hidden under the table and manipulated in other ways. So that was one idea of criteria of selection for estuarine sanctuaries.

Other than that, there was not a lot of agreement as to how, precisely, these sanctuaries should be selected, whether it should be largely arbitrary, for example, whichever state wants an estuarine sanctuary and comes up with a proposal before another state -- which is what I would call rather arbitrary -- or whether some very definite scientific criteria of selection should prevail. Naturally, the scientists in the work group felt that some scientific criteria should prevail. But beyond that, this perennial problem of the interface between scientific and political needs was pretty much left unresolved, as it generally is in our political system.

Another theme was developed out of our discussions of estuarine sanctuaries; this was that there was widespread feeling that the program should begin with only a few very good research laboratories -- and I am using the term "research laboratories" as a substitute for "estuarine sanctuaries." I think we meant them to be overlapping -- and that the program might even start with one good, high-quality research laboratory under this provision.

We realized or recognized that the funding limitations in this provisions were fairly restrictive, \$4 million, I believe, and you can't buy a lot for \$4 million. So there was a feeling that instead of spreading the money too thinly and trying to set up ten, twelve, fifteen, or how many sanctuaries in various areas, it would be better to concentrate the money and really do a good job in one or two areas. I think this makes a great deal of sense, personally, and it would be a significant improvement over what we now have or don't have.

Our discussion then moved on to a consideration of the marine sanctuaries provision in the bill, and our discussion on this subject, in contradistinction to what we were talking about when we were talking about estuarine sanctuaries, was much more equivocal and problematic. I think a lot of this was due to the fact that the marine sanctuary legislation is a lot more open-ended. The multiple-use concept is a very difficult one to apply in practice.

We simply had a lot of trouble in coming to grips with what a marine sanctuary was, and this came as no surprise, because on Wednesday I think the general discussions highlighted this aspect of the bill, also.

Largely, there was not total support for the idea of the establishment of marine sanctuaries. I think it was probably because many of us were unsure as to how the marine sanctuaries system would affect the authority of the states to regulate and use their respective coastal zones. The whole concept of coastal zone management is very new, and the states are reluctant to get involved in programs which they don't know the results of, and therefore they are reluctant to give up some of their autonomy and authority in order to participate in a federal program which might have the effect of delineating for them what they should do with their coastal activities. Our work group did include many representatives of states, and I think this is one of the facets of the legislation which really does need to be worked out further, the relationship between federal authority and state authority. And it is not only a problem in this legislation, as most of you know; it is a problem in quite a lot of legislation.

So in our discussions of marine sanctuaries, we kept coming back to the question: Would the establishment of a system of marine sanctuaries result in limiting or regulating state activity in the coastal zone? If it did, how would it? And so on. On this question we really came to no agreement, except that the feeling was one of much more caution on this program as opposed to the estuarine sanctuary program.

On the other hand, however, the viewpoint was expressed that the establishment of a system of marine sanctuaries modeled somewhat after our national park system or wilderness system would be a good idea. I tend to be a proponent of that position. I think the idea that marine sanctuaries, national marine sanctuaries, can be set up in the coastal zones is obviously a new idea, but we do have good models for it, and those are precisely the programs I just mentioned, i.e., the wilderness system and the national park system. One participant felt that we should extend the logic of federal and management to the coastal zone, and I don't mean to ignore the fact that the boundary problem is much more difficult on the coastal zone question than it is for land use. Nevertheless, I think there are some very good precedents in the federal land management area which can be applied to coastal zone management, and perhaps some research needs to be done in this area, in order to say exactly what can be transferred in terms of philosophy and management and administration, from the federal land management program to the coastal zone management program. I think, personally, that would be a very fruitful area of research.

Therefore, one of the opinions was that we should definitely set aside certain areas in the coastal zone for protection and limited use, but again I want to stress that this idea was not unanimously supported. There seemed to be a clear preference in our work group for the estuarine sanctuary concept as contrasted with the marine sanctuary concept, the latter being much looser, more vague and unspecified in the legislation.

To sum up, I will just go over the informal recommendations which came out of the political work group. The first was that first priority in funding and acquisition should be given to the estuarine sanctuaries provision, and especially to the more pristine, more undisturbed types of sanctuaries. In other words, we have to find areas which are pretty much undisturbed and protect them now, because we won't have the opportunity later. Second, we should begin this program of estuarine sanctuaries with one or two, or several, high-quality federal-state marine research laboratories, and see what the results are from this. In other words, we should start off strong and bargain from a position of strength if they turn out to be productive and useful. Third, the administering agency, NOAA should work at further specifying what a marine sanctuary is or ought to be, so that the states participating in the program know what they are getting into. And obviously, this should not be a unilateral specification on the part of NOAA. It should include citizens' advisory committees, states, representatives, and a whole host of coordinating mechanisms that we already have in existence in the governmental process. Although no one really talked too much about this, I am sure that is what we had in mind when we said that further specification of that program needs to be done.

Discussion

COMMENT: On marine sanctuaries particularly, establishing marine sanctuaries, we thought there should be one primary use and other uses, making sure they are compatible with that, other than just a multiple-use concept with no primary use specified.

COMMENT: First, I would like to talk against the concentrated labs, because if you put all your money in one lab and call it a high-quality lab, you may have to define what is a high-quality lab, and you will have a lot of problems identifying that. Secondly, on money, it was already pointed out you can get other sources of money from other places. Third, on baseline data, you will be doing long-term programs so you don't need that now. You can set up the sanctuaries and just start gathering data for comparison later on. And finally, on politics, the subject of your committee, where is that high-quality lab going to be located?

The other point I would like to make is about destruction of estuaries. It has come up several times in the meeting. I don't think anybody can destroy an ecosystem. It would be dangerous to use that word. I think a scientist could stress a system or set it back a few years, but he can not destroy it. You always find a new system evolves, so I suggest the word "stressed" or some other word be used, rather than "destroyed."

COMMENT: I want to address the business of environmental destruction. I submit the environment is being destroyed now, and as we have heard, in California 50 percent is gone now. Regardless of whatever word we use -- and "stress" is a good one -- we still need to manipulate and manipulate strongly. We are being asked to write these environmental impact statements, and to get at the basic roots of this we need information. To do that we need information on how the system responds. In some cases manipulation has to be very severe.

How do we know how an estuary responds, for example, to a major oil spill? We need to know this thing. We need to spill some oil while we are studying it, not run out after a spill and see what happens. How about liquid natural gas and so on? I have just been writing an impact statement on that.

Now, one point that really hasn't been addressed, to my knowledge, by any of these panels in sufficient detail is the matter of restoration. This was clearly written into the bill, and we have to give some thought to this. Certainly, in order to restore we need an area where we can denude the thing and then begin to work it on back. It should be emphasized that in order to really keep the quality of the environment up, we have to bring it back in some cases. So I submit what we are really dealing with here is a matter of national defense -- not the enemy without, but the enemy within. It is of urgency that we pin these things down and not worry about hang-up words, but get on with the job.

RESPONSE: Just on that point, one of the participants did point out that there are areas which are pretty much destroyed now, and why can't we use those to study, rather than take a pristine area and put very severe stress on that area.

COMMENT: Why don't doctors just study sick people instead of working with healthy bodies? We need the whole point of view, instead of just studying stressed areas.

COMMENT: The land use group did talk about this problem of recovery as part of this research emphasis that might take place in a sanctuary, and in the course of the day Dick Bader was to tell me of how the study in Biscayne Bay is proceeding,

to what degree natural recovery of previously destroyed Thalassia beds has taken place, where heated effluent no longer comes out, versus the area that has been seeded manually -- a very interesting study, and the kind of thing that might come into play in a recovery situation in a research sanctuary.

But I guess I agree with Dr. Cronin that the words "scientists' playground" are inappropriate, but I also believe we are doing ourselves a disservice in the scientific community as well as in the management community by calling the problems of today fire-fighting. They are really contemporary, continuing management and research needs, and I think the sooner we get away from the fire-fighting type language, the better off we'll be.

COMMENT: I have been struck with the use of the term "sanctuary." I am willing to admit that we may need to destroy some areas -- I don't like to think about that -- to see what will happen. Maybe we can go up and start studying the Port of Valdez now, and then when the first oil spill occurs, we'll be there to know. And I think the public will buy the use of the word "sanctuary," but I don't think they will buy the use of the term if we take a large area and create a New York Bight to see what happens.

RESPONSE: No, we addressed that problem and recognized it as politically very difficult to get that concept across. But in a work group such as this, it is much better to bring it out in the open and discuss the political problems or scientific problems as well, rather than ignore them. Is there a real need for these kinds of sanctuaries? I am not convinced, but then I am not a biologist or an ecologist. But generally, most of the participants did feel that this kind of research was necessary. And it is going to take a selling job.

COMMENT: I think the presentation by Dr. Cronin's group very well addressed itself to that issue, and we can leave it to that to be developed. But I would like to underscore something our chairman said in terms of dichotomizing the problem with relation to the marine sanctuary. Almost all the groups have concentrated to a greater extent on the estuarine sanctuary, and I think this is understandable. There are two areas that it seems to me have led us to do this, other than the political obvious necessity. One is that the bill as it is presently written for the marine sanctuaries is so vague in terms of where authority lies that our states are concerned about this. Our states need reassurance that this does not involve a mechanism whereby the Federal Government will preempt the control which the states justifiably feel they should have. And, of course, there are plenty of precedents by which this can be done. This is an element of the bill that creates problems for us and causes all of us representing state interests to express concern. It is not obligatory that that concern be as great as it is. That is, there are ways of resolving it by legislative history.

The other element that I do want to emphasize as a scientist is I think a great deal of the reason that we don't place emphasis as a group upon these marine sanctuaries is that there aren't many oxen being gored at the moment in that area. And I might say if this conference were meeting 25 years ago, we wouldn't be concerned about estuarine sanctuaries. I hope we won't let the fact we are not yet in trouble in the oceans let us assume we can back off from that. We need action now.

I used as an example that the State of Oregon was able to set aside all its beaches in state domain without much objection.

COMMENT: I think under the act to use a commonsense approach, you go to a state and ask them to have their governor approve the designation of an area, and then, upon acceptance by the state in going through the public hearing process that is required and so forth, have an area established as a marine sanctuary, and then, as is stated in the act, after the establishment, the Federal Government comes in and sets the regulations, conferring with other federal agencies and organizations.

I think the point of state concern is that we say, "Yes, we would like a sanctuary; we accept it," and then the regulations are established. After that, I think the two should be combined and the guidelines should set this forth, that at the time of designation the regulations also be subject to public hearings, both in one package for each particular area.

COMMENT: With regard to the establishment of marine sanctuaries again, my impression is that the impetus here is to look at these as research areas or areas for the preservation of ecological values. And just from the way the act is written, I don't see that those are the only reasons we need marine sanctuaries. For example, the value of establishing a critical marsh area that has been destroyed from a combination of natural and man-made forces could be designated as an area for the restoration of ecological values by whatever means you would have to use to restore it, and the establishment of a marine recreational sanctuary should be considered.

These other types of uses should be considered, I think, in the definition. I would hate to see a narrow definition be placed on what a marine sanctuary can be. One good reason for this is that if the marine sanctuaries can be used as a tool by managers, then the definition should be broad enough so we can include these kinds of things.

Now, I would like to see the question answered, as a result of this workshop, as to whether or not the act can be used as a tool by planners and managers. For example, if I have an area that should be

set aside as a sanctuary but I don't have a coastal zone management program and a plan set up and a program implemented, can I use that designation as maybe a five- or six-year holding action, and then, once my plan is done and once I can implement it, can I have the designation removed if I want to have it removed or modified? Is it a lasting thing? Can I use it this way? These are some of the kinds of things, as a water resource planner, that I would like the answers to in connection with really both of these acts, but specifically the marine sanctuaries act.

QUESTION: Are funds now available or expected this fiscal year under the Marine Sanctuaries Act?

RESPONSE (NOAA): There aren't any funds available now for the marine sanctuaries section. As you know, there is \$10 million a year authorized for that. But we do not have the monies at this time. We are not talking about large acquisitions in the marine area as contrasted with the estuarine areas. There would be some merit in having some study funds and operating funds, which we don't have.

COMMENT: The reason I asked was that in early discussion in the Land Use Work Group about estuarine sanctuaries, there was a discussion of what the scope of those things might be. And whereas we touched on potentially species, habitat, and research preserves, it was again brought out that those three categories by themselves, or inclusively really, can be the background for multiple use. The other uses would be compatible, both by function and by time. So using that approach, the question might be, from the standpoint of Michigan: Could they, without funds being available to NOAA, go to NOAA with a request that certain waters now in the State of Michigan be set aside as a sanctuary administratively, without management, just designated administratively?

RESPONSE (NOAA): The answer to that is yes. As a matter of fact, we are working on several proposals now, pretty much on that basis.

COMMENT: It seems to me that now all the land that necessarily should be set aside will have to be set aside under this act. About half of the states now have natural area laws on the books, Wisconsin being the first one, and Wisconsin now having 108 areas already set aside. Michigan also has a law, and so do Indiana, Ohio, and so on. These laws are available. Secondly, I would like to say the Federal Home and Housing Finance Act has put HEW into the land business, and through the open spaces provision, at least certain kinds of areas can be set aside near urban centers, some for educational purposes and some of the lands could be obtained through these means. If we investigate, there are a number of laws already on the books, the Wilderness Act, and many others. So I don't think everything has to necessarily go according to the Coastal Zone Management Act in having to purchase land. I think there are other means of acquisition, or you can do both.

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APPENDIX

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