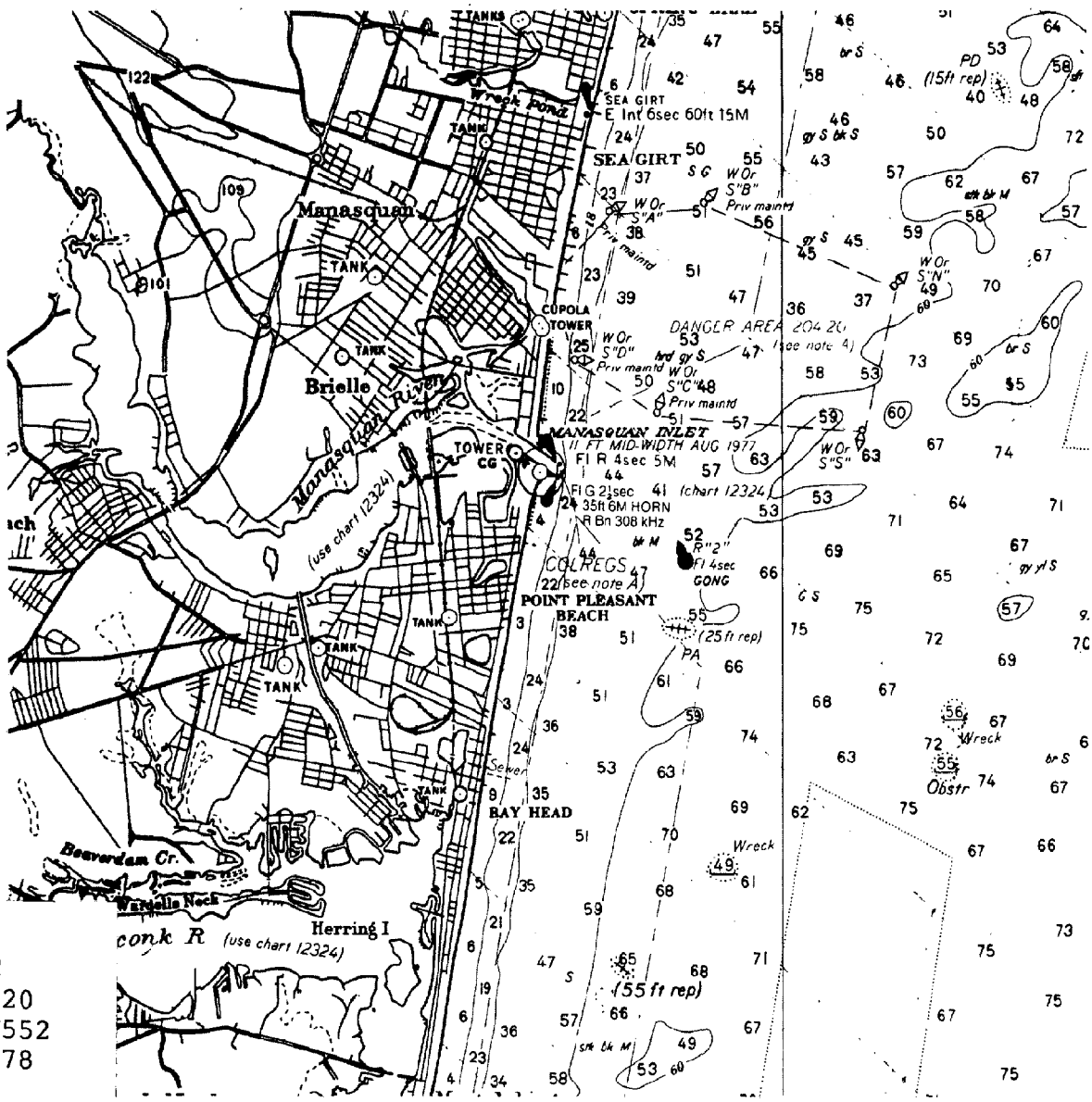
U.S. OCEAN POLICY IN THE 1970s: STATUS AND ISSUES

POLICY OVERVIEW

October 1978



U.S. DEPARTMENT OF COMMERCE

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Foreword and Acknowledgments

The ocean has played a major role in the growth of the United States—as a source of food, in the development of commerce, in the Nation's security, and as a recreational outlet. Today, in the Nation's quest to satisfy expanding needs for energy, minerals, space, food, and recreation, new demands are being placed on the ocean and coastal regions, many of which already are intensively developed. Problems relating to these demands are intensified by increasing concern about the present and future quality of the natural environment and the best use of resources—many no longer thought to be unlimited. These pressures for development are worldwide and are reflected in the continuing effort by the United Nations to reach agreement on an international law of the sea.

A decade has passed since the last systematic review of U.S. ocean policy by the Stratton Commission. During the interim, significant changes have taken place in societal values—in the equitable and best use of resources, in environmental law, in technological capabilities, and in the broadening of conflicting interests of use to an international scale. New laws have been enacted to give the Federal Government a measure of control over the use and protection of U.S. ocean and coastal resources, but many problems remain to be solved. If solutions are to be forthcoming, the Federal Government must exercise greater leadership in managing this trust on behalf of all the people.

In recognition of this situation, President Carter, in June 1977, requested the Secretary of Commerce to make a comprehensive review of U.S. ocean policy. This decision by the President was enthusiastically supported by a number of U.S. Senators and Congressmen. This report is the result of the President's request. It discusses current ocean policies in each major area of civilian ocean and coastal affairs, provides background information on the evolution of policies, describes and appraises the status of Federal ocean programs, identifies issues that need to be resolved, and reviews recommendations that have been made by various advisory commissions, councils, and other groups, including legislative proposals where appropriate. The report does not offer recommendations. It is a reference document for study and review of domestic ocean policy, and is intended to provide the background and impetus for discussion and debate of outstanding ocean policy issues. A separate appendix includes a compilation of the statutes and executive orders that form the framework of U.S. ocean policy.

Preparation of this report was coordinated under the general direction of the Secretary of Commerce, Juanita Kreps, within the Office of the Assistant Secretary for Policy, Jerry J. Jasinowski, under the supervision and guidance of James W. Curlin, Deputy Assistant Secretary for Ocean, Resource and Scientific Policy Coordination. The study was compiled in consultation with Richard A. Frank, Administrator of the National Oceanic and Atmospheric Administration, and Robert J. Blackwell, Assistant Secretary for Maritime Affairs. Although the Department of Commerce had major responsibility for compiling the report, major contributions were made by the Department of the Interior, Department of Transportation (U.S. Coast Guard), and the National Advisory Committee on Oceans and Atmosphere (NACOA). Over 100 persons were involved. Comments were offered by a wide range of reviewers in the academic and private sectors, at State and Federal levels of government, and from the Congress.

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Overview

Introduction

The study that is highlighted in this summary, *U.S. Ocean Policy in the 1970s: Status and Issues,* is the result of the first extensive review of national ocean affairs since 1969. This review was requested by President Carter with the encouragement and support of leading U.S. Senators and Representatives. The review is to serve as a reference for further discussion of national ocean policy and as a focal point for future debates on critical ocean policy issues. In directing the Secretary of Commerce to undertake this study, the President specified that it was to be comprehensive in its treatment of major elements of U.S. ocean policy and objective in its identification and discussion of issues.

Accordingly, the contents of this study consider the Nation's overall stake in its ocean and coastal resources and review the status of the six major elements of U.S. ocean policy: marine fisheries; coastal resources; the marine environment; marine science and technology; marine transportation; and marine employment, education, and training. The study also considers the organizational structure that is employed by the Federal Government in carrying out the national ocean effort.

The study concentrates on today's ocean and coastal policies and on tomorrow's problems and issues. Particular attention is paid to the many important changes that have been made over the past decade in this Nation's laws and policies concerning the use and preservation of ocean and coastal resources. Each chapter also highlights the principal Federal organizations and programs that are engaged in carrying out the national ocean effort.

Importance of Ocean and Coastal Resources to the United States

An awareness of the size and importance of the ocean and coastal resources available to the United States is central to the consideration of possible new directions in national ocean policy. Although the ocean has always had a great influence on American life and culture, today's national interest in our ocean resources is much different than it has been in the past. The difference can be attributed in part to our increased knowledge about the characteristics, composition, and condition of ocean resources and in part to a number of major changes in national needs and priorities.

The ocean and coastal resources of the United States include: 545,000 square nautical miles of open ocean over which the United States has absolute jurisdiction; another 1,500,000 square nautical miles of ocean over which the United States has partial jurisdiction; approximately 101,000 linear miles of coastline; more than 26,000 islands; and uncounted bays, estuaries, tidelands, and wetlands. The vastness of these resources is illustrated by the fact that, together, the 50 State governments and the Federal Government control an ocean area which is nearly three times larger than all of the publicly owned land in the United States. It is also important to note that almost no ocean resources are privately owned. Instead, these resources are held and managed in trust for all the people by various units of government. This "common property" characteristic of ocean resources increases the importance of public policy in managing our Nation's ocean affairs, and dominates what may be termed the "national interest" in ocean and coastal resources.

Today's national interest in the ocean is actually a complex mixture of three different interests: the traditional strategic value of ocean resources; their contemporary economic value; and their long-term intrinsic and esthetic value. Although the relative priorities of these three interests have waxed and waned over the past decade, the Nation's overall stake in its ocean and coastal resources has grown and is now greater than ever before.

Until the end of World War II, the strategic importance of the ocean controlled our national policy. The seas have always provided this Nation with a natural barrier against military invasion, and seapower was the predominant aim of Federal ocean interests for many decades. To some extent, the ocean continues to fulfill this function today, and U.S. naval power still depends on advances in ocean science and technology.

Another traditional strategic use of the oceans has been for transportation and trade. Although ships

are no longer the principal means of transporting people from coast to coast or from country to country, the United States is still highly dependent on waterborne transportation for the movement of trade goods. In fact, almost all of the Nation's commerce with international trading partners moves over sea lanes and through port facilities—more than $145 billion worth in 1976.

A third strategic concern arises from the importance which ocean issues have assumed in the international arena over the past decade. During this time over 100 nations have met repeatedly, under the auspices of the United Nations, to seek international agreement on a new "Law of the Sea." There have been many issues raised in this arena: the creation of economic resource zones, passage of vessels through straits, access to deep seabed mineral resources, and access to coastal waters for scientific research purposes, to name only a few. All of these have strategic significance to one nation or another and, therefore, to the United States. Accordingly, the strategic value of the ocean is still a major component of the national ocean interest, although its relative importance may have diminished somewhat in recent years.

At the forefront of today's national interest in ocean and coastal resources is a second concern: their economic value. The energy crisis of the 1970s has focused attention on the oil and natural gas resources of the seabed. It has been estimated that two-thirds of the recoverable reserves of oil and natural gas in the United States lie under the Outer Continental Shelf and the coastal margins of Alaska. At 1978 market prices, these resources would be worth almost a trillion dollars. American coastal waters and estuaries also support the most productive fisheries in the world, yielding almost one-fifth of the world's harvestable supply. Commercial fishing contributes nearly $4 billion a year to the economy in terms of processed fish at wholesale prices, and employs over a quarter of a million people on a seasonal basis.

The future economic outlook for ocean use is good. More than 10 billion tons of nodules containing nickel, cobalt, copper, and manganese may lie on the floor of the deep seabed. Closer to shore, large quantities of valuable sand, gravel, shells, phosphorite, and even coal may prove to be of importance. Seawater itself may become an important source of energy in the future, either through the development of fusion technology or through conversion of the heat that the ocean stores in great quantities. Because of this economic potential, commercial uses of ocean and coastal resources are likely to stay high on the priority list in terms of the overall national ocean interest for the foreseeable future.

Basic intrinsic and esthetic values are the third major component of national interest in ocean and coastal resources. The intrinsic value of the world's ocean should not be underestimated. The climates of the world are largely determined by oceanic and atmospheric currents that transport heat. Ocean waters also are instrumental in controlling gas exchanges that maintain the balances of oxygen and carbon dioxide in the atmosphere. Esthetic goals, such as protection of the marine environment and preservation of natural resources, have become increasingly important in the past decade. Further, these goals have become important not only to the enjoyment of the Nation's ocean and coastal riches, but also to the preservation of their economic value. Our ocean and coastal regions have also become a mecca for recreation in recent years, and over 40 percent of the U.S. population resides in coastal counties. As the population continues to increase, and as the trend toward more leisure time continues, it is expected that the intrinsic and esthetic worth of the ocean will grow in terms of its importance in the overall national interest.

U.S. Ocean Policy Today: Status and Trends

National interests in the ocean, as reflected in Federal civilian ocean policy in the United States today, encompass five interrelated goals:

- Development of ocean and coastal resources,
- Protection and preservation of ocean and coastal resources,
- Management of ocean and coastal resource use,
- Provision of services to ocean users, and
- Advancement of marine science and technology.

To a large extent, the goals apply equally to both the domestic and the international ocean policies of the United States. Although national security goals are beyond the scope of this policy discussion, they are likely to play a major role in determining international ocean policy, but not domestic ocean policy at this time.

National policies for ocean and coastal resource development seek to ensure that the United States makes full economic and social use of its ocean-related wealth. Resource development has long been an aim of national ocean policy, and in the post-Sputnik decade of the 1960s, this goal shared top priority with the goal of advancing marine science and technology. In fact, during that era, the prevailing philosophy was that massive new Federal investments in marine science and technology were needed to stimulate development of the oceans' economic potential. Today we recognize that the opposite is true. Where there has been significant economic

potential, such as in the recovery of offshore oil and gas, the necessary scientific and technological advances have been forthcoming. Accordingly, today's Federal ocean resource development policies emphasize private industry's role in assuming many, if not most, of the financial and technological risks associated with resource recovery and use.

However, it has also been Federal policy to encourage and, in selected instances, to assist private industry in the development of ocean and coastal resources. Major forms of Federal assistance for resource development include making available for private development or use ocean and coastal resources that are Federally controlled, and providing financial assistance in the context of the Government's overall economic development goals. Major, specific policies of this type at the current time provide for: (1) accelerated leasing of Federally owned Outer Continental Shelf areas thought to contain oil and natural gas; (2) designating or purchasing coastal parklands, beaches, and other areas for recreational use—often stimulating local economic development and contributing to resource protection and preservation objectives; (3) making available to State and local governments grants, loans, and loan guarantees for economic development in coastal areas, particularly areas that are economically depressed and areas that are affected by offshore energy development; (4) subsidizing the construction and operation of U.S. merchant vessels, which not only has strategic benefit but also helps to maintain healthy levels of local employment; (5) assisting the fishing industry in constructing, equipping, and renovating vessels and in developing new uses and markets for fishery products. In the near future, the Congress is expected to adopt a new policy that will provide U.S. industry with legal protection for the recovery and processing of deep seabed hard minerals. Additional information on the current objectives and Federal Programs involved in carrying out these development policies is contained in the individual chapter summaries that follow this overview.

Policies aimed at comprehensive protection and preservation of ocean and coastal resources are relative newcomers to the field of ocean affairs as a whole. However, from the mid-1960s to the mid-1970s, protection and preservation goals dominated new national ocean policy initiatives. During this period, new laws and policies were adopted by the Congress at a rapid rate so that, today, the Federal Government has available a large arsenal of protection and preservation tools. The reasons for the increased emphasis on protection and preservation are clear: a general trend toward environmental protection in all areas, the continued dredging and filling of coastal wetland areas for developmental purposes, the promise of continued economic development pressures in the coastal region, the increase in oceanborne shipments of oil and other hazardous materials, and the availability of better scientific information demonstrating the ecological frailty of the oceanic and coastal environment.

Today's policies continue to stress the need for adequate marine environmental protection and ocean and coastal resource preservation. At the same time, protection and preservation no longer enjoy the overriding priority they once had. The energy crisis, general economic conditions, and, to some extent, the success of environmental rules and regulations now in force have combined to restore a balance between development goals and protection goals in the overall scheme of national ocean policy priorities.

Major protection and preservation policies now being pursued by the Federal Government include: (1) restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters as a whole; (2) eliminating the discharge or dumping of materials into the ocean that adversely affect human health, the marine environment, or the oceans' economic potential; (3) protecting U.S. navigable waters and their resources from pollution caused by the discharge of oil from ships or by vessel accidents; (4) preserving, protecting, and, where possible, restoring the resources of the coastal zone; and (5) preserving fishery habitat and protecting endangered marine species and marine mammals. The primary tool used by the Federal Government in achieving these protection and preservation goals is the regulatory process, which involves scientific research and monitoring, legal activities, and enforcement efforts. However, other forms of inducement are also applied, including the provision of financial assistance in the construction of sewage treatment facilities and the purchase of coastal land areas for parks and sanctuaries.

The continuing need to strike a balance between resource development goals and resource protection goals has given rise to a new type of Federal ocean policy over the past few years: management of ocean and coastal resource use. Few examples of this type of policy exist as yet, and clear operating objectives and philosophies have not been articulated for ocean management as a whole. However, the underlying aim is to develop a system or process that will provide a comprehensive and consistent way of resolving potential conflicts over ocean resource use. Such a system is necessitated by the common property nature of ocean resources, by the large impact that

development at sea has on coastal land areas, by the split jurisdiction over ocean territory, and by the increasing number of ocean areas that are being subjected to multiple uses and possible conflicts (such as certain areas off the East Coast that are used simultaneously for commercial and recreational fishing, commercial shipping, recreational boating, ocean dumping, oil drilling, and other activities).

Major ocean and coastal resource management policies now in effect provide for: (1) carrying out a comprehensive program of fishery conservation and management in the 3- to 200-mile zone; (2) encouraging and assisting coastal States and territories in the planning and implementation of programs for coastal zone management; and (3) designating selected ocean and coastal areas as Federal marine sanctuaries, and restricting the types of activities that may occur in these areas. Although the future extent and direction of Federal policies for ocean resource use management remains to be resolved, some of the techniques that may be applied are: the harmonization of regulations, the development of improved and more comprehensive resource use planning, the provision of better scientific information needed for management, and the use of financial incentives.

One of the earliest thrusts of ocean policy in the United States was the provision of services to ocean users. This aspect of ocean use remains an important part of today's ocean policy, at least in terms of the number and size of Federal activities devoted to it. The main policy goals in this area are to improve navigability of the Nation's marine waterways and ensure the safety and efficiency of marine operations. The Federal Government has had programs aimed at harbor expansion, channel improvement, and port access enlargement since 1824. The Federal role in this policy area includes the construction of waterways and facilities as well as the provision of assistance to private sector interests. Federal efforts to ensure marine safety and efficiency include the provision of aids to navigation, the conduct of search and rescue operations, the publication of coastal maps and nautical charts, and the provision of marine weather services.

Over the years, Federal policy has been to provide these services largely free of charge. This has been deemed an appropriate Government function, because the services are needed by many users for a wide variety of purposes, and because the cost and effort involved in providing them are more than any individual or user group could afford. Generally, these Government services have been expanded or contracted in accordance with demand. They have been regarded as an uncontroversial element of overall ocean policy.

Marine science and technology developed in the 1920s, matured during World War II, and rose to prominence (as discussed earlier) in the 1960s. At its zenith, marine science and technology was nearly synonymous with the term "ocean policy." The lack of adequate scientific knowledge and lack of technological capability were viewed as the principal barriers to realization of the oceans' vast economic and social potential. Over the past decade, however, major changes have been made in other elements of national ocean policy that have profoundly affected marine science and technology. The dominant view today is that marine science and technology constitute important tools that are best used in the achievement of other ocean policy goals and objectives.

Accordingly, the Federal Government today has no overall policy toward marine science and technology. Although scientific and technological activities are common elements of nearly all Federal ocean endeavors, no overall policy has been established to define a Federal role in marine R&D or to guide Federal support for it. Instead, individual goals and strategies are pursued by a wide range of different Federal agencies, academic institutions, and industries. This situation notwithstanding, the overall level of Federal financial investment in marine science and technology has remained firm over the past decade, an indication of its continuing importance.

Major Ocean Policy Issues

The full study identifies numerous U.S. ocean policy goals and objectives, and also brings out several dozen specific, unresolved issues of consequence to the individual elements of Federal ocean affairs. These issues are highlighted in the chapter summaries that follow this overview. At the same time, there are a number of key policy issues that cut across the boundaries of several different elements. These issues will be harder to resolve and are of greater importance.

One such issue concerns the need for an overall national ocean policy framework that can be used for the effective long-term management of ocean and coastal resources under U.S. jurisdiction. There has been some question as to whether a policy framework that chooses the ocean as its basic integrating theme is necessary, or even desirable. National energy policy, it is argued, should be sufficient to govern the recovery of offshore oil and gas, and overall environmental policies should be applied to ocean and coastal areas as well as inland areas. This has been

the approach used in the past. The problem is that it is a piecemeal approach that may not recognize adequately the unique characteristics of ocean and coastal resources and the special nature of the Government's responsibility as trustee of a vast "common property" resource. Increasing congestion in offshore areas has already intensified the competition for space and other resources. Activities in U.S. ocean space affect other countries as well. Accordingly, many have felt the need for a policy framework that will balance ocean use with environmental protection and ocean and coastal resource development with resource conservation. At the center of this issue is the matter of whether a set of laws, principles, strategies and programs can be formulated and implemented that will provide a comprehensive and consistent approach to the management of ocean and coastal resources without unduly hampering the achievement of other goals of major importance to the Nation.

Another issue of overriding importance concerns the extent to which the United States will exercise jurisdiction over ocean and seabed resources. This issue has been a subject of intense international debate at the U.N. Law of the Sea Conference in recent years. The United States has already extended its jurisdiction over fishery resources seaward to a distance of 200 miles, and other nations have adopted this limit for all resources. The question is whether the United States should also consider extending its jurisdiction over resources other than fisheries in this 200-mile zone.

A third issue of major importance is the need for a national policy toward the development of ocean and coastal resources. The United States unquestionably depends upon its ocean and coastal resources for continued economic growth and stability. However, the United States today lacks a policy deliberately providing for the maximum development of those resources, consistent with sound principles of conservation and management. Again, the Nation's approach is ad hoc and fragmented. The question is whether a larger Federal role is needed to stimulate the development of ocean and coastal resources and, if so, what that role should be in relation to private industry and State and local governments. A related question is how a vigorous policy for ocean resource development will affect the achievement of environmental and other social goals.

A final key issue concerns the development of an appropriate Federal organizational structure for effectively discharging national ocean policy responsibilities. Numerous proposals have been advanced over the past decade for strengthening the Government's institutional capability to implement and coordinate ocean-related activities. The Administration now is actively considering several additional proposals. The question is whether ocean-related activities constitute the best, or even a good, central theme around which to structure an organization, or whether there are other overriding missions or goals which should dictate organizational arrangements.

Conclusions

The importance of ocean resources to the United States has increased markedly since the last comprehensive review of national ocean policy was made in 1969. During this same period, there have been major changes in emphasis between the various elements of U.S. ocean policy, and the number of critical ocean policy issues has grown rather than diminished. Leadership during these years has been exercised largely by the Congress through the enactment of new laws and the authorization of new programs. Many issues have received inadequate attention in this period and some are now beginning to reach the critical stage. The future ability of the United States to develop and use its ocean and coastal resources may well hinge on the prompt resolution of several of the critical issues identified in this study. Whether or not that proves to be the case, the study will have served its purpose if it stimulates and focuses further debate over ocean policy issues in the coming months and years.

Marine Fisheries

1. Background

When compared with many other countries, the United States is a relatively minor fishing Nation. In 1976, for example, the United States was the world's sixth-ranked fishing nation, but accounted for only 4 percent of total world landings. Per capita consumption of fish in the United States is small compared to consumption in other countries and to consumption of beef and poultry. Total value added to the U.S. economy annually by fishing activities is less than 1 percent of the Gross National Product.

In spite of this situation, marine fisheries resources are of enormous importance in Federal ocean policy affairs. Because as much as one-fifth of the world's harvestable supply of fish may be found off U.S. coasts, there is major international concern over U.S. fishery conservation and management policies. Within the United States, fishing is more important to some regions than the national picture indicates. In Alaska, New England, Maryland, Virginia, Texas and Washington, for example, many counties rely on the fishing industry for income and employment. In these areas fishing is a traditional way of life which is pursued by independent individuals. In fact, 90 percent of all U.S. fishing vessels are independently operated and employ fewer than five people.

Some background information on the U.S. fishing industry, U.S. consumption of fishery products, and the nature of U.S. fishery resources is essential to an understanding of current Federal fisheries policies and related issues. The fishing industry consists of four interrelated activities: harvesting, processing, transporting, and distributing/marketing. The annual harvest of about 2.1 million metric tons has remained stable in recent years. The dockside value of 1977 landings was approximately $1.5 billion. About 161,400 people work in the harvesting sector of the industry.

The processing sector employs some 92,000 people each year. In 1976, 1,668 plants in the U.S. processed freshwater and marine fishery products and another 1,992 plants were engaged in wholesale distribution. Unlike the harvesting sector, several large firms dominate the processing portion of the industry. The total value of processed edible and industrial fishery products was about $3.9 billion in 1977.

The U.S. per capita consumption of fish in 1975 was 15.1 pounds, nearly 2 pounds higher than it was 20 years ago, but still much less than the annual per capita consumption of beef (158.1 pounds) and poultry (49.3 pounds). The demand for fish, however, is growing. While the U.S. population has increased by about 1 percent a year, fish consumption has increased about 3 percent a year. Expenditures on fish, as a percentage of the food budget, increased from 2.5 percent in 1960 to 4.9 percent in 1974. In addition, the U.S. consumes a disproportionate share of the world's supply of relatively expensive species of fish, including 91 percent of world lobster landings, 46 percent of world scallop landings, 45 percent of clam landings, 41 percent of tuna landings, and 27 percent of world salmon and shrimp landings. U.S. landings account for only 39 percent of the total supply of edible fish products available in American markets; imports account for 61 percent. In large part, this is due to the fact that many of the edible species U.S. consumers find desirable cannot be harvested in U.S. waters.

At the same time, many species of fish desired by foreign nations live in U.S. waters. Throughout the 1960s, foreign fishing in U.S. waters increased, reaching a high point of 3.5 million metric tons in 1971. Japan, the U.S.S.R., the Republic of Korea, Poland, and Canada all conducted intense fishing operations off the U.S. coast during that time. Since 1971, foreign catches have declined in the U.S. zone. Under a law enacted in 1976 the U.S. now controls all fishing within 200 miles.

Many estimates indicate, however, that damage has been done to these fishery resources over the past 20 years through overfishing, marine pollution, loss of habitat, and other factors. Major commercial species of Atlantic groundfish (such as cod, flounder, haddock, hake, and ocean perch) have been depleted. Pacific stocks of Alaska pollock, yellowfin sole, and yellowtail flounder are similarly depleted. The American lobster is seriously overfished. Oyster landings have steadily declined. Twenty-five percent of the clam flats in the two leading hard clam producing States are closed because of pollution. All Pacific salmon stocks are heavily fished and some are depleted. Habitat degradation has been a major cause of the decline in Pacific Coast salmon runs.

Recreational fishing is economically healthy, but has caused a decline in certain fish stocks. It is estimated that 207 million days were spent in saltwater recreational fishing in 1975. Thus, this effort results in a $3.4 billion annual industry, but it also removes about the same number of fish from the sea as the commercial industry.

2. Current Status of U.S. Marine Fisheries Policy

Today's fisheries policy is an amalgam of many approaches, both old and new, aimed at dealing with the complexities of declining fisheries resources, a fragmented industry, growing consumption, growing imports, increased pressure from foreign fleets, and increased competition from recreational fishing. Federal fisheries policy is in a state of transition, and is likely to remain so for a number of years. The enactment in 1976 of the Fishery Conservation and Management Act, more commonly called the 200-mile law, has contributed further to the complex situation.

This landmark act established, for the first time, a comprehensive system for managing fisheries in a conservation zone that extends seaward from 3 to 200 nautical miles. This act extended the legal jurisdic-

tion of the United States from an area of about 545,000 square nautical miles to an area of over 2,000,000 square nautical miles. One major aim of the legislation was to curb foreign fishing off U.S. coasts, but the Act's management controls apply equally to domestic fishing. The policy brought into effect by the Act is to assure that fish are harvested responsibly in accordance with regionally developed plans. These are based on the best available scientific information and must meet specified national standards. A key goal is the attainment of what is termed the "optimum yield" of each fishery. Optimum yield is a concept which denotes the amount of fish that will provide the greatest overall benefit to the United States, including both food production and recreational opportunities. The concept not only takes into account the maximum harvest that will permit a species to sustain itself, but also includes consideration of any relevant economic, social, political, or ecological factors.

The Act limits foreign fishing in the U.S. 200-mile zone to that portion of the optimum yield which will not be harvested by U.S. vessels. Both the optimum yield and the amount to be made available for foreign fishing are determined by the eight Regional Fishery Management Councils established by the Act and approved by the Secretary of Commerce. The surplus is allocated among foreign nations by the Secretary of State, in cooperation with the Secretary of Commerce. Permits to fish are issued to individual vessels by the United States, and enforcement is the responsibility of the Coast Guard of the Department of Transportation and the National Marine Fisheries Service of the Department of Commerce. Domestic fisheries management rules are also drawn up by the Regional Fishery Management Councils, in the form of fisheries management plans, and promulgated by the Secretary of Commerce. For the most part, fisheries management plans are prepared on a species-by-species basis and cover a specified geographical area. Although the Regional Fisheries Management Councils are Federal entities, their membership is drawn primarily from nominations made by the Governors of the States in each geographic region of the country. Thus the Councils' membership is representative of all applicable fisheries interests, not just Federal interests.

Implementation of the Fishery Conservation and Management Act of 1976 is the dominant factor in U.S. marine fisheries policy at this time. Because the Act is relatively new, many policy adjustments represent the normal "fine tuning" associated with carrying out any major new law. Many more fundamental policy revisions may be needed as experience is gained with the new law and its full effects become clear. Thus, the United States can be described as entering a "new era" in fisheries policy in the late 1970s.

Federal fisheries policy now consists of three major components: fisheries research and information; fishery management and conservation; and development of fishery resources and the fishing industry. Principal policy efforts and ongoing Federal activities in each area are described in the following paragraphs.

a. Fisheries research and information

Since enactment of the 200-mile law, the primary goal of Federal fisheries research and information policy has been to ensure that adequate scientific data are made available for conservation and management purposes. Basic biological and ecological research pertaining to fisheries, however, has been a mainstay of Federal fisheries programs for many years. While much of this work is now being applied to fisheries management problems, other basic research and information programs are being conducted to

- gain knowledge about particular species of fish, their environment, and their sensitivity to environmental change,
- protect marine mammals and endangered marine species,
- resolve problems related to fish culture and husbandry, and
- improve harvesting and processing technology.

In all, nine Federal departments and agencies administer marine fisheries research and information programs, including the Departments of Commerce, Interior, Army (Corps of Engineers), Energy, Navy, and Agriculture; the Environmental Protection Agency; the National Science Foundation; and the National Aeronautics and Space Administration. The Federal Government's principal marine fisheries programs are administered by the National Marine Fisheries Service (NMFS), a part of the Department of Commerce's National Oceanic and Atmospheric Administration. NMFS is responsible for monitoring and assessing the composition, distribution, abundance, and availability of living marine resources, including threatened and endangered marine species and marine mammals. The data and information resulting from this program are used for various purposes, but their primary value is in implementing Federal fishery conservation and management measures. The work is carried out at seven regional centers and 17 associated laboratories, and involves numerous at-sea surveys by research vessels. Another De-

partment of Commerce effort, the National Sea Grant Program, supports university-based fisheries research in aquaculture, ecology, and basic biology.

Although the primary responsibility of the Department of the Interior is for freshwater species, the Fish and Wildlife Service operates several laboratories that perform basic biological research, conduct research on fish diseases, and operate a variety of programs related to anadromous species (species which spawn in freshwater but live in the sea as adults). Significant fishery research and information efforts administered by other agencies include:

- Marine ecological analyses, which are conducted by the Environmental Protection Agency as a means of protecting fishery resources and fishery habitats in the issuance of discharge permits.
- Assessments of the impact on fishereies of offshore oil and gas development, which are conducted by the Department of the Interior's Bureau of Land Management.
- Sponsorship by the National Science Foundation of basic research in marine and oceanographic affairs, including assessments of the impacts of ocean dumping on fish habitats.
- Research, by the Departments of Agriculture, Commerce, Interior, and others, to aid the development of aquaculture.
- Research and information related to the protection and preservation of threatened and endangered marine species, and all marine mammals, which are joint responsibilities of the Departments of the Interior and Commerce.

b. Fisheries management and conservation

The highest priority efforts being directed to marine fisheries by the Federal Government are in the area of management and conservation. This is a result of the enactment of the 200-mile law in 1976. The principal thrust of these efforts is to provide a comprehensive and scientifically sound system for managing fishery resources in the 3 to 200 mile zone. Coastal States continue to maintain nearly full authority over the 3-mile territorial sea.

Federal policy under the new Act is to permit as much U.S. fishing in the zone as is consistent with sound principles of conservation, and to permit foreign fishing for any portion of the total allowable catch which cannot be harvested by U.S. fishermen. Implementation of this policy by the Federal Government requires several types of programs and involves four agencies.

- The fishery planning and management program, is administered principally by the Department of Commerce. This program involves the development of information on the abundance and distribution of fishery resources, the computation of optimum yield, the determination of U.S. harvesting capacity, and the development and promulgation of fishery management plans specifying catch levels and seasons along with other conservation measures. The Department of Commerce provides much of the information needed to prepare the plans, reviews the plans for conformance to national standards, and promulgates the plans in the form of Federal regulations. Actual preparation of the plans is the responsibility of the eight Regional Fishery Management Councils established by the Act. The Department of Commerce also has established a Federal-State fishery management program to ensure that State management measures within the 3-mile territorial sea are consistent with each other and with measures adopted for the conservation zone.
- The international fisheries program, is administered principally by the Department of State. The international program involves negotiating international fishery agreements under the 200-mile law, negotiating special bilateral and multilateral fishing agreements with other countries, and allocating the total allowable level of foreign fishing in the U.S. zone among the countries wishing to fish there.
- The enforcement and surveillance program, is administered principally by the U.S. Coast Guard, and also by the Departments of Commerce and Justice. The main concern of Federal fisheries management enforcement efforts is the regulation and control of foreign fishing in the U.S. zone. Domestic fishing is less regulated and less strictly enforced. At-sea enforcement is carried out by the Coast Guard, with assistance from agents of the National Marine Fisheries Service. Shoreside enforcement is the responsibility of the Fisheries Service. Aerial and surface patrols—and dockside inspections of catches, records, and gear—are the primary enforcement tools used. The Department of Justice provides legal support for the enforcement program, prosecutes violators, and represents the United States in civil actions against seized fishing vessels.

Apart from implementation of the Fishery Conservation and Management Act, three other major programs are carried out to implement Federal fisheries management and conservation policies. These are: the endangered species program, the marine mammals protection program, and several habitat protec-

tion and restoration efforts. Under the Endangered Species Act, the Secretaries of Interior and Commerce identify, and take actions to protect, species whose numbers are severely diminished and whose populations are threatened or endangered. The Act applies to all species of threatened flora or fauna, including marine species. A similar statute, the Marine Mammal Protection Act of 1972, seeks to protect the dwindling numbers of seals, whales, porpoises, walruses, and other marine mammals. Responsibility for administering this program is also shared jointly by the Departments of Commerce and the Interior. Habitat protection programs are operated by several agencies including the Departments of Agriculture, Commerce, and Interior; the Environmental Protection Agency; and the U.S. Army Corps of Engineers. There is no comprehensive or cohesive policy. Various protection measures include regulation, Federal acquisition, and financial assistance in the restoration of damaged areas.

c. Development of fishery resources and the fishing industry

The development of fishery resources and the fishing industry is another area in which there are many programs and activities, but no clear, overall Federal policy. Among the functions in this area are:

- Assessments and exploratory fishing for species that are underused but which exist in commercially harvestable quantities in U.S. waters;
- Development of new or improved vessel and gear technologies and harvesting techniques;
- Improvement of product handling, processing, and storing techniques;
- Assistance in the distribution and marketing of fisheries products;
- Development of consumer education aids, product and quality safety standards, and inspection services; and
- Provision of financial assistance to the fishing industry.

Although all the functions are being carried out, the policies, goals, and objectives that govern their operations have not been integrated into a cohesive policy for providing Federal assistance to the fishing industry. Furthermore, the policies and programs have not been reviewed to determine what changes might be necessary or desirable since passage of the Fishery Conservation and Management Act in 1976. Consequently, Federal policy in this area is a patchwork of functions and programs that have evolved over the years on a case-by-case basis. The intent of this patchwork system, however, is to develop and maintain a healthy commercial fishing industry and to assure the quality of seafoods available to the U.S. consumer.

Federal programs to increase the harvest and consumption of underused species are conducted by the Commerce Department's National Oceanic and Atmospheric Administration. The effort consists primarily of resource surveys, although a prototype regional program in New England runs the gamut from resource identification through harvesting and processing to distribution and marketing assistance.

Development programs in vessel and gear technology, and harvesting techniques, also are carried out by the National Oceanic and Atmospheric Administration. Generally, these programs are carried out to assist other missions—to protect marine mammals or increase the harvest of a underused species—and not as programs of general assistance to the fishing industry. A major unresolved issue is the nature and extent of the Federal role in developing new technology as compared to the role of private industry.

Programs to improve handling, processing, and storing of fishery products are administered by the Department of Agriculture and by the National Oceanic and Atmospheric Administration. The Department of Agriculture develops and promulgates standards for handling, processing, and storing food products. The National Oceanic and Atmospheric Administration sponsors research in these areas to the extent that they pertain to fishery products, and the handling, processing, and storing of those products at sea.

Assistance in the distribution and marketing of fishery products is provided through the Departments of Commerce and Agriculture. Department of Commerce programs seek to work cooperatively with industry groups to identify and open up new markets for fisheries products, both at home and abroad. The Department of Agriculture's Cooperative Extension Service, and programs in Commerce, fund marketing research and analysis studies that assist the fishing industry by projecting important trends in consumption and utilization.

Consumer education and protection programs in the fisheries area are the responsibility of three Departments: Agriculture, Commerce, and Health, Education, and Welfare. The Department of Agriculture's Extension Service provides information to the consumer on the availability, best uses, and nutritional value of fisheries products. The Department of Commerce operates a voluntary seafood inspection and grading program, but it covers only about 30 percent of U.S. production and about 5 percent of U.S. processing facilities. The main responsibility for consumer protection is in the Department of Health,

Education, and Welfare's Food and Drug Administration, (FDA). Under the Food, Drug, and Cosmetic Act, FDA must assure that a high standard is maintained for the sanitary quality, safety, and wholesomeness of fish, shellfish, and related products that are shipped in interstate commerce.

The Departments of Commerce and Agriculture provide direct financial aid and incentives to the fishing industry, and several other agencies (such as the Small Business Administration and the Department of Housing and Urban Development) operate programs that are or can be made available to fishing concerns as part of their broader purposes. Federal financial assistance in this area can be used for a wide variety of purposes, including the construction, purchase, or renovation of vessels, and the construction of private or public onshore facilities. The Department of Commerce is authorized to provide direct loans, guaranteed loans, and tax deferrals to the fishing industry through its National Oceanic and Atmospheric Administration. Through its Economic Development Administration, the Department of Commerce also has available a loan program that can be used to develop onshore facilities. Loans for vessels and facilities also can be made by the Department of Agriculture through its Farmer's Home Administration and Farm Credit System.

3. Results of U.S. Fisheries Policy and Current Fisheries Issues

Because current Federal fisheries policy is dominated by the 200-mile law and the complexities involved in administering that law, the results of current policy are difficult to assess. U.S. fisheries policy is in a state of transition. Both this state of transition and the passage of the 200-mile law can be attributed to the Nation's former laissez-faire fisheries policies. Since the new approach the U.S. has adopted is only about a year old, it is still too early to determine what its long-range effects will be. After the first year of operating under the 200-mile zone, there were signs of progress.

- The 1977 foreign catch was about 1 million metric tons less than the 1976 foreign catch, and approximately half that of the peak year.
- The monthly average of foreign fishing vessels off U.S. coasts declined by about one-third.
- Domestic catches of several species that were in decline (such as cod, haddock, and jack mackerel) began to show encouraging increases in 1977.
- Private investment in new fishing vessels and gear increased at a rapid rate following enactment of the 200-mile law, indicating a new business confidence in the U.S. fishing industry.

Other indicators of possible policy impact have not changed dramatically. The overall size of domestic fish catches remains at about the same size (25 million metric tons) as it has been for several years. Increases in U.S. fish consumption continue to exceed increases in domestic landings, further aggravating an existing imbalance in trade in fisheries products. Also, the 1977 consumer price index for fish increased 10.4 percent over 1976, while the price index for meat remained essentially unchanged and the price index for poultry declined 4.2 percent.

While the passage of the Fishery Conservation and Management Act represented a major change in U.S. policy, it did not resolve many of the Nation's fishery policy issues. Issues that need to be faced by Federal policymakers over the next few years are described in the following paragraphs.

- *The need for new or revised fishery conservation and management policies so that the full intent and benefits of the Fishery Conservation and Management Act can be realized.*

Although overall policy goals and intentions are set forth in the Act, some issues have not been resolved and new problems have evolved in the course of implementing the new law.

(1) The adequacy of long-range policy toward foreign access to U.S. fisheries stocks, the management of transnational fisheries stocks, and the overall administration and enforcement of the Act.

Passage of the 200-mile bill, coupled with a high foreign dependence on U.S. fisheries stocks in certain instances, have raised complex, technical issues related to foreign access. These include questions regarding joint ventures between U.S. and foreign companies in the areas of fish harvesting and processing; the treatment of "neighboring" fishermen (from Canada, for instance) desiring access to U.S. fishing waters on a reciprocal basis; and the status to be accorded to fisheries stocks harvested by U.S. fishermen and sold to foreign processing vessels at sea. At stake here are questions involving restrictions on foreign investment in the United States, evasion of foreign fishing quota restrictions, the success of efforts to build up the U.S. fish processing industry, and the treatment to be accorded to U.S. fishermen who fish in foreign waters.

The management of transnational fisheries stocks is another matter of important policy concern. Valuable fisheries stocks such as salmon, cod, and flounder frequently migrate beyond U.S. borders. Con-

sistent management approaches and procedures are needed to safeguard the health of the resource and to ensure equitable treatment for U.S. and foreign fishermen off each others' shores. For example, there are disputes between the United States and Canada over salmon fishing regulations, international boundaries, and Atlantic groundfish management procedures. These must be resolved. Not only is a long tradition of good will and cooperation at stake, but also the status of critical fishery resources and the livelihoods of many fishermen in both nations.

Technical questions regarding the administration and enforcement of the Act also exist. These have potentially significant policy implications. They include the manner in which optimum yield is determined, the basis for estimating the harvesting capacity of the U.S. fishing fleet, the extent to which U.S. observers will be placed on foreign fishing vessels, the need to adopt limited entry principles for domestic fishing, the charges to be levied against foreign vessels in the future for the privilege of fishing in U.S. waters, and the levels of enforcement to be mounted by the Government in the 200-mile zone. At stake here are such important matters as the extent to which foreign governments continue to cooperate with the U.S. in implementing a fishing conservation and management program, the extent to which economic retaliation against the U.S. is sought by foreign governments in other fields of international trade and relations, and the economic health of the U.S. fishing industry.

(2) The adequacy and impact of alternative Federal policies and mechanisms for the management of marine recreational fishing.

Recreational fishing in the United States today accounts for almost as much fish catch as commercial fishing. Conflicts between commercial and recreational fishermen over certain species exist in some areas, and more conflicts are inevitable if the growth trend in recreational fishing continues. Under the 200-mile law, the Federal Government is responsible for management of the recreational effort as well as the commercial effort. As a practical matter, however, first priority has been placed on commercial fishing because of its importance. Recreational fishing also is less susceptible to management because of its unpredictability and its diffuse nature. Furthermore, marine recreational fishing has, traditionally, not been regulated or restricted in any way by either the States or the Federal Government. Hence, resistance to strong management controls can be expected. The Federal Government and the Regional Fishery Management Councils will need to address the matter of recreational fishing policy in the near future to avoid resource depletion and conflicts with commercial interests.

(3) The relative roles of Federal, State, and local governments in the management of fishery resources in the future.

The principal issue in this area is one of consistency and the Federal role in ensuring that consistency is achieved. An effective overall fisheries management program for the United States requires that State management programs for fisheries resources within the 3-mile territorial sea be consistent and compatible, both with each other and with Federal management programs in the 3 to 200 mile zone. Since fisheries management in the 3-mile territorial sea is a responsibility of the States, the Federal role must be limited. The issue remains, however, of exactly what the Federal role should be in development of: (a) mechanisms for joint Federal-State management of common fishery resources; and (b) mechanisms for interstate management of shared fish stocks in the territorial sea.

- *The adequacy of current Federal policy toward the development of fishery resources and the fish industry, and the need for new approaches.*

There is no overall Federal policy regarding the promotion and development of fishery resources and the fish industry. In part, this is due to the patchwork nature of existing Federal approaches, and in part to the nature of the industry. The common property character of fishery resources, and the large number of small or individual operators that characterize the fishing industry, have made it difficult to develop a comprehensive assistance policy that meets the wide variety of needs and conditions which exist. With the advent of comprehensive fisheries management, it is becoming more important to develop a Federal policy in this area. It is expected that comprehensive management may eventually lead to significant changes in the structure of the industry, brought about by availability of additional resources and imposition of restrictions that did not previously exist. It also is expected that significant economic opportunities for the U.S. fishing industry may go unnoticed or may be bypassed in the absence of Federal assistance. What appears to be needed to many observers is an integrated fisheries policy that couples resource allocation and management decisions with decisions regarding investment in vessels, equipment, processing plants, marketing, and distribution. The following specific issues will need to be resolved in the development of an overall Federal policy:

- The appropriate Federal role in promoting and marketing fishery products, both at home and

abroad, and in ensuring the quality and safety of fishery products available to the consumer.

- The appropriate Federal role in the promotion and development of marine recreational fishing and the recreational fishing industry.
- The appropriate Federal role in increasing the supply of fishery products—through aquaculture, fish ranching, the development of underutilized species, and other means.

There are two definite sides to each of these issues. One side takes the position that promotion and development activities should be predominantly the responsibility of the industry. The other side holds the view that Federal assistance is necessary and justifiable to ensure the success of the management program and to preserve the economic health of a traditional industry.

- *The need for a new or improved Federal approach to fisheries research and the provision of data and information needed for fisheries management.*

In the past, Federally supported fisheries research has been extensive, but has concentrated on developing basic biological information about individual species. A 1973 survey identified nearly 1,500 fishery-related research projects in eight departments and agencies, not including research conducted by States and universities. Despite this effort, the data base is not sufficient for today's management needs, owing to the inadequacy of stock assessment research and to the absence of reliable socioeconomic data on elements vital to fisheries management. At stake are the adequacy of catch quotas, foreign allocations, and other management measures embodied in Federal regulations. The issue is the adequacy of the size and purpose of the current Federal role in obtaining the data and information needed for management, the need for changes in that role, and the cost-effectiveness of alternatives.

4. Conclusions

The United States has recently entered what has accurately been termed a "new era" in fisheries policy. Many traditional policies, concepts, and approaches were radically altered with the establishment of the 200-mile zone and the creation of a management system. Over the past 2 years, Federal fisheries policy and administrative machinery has been geared almost solely to making the adjustments necessary to implement the new law. As a result, policy revisions have not been made in related areas and fisheries policy issues have proliferated. Over the next few years, significant efforts to develop and implement a comprehensive and consistent set of new fisheries policies, based on the foundation of the new management regime, need to be made. At stake is the future of an important national resource and the economic viability of the U.S. fishing industry.

Coastal Resources

1. Background

The coastal region of the United States includes over 100,000 miles of shoreline, a band of land several miles wide behind that shoreline, the waters of the Great Lakes, ocean waters within the 3-mile Territorial Sea, and the seabed which underlies those waters. Within this region are bays and estuaries, tidal freshwater rivers, tidelands, wetlands, islands, dunes, and coral reefs, and some of the Nation's most useful and productive resources. The region serves as:

- The place of residence of more than 40 percent of the population,
- The workplace of over 40 percent of the U.S. work force,
- A nursery area for most of the Nation's important commercial and recreational species of fish,
- A recreational area for tens of millions of people each year,
- A repository of oil, gas, and other commercially important minerals, and
- The nucleus of the Nation's marine transportation system.

At the same time, intensive use of the coastal zone has subjected its valuable resources to more environmental stresses than most other ocean or land-based resources. Among the activities contributing to these stresses are dredging and filling of wetlands, dumping of wastes in biologically productive areas, contamination of estuaries, destruction of dunes, and construction of residential and commercial facilities. To these manmade stresses must be added those of nature—erosion, floods, hurricanes, earthquakes, seismic sea waves, and other phenomena. As a consequence, the Nation's coastal resources not only are among our most valuable, but also our most fragile.

Coastal resources differ from other marine resources in several respects. First, both their landward and seaward dimensions must be fully considered in

providing for their use and protection. Second, many coastal resources are subject to private ownership, whereas ocean resources are totally in the public domain. Third, coastal resources are local in nature, whereas other ocean resources tend to be national, or even international, in character.

These differences have weighed heavily in shaping public policy in regard to the use and protection of coastal resources. Throughout our history, decisions regarding the permissible uses of coastal areas have been largely matters of local concern and local responsibility. Only during the past decade has there been a broader public awareness of overriding national interest in the use of U.S. coastal resources. And only during this same decade has the Federal Government begun to take an active part in the development of comprehensive coastal management policies.

2. Current Status of U.S. Coastal Policy

Most policies regarding the use of U.S. coastal resources are still made at local levels, with occasional involvement by State governments. Federal policies have been developed to deal, however, with four broad aspects of coastal resource use.

- Encouragement or provision of adequate coastal development when national interests are at stake.
- Preservation of selected coastal resources.
- Protection of environmental quality in coastal areas.
- Development of processes by which States and localities can plan and manage the use of their coastal resources.

The chronological development of this multifaceted Federal interest provides insight into the emphasis currently given to each of the four areas, as well as an indication of the problems and issues that future public policy may face. The earliest Federal interest was aimed at developing the economic and social values of coastal resources. This was the primary goal of Federal coastal policy from the early 1800s to the mid-1960s. This emphasis began to shift in the mid-1960s to the preservation of valuable coastal areas, and later to protection of the coastal environment. For example, before 1965 the Department of the Interior (DOI) had established only two National Seashores. Between 1965 and 1972, DOI established 13 National Seashores, Lakeshores, and Gateways. In 1969 the National Evironmental Policy Act became law, requiring Federal agencies to consider fully the environmental aspects of their actions. This Act was followed by a number of other laws aimed at protecting the coastal environment. They include the Federal Water Pollution Control Act Amendments of 1972; the Marine Protection, Research, and Sanctuaries Act of 1972; and the estuarine sanctuary provisions of the Coastal Zone Management Act of 1972.

The Coastal Zone Management Act moved the Federal Government into its fourth area of interest: helping the States develop processes for planning and managing the use of their coastal resources. The main purpose of the Act was to provide another dimension—cooperation with the States—to Federal efforts aimed at preserving and protecting the coastal environment. In return for Federal assistance, the Act encouraged the States to include in their planning process adequate provision for uses of the coastal zone that were determined to be in the national interest. Since the Act was passed in 1972, changes in economic, social, and political conditions (such as the increased need for offshore oil and gas) have caused the focus of the Federal approach to be altered, both legislatively and administratively. The current Federal policy still seeks to develop comprehensive Statewide plans for coastal zone management, and provide for the protection of valuable coastal resources and the overall coastal environment. At the same time, today's Federal policy also gives the States more inducements to develop coastal resources than were envisioned in 1972. As a result, Federal policy today is changing: moving away from the strict environmental protection approach of the early 1970s and toward a more balanced approach involving both protection and coastal resource use.

a. Federal Coastal Zone Management Policy

Today's Federal coastal zone management policies originated in the late 1960s. In its 1969 report, *Our Nation and the Sea*, the Commission on Marine Science, Engineering and Resources outlined the key elements of these policies. A major recommendation of the Commission was the enactment of Federal legislation to provide policy objectives for the coastal zone and authorize Federal grants-in-aid to facilitate the establishment of management authorities at the State level. The Commission further recommended that the Federal approach not concentrate on the form of organization adopted by the States for the management of their coastal zones, but rather emphasize the need for States to provide adequate management authorities and program development processes.

These recommendations became public policy with enactment of the Coastal Zone Management Act of 1972, which sets forth four major national policy objectives.

- Preserve, protect, develop, and, where possible, restore or enhance the resources of the Nation's coastal zone for this and succeeding generations.
- Encourage and assist the States to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values, as well as needs for economic development.
- Require all Federal agencies to cooperate and participate with State and local governments and regional agencies in accomplishing the purposes of the Act.
- Encourage the participation of the public, Federal, State and local governments, and regional agencies in the development of programs for coastal zone management.

The ultimate objective of the Act is to create a comprehensive national system of coastal resource management, with emphasis on protecting the environment. The Federal role in achieving this objective is one of providing national leadership, financial assistance, and active cooperation with the States. The primary responsibility and authority for coastal zone management resides with State governments, although broad participation from local governments and the general public was envisioned. State participation in the national effort is not required, and no sanctions are imposed if management plans are not developed or implemented.

A total of 34 states and territories are eligible to participate in the program. The mechanisms for encouraging State participation are: (1) Federal matching grants for the planning and development of State programs, (2) Federal matching grants for the administration of State programs following their approval by the Secretary of Commerce, (3) a general requirement that Federal agencies ensure that their activities in the coastal zone are consistent with the provisions of State programs that are approved, and (4) Federal matching grants for State acquisition and operation of sanctuaries in estuarine areas.

Grants of up to two-thirds the cost of State development and implementation programs are authorized, with certain absolute limits specified, but development grants to an individual State cannot be authorized for more than 3 years. In general, Federal approval is given to management programs on a Statewide basis, but the Act provides authority to adopt State programs in segments when that is necessary or desirable. Federal regulations implementing the Act further specify that long-term basic research would not receive high priority for funding under the program, in part because a large number of other Federal programs for research and technical assistance are available to the States and in part because the primary purpose of the Act is to initiate management processes.

The Act has several novel Federal approaches to resource management. One is the goal of creating a comprehensive and consistent regional system of land and water management. Second is the attempt to involve large numbers of States in a management process that previously had been the primary responsibility and function of local governments. A third is the use of Federal consistency as an inducement to the States to develop and implement programs of coastal zone management. A fourth is the lack of direct Federal acquisition and management elements in the program. A fifth is the voluntary nature of State participation. All of these elements differ from previous Federal approaches to resource management. Although the thrust of the Federal effort has been modified somewhat in recent years, these novel policy elements have been preserved and still serve as the nucleus of the Federal policy for coastal zone management. Changes in Federal policy since passage of the original Coastal Zone Management Act in 1972 have resulted from: (1) practical experience in working with the States on the development of their coastal zone mangement plans, and (2) a more intense national interest in developing the commercial uses of coastal resources, both on land and at sea. Practical experience in working with the States has led to the following changes in Federal policy.

- The total time allowed for developing State programs has been extended from 1977 to 1979.
- The size of the Federal share of matching grants has been increased from 66⅔ to 80 percent.
- A new program of financial assistance has been authorized for coastal States that have developed management programs but do not yet qualify for Federal approval.
- The Congress has granted its assent and has authorized financial assistance for the formation of interstate compacts and agreements to develop and administer coordinated coastal zone planning, policies, and programs.
- A program of research and training to support coastal zone management efforts has been authorized.
- The planning process required of the States prior to qualifying for Federal approval has been broadened by adding new elements to the list of approval criteria.

These changes, which were authorized by amend-

ments to the Coastal Zone Management Act in 1976, were not major departures from the policies established in 1972. These same amendments, however, also contained provisions that increased significantly Federal concern with the development and use of coastal resources. Whereas the previous policy emphasis had been largely on the protection of coastal resources and the environment, the new provisions stressed the national importance of certain coastal uses by:

- Authorizing a new program of Federal matching grants to enable coastal States to: (1) acquire access to public beaches and other public coastal areas of value, and (2) preserve islands (a program intended to help meet the growing need for more recreational outlets in coastal areas);
- Requiring the States to include, in the development of their programs, a planning process for energy facilities likely to be located in the coastal zone or which might impact the coastal zone; and
- Providing a major new program of financial assistance to meet State and local needs resulting from new or expanded coastal and offshore energy activity in order to permit development of new or expanded production of oil and natural gas in an orderly manner from the Outer Continental Shelf.

It was not the intent of the 1976 Amendments to deemphasize the resource conservation and protection aspects of Federal coastal policy in favor of increased development. Rather, the intent was to use an already-established Federal process to ensure the balanced consideration of both competing objectives. This goal is to be achieved by providing Federal financial assistance to States and localities in dealing with both the economic and the environmental impacts of offshore energy development (Coastal Energy Impact Program). Balancing development and protection of the coastal region remain the objective of today's Federal policies for coastal zone management.

The Federal program that carries out these policies is administered by the National Oceanic and Atmospheric Administration, which is an agency in the Department of Commerce. From the program's inception in March 1974, through September 1977, Federal funds of $64.5 million have been provided to the States. State matching funds of about $25.4 million also have been spent on coastal zone management. The program has 33 States participating. Four have received approval for all or part of their State programs. The remaining 29 States are still in the program development phase of their efforts. With the authority for Federal funding of State program development activities scheduled to expire on September 30, 1979, the next few months will be critical for the overall Federal effort.

b. Coastal Resource Development Policy

The vast economic value of U.S. coastal resources has been noted. Although their total worth is unquantified, the more important resources include:

- Land—for location of residences, vacation homes, heavy industry, ports, and powerplants;
- Water—for transportation of trade goods, cooling of powerplants, recreational uses, and (perhaps) conversion to freshwater or energy;
- Fishery resources—including commercial stocks worth $300 to $500 million a year, and sport fish catches of some 800,000 tons a year;
- Energy resources—including much of the remaining reserves of domestic oil and gas; and
- Mineral resources—including sand and gravel worth over $100 million annually.

Because of this economic potential, resource development was the focus of Federal coastal policy until the mid-1960s. Under the Swamp Land Acts of 1849, 1859, and 1860, for example, 65 million acres of wetlands were ceded to the States for reclamation. Until well into this century, the Federal Government also encouraged the drainage of wetlands that were suitable for agricultural use. Further, massive Federal public works projects and large amounts of Federal economic development assistance were concentrated in coastal areas, because of their large populations and economic importance.

Today's Federal policy seeks a more balanced approach to the development of coastal resources. New emphasis on environmental protection and comprehensive coastal zone management has reduced, somewhat, the priority given earlier to resource development. At the same time, development remains an important element of Federal coastal policy, particularly in the area of energy resource development. Some of the other Federal policy goals that have a major effect on coastal resource development are:

- Increasing the domestic commercial fish catch,
- Providing for the general expansion and improvement of marine waterways,
- Developing offshore hard mineral resources,
- Promoting regional economic growth and development in coastal areas,
- Increasing recreational opportunities in the coastal region, and
- Promoting domestic and international tourism.

One of the most important goals in recent years has been the development of U.S. coastal energy resources. It has been estimated that as much as two-thirds of the Nation's remaining reserves of oil and natural gas lie in the Outer Continental Shelf and Alaska lands. The accelerated recovery of these resources has been a major Federal goal since the 1973 oil embargo. Both the recovery, and the transportation and storage of offshore oil and gas seriously affect certain coastal areas, and Federal energy planners have become aware that State and local governments might block, or severely limit, the expansion of energy production. As a result, new Federal policies were adopted in 1976 and 1977 to deal with the effects of energy development on the coastal zone.

One such policy, enacted as part of the 1976 Amendments to the Coastal Zone Management Act, provides for timely Federal financial assistance to aid State and local governments in dealing with the impacts of Federal offshore energy development. At the same time, the Congress declared that the States and localities, by virtue of being closer to and better able to deal with the problems, should make the basic decisions as to the particular needs that result from new or expanded energy activity. These policies were implemented by the establishment of a Federal Coastal Energy Impact Program, which includes:

- A Coastal Energy Impact Fund, authorized for 10 years at a total level of $800 million, to provide loans, loan guarantees, repayment assistance, and grants to States and localities. These funds are intended primarily for use in planning and financing the new public facilities and services in the coastal zone that are required by energy development activities.
- Federal formula grants, authorized at $50 million annually for 8 years, to enable State and local governments to retire bonds that were issued to provide new facilities and services related to energy.

The program also provides grants to protect or restore coastal environmental and recreational resources that have been impacted by offshore energy development when other funds are not available. This program is administered by the Office of Coastal Zone Management of the National Oceanic and Atmospheric Administration.

A second dimension of Federal policy concerning the relation between energy development and coastal resource use concerns the siting of energy facilities. The location of offshore oil and gas projects, oil port facilities, tank farms, liquefied natural gas (LNG) terminals, onshore electrical generating stations, and offshore nuclear powerplants has become an increasingly controversial issue. Traditionally, the Federal Government seldom has been involved in such decisions. Its role was largely limited to a regulatory review of industry's proposals after a site had been chosen for development. Today, that situation is changing: there is a national need to provide more energy, the Federal Government is playing an active role in meeting that need, and the public is seeking a greater involvement in the site selection for energy facilities. As a result, the Federal Government is becoming increasingly involved in new approaches and public processes related to the siting of energy facilities. Issues such as reactor safety, LNG safety, and basic environmental safeguards, for example, are now being addressed by Federal agencies on other than a case-by-case basis. Further, new laws such as the Deepwater Ports Act, the Coastal Zone Management Act, and the Outer Continental Shelf Lands Act Amendments of 1978 are requiring the use of new processes to:

- Facilitate public participation in Government proceedings,
- Involve the Government in site selection processes at an earlier stage of development, and
- Improve interagency coordination of Federal permit and licensing procedures.

However, a number of important energy facilities siting issues remain to be resolved, which will be discussed later.

Another important Federal role in the development of coastal resources concerns the provision of recreational opportunities and, collaterally, the promotion of tourism to coastal areas. Recreation and tourism are the leading economic activities in many parts of the coastal region. Americans are expected to spend over $100 billion a year on travel and tourism by 1980, much of it in the coastal region. In 1970, the Bureau of the Census reported that about 9.5 million people went saltwater fishing more than three times a year, and the Coast Guard estimates that there are 8.3 million recreational boats in the United States. The Federal role in this area includes:

- Providing financial and technical assistance to the States for outdoor recreation planning, for the acquisition of land for recreation, and for the development of facilities,
- Providing public lands to State and local governments for use as parks,
- Establishing national parks, seashores, or lakeshores in coastal areas through direct acquisition and development,

- Providing grants to States to enable them to acquire access to public beaches, and
- Promoting both domestic and international travel to U.S. coastal and resort areas.

The bulk of this Federal role is the responsibility of the Department of the Interior acting through the Heritage Conservation and Recreation Service (formerly the Bureau of Outdoor Recreation) and the National Park Service. Through the Land and Water Conservation Fund administered by the Heritage Conservation and Recreation Service, for example, the States have been able to acquire nearly $2.4 billion worth of land in coastal counties since 1965. Further, the National Park Service has set aside some 807,000 acres of land for national seashores and lakeshores. A major study of the Federal role in providing recreational opportunities, including coastal recreation, is now in progress under the aegis of the Department of the Interior.

The Department of Commerce also plays a role in the development of marine recreation. A program of grants to enable States to provide greater public access to beaches and other recreational areas in the coastal zone has been authorized, although not implemented. The U.S. Travel Service, another agency of the Department of Commerce, seeks to promote travel to the United States from foreign countries and to develop travel within the United States by U.S. residents. The primary focus of this program, to date, has been on the promotion of foreign travel to the United States.

The development of nearshore hard minerals, including sand, gravel, phosphorite, and coal, has been a largely ignored area of Federal policy so far. However, both the Department of the Interior and the Department of Commerce are becoming concerned with the economic potential of these resources and with the environmental effects that recovery of these resources might cause. There has been little need for a definitive Federal policy in this area to date, because most of these minerals lie within the 3-mile territorial sea and are owned and controlled by the coastal States, which have largely restricted their development. As mineral shortages increase and seabed mining technology progresses, however, a reexamination of the Federal role will be required. This will probably be needed within the next decade or two.

An important Federal role in coastal resource development concerns general national and regional economic development in the form of public works and financial aid to States, localities, and regions. Because the coastal zone contains high concentrations of population, and has more than a proportional share of unemployment and other economic problems, a great deal of Federal economic development assistance goes to entities in the coastal zone. Current Federal policy concentrates on the economic needs and problems of individual cities, States and regions rather than on developing the full economic potential of coastal resources. At the same time, there is a growing Federal awareness of the need to consider other factors (such as State coastal zone land use plans and national energy needs) in the provision of special types of economic aid to coastal areas. Although no clear policy trend is yet apparent, new directions will be taking shape in the next few years as States implement their coastal zone management programs, as more offshore areas are leased for energy production, and as other developments occur.

c. Protection and Preservation of Coastal Resources and the Environment

Some measure of Federal protection for coastal resources has been provided for many years. For example, the Fish and Wildlife Coordination Act, which was enacted in 1934, sought to provide ". . . that wildlife conservation shall receive equal consideration and be coordinated with other features of water resource development programs." It was not until the late 1960s, however, that Federal coastal policy began to emphasize the environmental protection aspects of coastal resource use. This change in policy emphasis coincided with a general trend throughout the Nation toward greater protection of the environment.

In the past decade, a number of significant actions have been taken by the Federal Government to ensure a greater degree of coastal resource protection and preservation. These include:

- A 1968 interpretation, by the U.S. Army Corps of Engineers, of the provisions of the Rivers and Harbors Act of 1899. This interpretation broadened the Corps' review process for dredge and fill permits to include the environmental effects of approving an application. The previous procedure provided only for a review of how dredging and filling affected navigation.
- Enactment of the National Environmental Policy Act in 1969, requiring all Federal agencies to consider the environmental impacts of their actions, including those in the coastal zone.
- Passage of the Federal Water Pollution Control Act Amendments of 1972 and 1977, providing for Federal regulation of pollutants released into the Nation's waters. This Act was also the basis for an extension of the Corps of Engineers'

dredge and fill permit program to all U.S. waters, not just navigable waters.

- Enactment of the Coastal Zone Management Act of 1972, which was protectionist in its overall objectives as well as in several of its specific provisions.
- A 1977 Presidential message to Congress on the environment that addressed, both broadly and specifically, the need to provide further protection for U.S. wetlands, coastal barrier islands, and other estuarine and ocean resources.

The end result of these and other Federal actions in the last 10 years has been the creation of a broad base of Federal statutory and administrative mechanisms for protecting valuable, desirable, or threatened coastal resources. Collectively, these Federal programs have concentrated on the following aspects of coastal environmental protection:

- Control of coastal water pollution;
- Preservation of specific coastal areas;
- Mitigation of natural hazards;
- Protection of endangered species of fish and wildlife;
- Reduction of the adverse environmental effects of Federal, or Federally supported, activities in the coastal regions of the United States; and
- Creation of effective State mechanisms for planning and managing the use of coastal resources in an environmentally sound manner.

Control of coastal water pollution is the primary responsibility of two Federal agencies: The Environmental Protection Agency and the Army Corps of Engineers, although eight departments and nine independent agencies are involved in some form of marine pollution research and monitoring. The thrust of Federal efforts in this area, as specified in the Federal Water Pollution Control Act, is ". . . to restore and maintain the chemical, physical, and biological integrity of the Nation's waters," including those in the coastal region. To that end, the Corps of Engineers administers the far-reaching dredge and fill permit program already noted, and the Environmental Protection Agency is responsible for a broad-based program of pollution abatement and control, research and development, and enforcement. Within this effort, the current emphasis is on the control of pollution from "point sources:" municipal waste systems, industrial plants, and the like. Emphasis is also placed on reducing pollution from "nonpoint sources," such as the runoff from agricultural operations. The subject of Federal pollution abatement policy is treated in greater detail in the section on "The Marine Environment."

Federal programs to preserve specific coastal areas, i.e., those which are endangered or have unique environmental attributes, are carried on by the Department of the Interior and the Department of Commerce. Several programs of the Department of the Interior serve dual purposes. They provide for the acquisition of land for recreational uses and for conservation purposes. These programs include those of the National Park Service and the Heritage Conservation and Recreation Service, which have been discussed earlier. The Department of Commerce provides grants of up to 50 percent to the States for the acquisition of estuarine sanctuary areas. The goal of this program is to establish sanctuaries, primarily for research purposes, that are representative of each major type of estuarine area in the United States. A total of 18 to 20 sanctuaries will be needed to accomplish this purpose, and 5 have been established to date. The Department of Commerce also administers a marine sanctuary program, which uses the Federal regulatory process to prohibit or restrict certain types of activities in offshore areas to protect the marine environment.

Special emphasis on protection of coastal resources was included in President Carter's 1977 environmental message to the Congress. Among other things, the President's message called for more Federal action to:

- Protect U.S. wetlands from further destruction (through direct acquisition and reduced Federal support for development in wetland areas),
- Protect the 69 remaining unspoiled coastal barrier islands, and
- Increase the number of marine sanctuaries designated by the Federal Government over the next few years.

Another important Federal role in the protection of coastal resources is the mitigation of natural hazards. At least 10 hazardous natural events occur often enough in coastal areas to be causes of concern. These include hurricanes, tornadoes, and other severe storms; floods and storm surges; earthquakes; tsunamis; and erosion. Most Federal policies in the natural hazards area are aimed at protecting human life and property or providing disaster relief, not at protecting the physical environment. At the same time, environmental protection may be provided as a byproduct of the main goal. Programs to reconstruct eroded beaches or to erect seawalls and artificial dunes, for example, can benefit the environment. Likewise, programs to restrict or regulate development in flood plains or hurricane-prone areas often result in preserving more of the original environment than would otherwise be the case. These Federal roles

are carried out by a variety of construction and management agencies, including the Corps of Engineers, Department of Housing and Urban Development, and Department of Commerce.

Fish, wildlife, and plants are among the most important environmental resources of the coastal zone. Federal policy in regard to these resources involves providing protection for them if their survival as species becomes threatened or endangered. In these cases, the Federal Government has assumed the responsibility for direct management of the species to preserve them. This responsibility includes performing research to determine the status of species thought to be endangered, designating species to receive Federal protection, establishing appropriate rules and regulations for protecting the species, enforcing those regulations, and monitoring continuously the threatened or endangered populations. Research, regulation, and monitoring are performed by the Department of Commerce and the Department of the Interior under the Federal Endangered Species Act and Marine Mammals Protection Act. Enforcement is carried out by these two departments along with the Coast Guard, the U.S. Customs Service, and the States.

Direct Federal action to protect coastal and other natural resources was taken in 1969 with enactment of the National Environmental Policy Act. Among other things, this Act requires all Federal agencies to consider the environmental consequences of their activities before proceeding, including activities affecting the coastal zone. This Act requires environmental impact statements, which are made available for public review and comment before final action is approved.

In the long run, the greatest potential for providing protection to coastal resources and the environment appears to be offered by effective State and local land use planning and management mechanisms. The Federal Government has become increasingly involved in encouraging this approach over the past decade through such efforts as the coastal zone management program. It also appears now as though the States will assume greater responsibility for the administration of dredging and filling activities, which is now a Federal responsibility. At the same time, the States have been moving to provide their own statutes for coastal environmental protection. Thirteen coastal States have laws which specifically protect wetlands, and an additional 17 States include some form of wetlands protection in their overall land use or environmental programs. A definitive Federal policy and role in this area has yet to be developed.

3. Results of U.S. Policy and Current Issues in Coastal Resource Policy

The cumulative effects of the fluctuations in Federal policy that have occurred in recent years are difficult to assess. However, one result has been an increasing public awareness of, and interest in, issues surrounding coastal resource use. This result is important, because, until recently, there was no public demand for a strict accounting of the uses of the coast as a distinct and important geographical entity. Coordinated management of all of the various possible uses of coastal resources in the past was a matter of scientific, but not political, concern. This situation has changed in the past decade, and public awareness of "the coast" as a unique region is likely to continue for the foreseeable future.

On a more measurable scale, some of the results of U.S. coastal policies have included:

- The initiation of coastal zone management planning processes in 33 States and territories;
- The approval and implementation of management programs or program segments in 4 States;
- The establishment of 10 national seashores, 3 national lakeshores, and 2 gateway recreation areas in the coastal zone;
- The acquisition of several million acres of coastal lands by governmental entities—Federal, State, and local—for conservation or recreation purposes;
- The establishment of 5 estuarine sanctuaries; and
- The establishment of 2 marine sanctuaries, with several dozen more under active consideration.

These results indicate a much more active Federal interest in the past decade in protecting and managing U.S. coastal resources. At the same time, coastal development continues, as it must if the United States is to meet its future energy needs and maintain adequate economic growth. Inherent in this competition for the use of coastal resources is potential conflict over the nature and location of energy support facilities in the coastal zone, over whether resources are to be used for recreational or commercial purposes, and over whether the resources are to be used at all or preserved for future generations. Further, these potential conflicts are likely to intensify as time passes, because the resources available for use are limited and the demands for them are growing. Future Federal coastal policies will need to consider this situation and provide for the effective resolution of potential conflicts.

Several major issues of coastal resource policy that will be facing the Federal Government over the next few years further illustrate the potential for conflict.

- *Developing a stable, long-term Federal role in encouraging State and local governments to manage their coastal areas.*

The legal authority to provide Federal assistance to the States in planning and developing their coastal zone management programs expires in September 1979. A decision is needed before then as to whether additional Federal *planning* support is needed or warranted. Further, a decision is needed on the length of time to be authorized for Federal assistance to the States in *implementing* their programs. Progress to date has been slower than expected; only two complete plans and two plan segments have been fully approved for implementation. One issue will be whether adequate time and Federal assistance has been provided to permit the development of State plans. Another will be whether the Federal emphasis should be on quality or quantity in approving State programs. Implicit in both of these issues is a third question: What will be the effect of terminating Federal planning assistance to States that have not developed programs which meet the legal criteria for Federal approval?

Beyond these near-term issues, there is also an issue concerning what is to be the "permanent" Federal role in State and local coastal zone management. At some future time (yet to be determined), all the States that are going to have coastal zone management programs will have received the maximum Federal assistance now envisioned. When this occurs, which may be within 3 to 5 years, a decision will be needed on whether the Federal Government should play a continuing role in coastal zone management and, if so, what that role should be. Consideration of this question now is important, because decisions regarding the longer term Federal role will influence decisions on the issues to be resolved in 1979.

Further, the Federal Government must address the issue of its relation with local governments in the management of coastal resources. The existing coastal zone management program was designed to assist the *States* in planning and implementing effective programs. For the most part, however, coastal zone management is synonymous with land use management, and this function is largely a prerogative of *local* governments. Because of this situation, the eventual success of the Federal program will depend on how well local needs and interests are represented in State programs, and consideration of a more direct Federal-local relationship may be warranted.

- *Assessing the Federal role in determining what should be the balance and priorities between coastal resource development and protection of the coastal environment.*

In addition to the Federal role in providing assistance to State and local governments in the development of coastal zone management processes, there is also an issue regarding the Federal role in determining the substance of coastal resource use decisions. The 1972 Coastal Zone Management Act requires that State programs must provide for "adequate consideration of the national interest involved in the siting of facilities necessary to meet requirements which are other than local in nature" in order to qualify for Federal approval. In this case, the definition of "national interest" is a matter of Federal regulation and is subject to wide interpretation. The issue is whether the Federal Government should use this provision, some other means, or no means at all to: (1) seek an overall balance between the development and protection of coastal resources or (2) set priorities for specific types of development to be allowed. Resolution of these questions in the near future is important because several States will be approaching the implementation phase of their coastal zone management efforts in the next 1 to 2 years.

- *Determining the effectiveness of Federal consistency laws as a resource management tool.*

The Coastal Zone Management Act requires that "each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved State management programs." This provision could be a powerful incentive to the States, depending on the scope and importance of Federal activities in a particular area, or it could prove to be a barrier in the Federal review and approval of State programs. Further, it if becomes an effective management tool in the area of State and local coastal zone management, it could be applied to other areas of natural resource management. The questions are whether Federal consistency is necessary and desirable, and whether it can be made to work over the long term and in the presence of competing mission requirements. Legal exemptions from the consistency requirement are already being proposed, although none has yet been approved. Should exemptions be granted, alternative means to achieve balance between State programs and Federal activities will need to be considered.

- *Determining the Federal role in energy facilities siting.*

In addition to questions of Federal involvement in the substance of coastal resource use and of implementing the existing Federal consistency provisions of the law, there is already a major issue involving the Federal role in the siting of energy facilities. This

issue is, in large measure, a coastal issue because of the heavy dependence of energy producers on coastal resources. This issue centers on the question of the extent to which the Federal Government will involve itself in a process that has, until now, been largely a prerogative of the private sector and local governments. Federal involvement may be necessary and desirable because (1) the need for new energy supplies is a critical national concern; (2) new forms and sources of energy (such as nuclear power and offshore oil and gas) are controlled, at least in part, by the Federal Government; and (3) the general public is beginning to raise questions that go well beyond the domain of private and local government concerns (such as the extent to which the United States should use nuclear power) and urge the use of alternative energy sources. Often, the issue of facilities siting is chosen as a forum for raising, and resolving, these broader questions. To date, the Federal establishment is not well equipped to deal with these problems in this context. An overall Federal policy may be needed to permit such issues to be promptly and satisfactorily resolved in the national interest.

- *Determining the Federal role in increasing recreational opportunities in the coastal zone.*

There is some evidence that future demand for the recreational use of coastal resources may outpace the available opportunities, especially if population growth trends in coastal areas continue. The main issue in this area is the extent to which new opportunities should be provided through the support of the Federal Government instead of by the private sector or other governmental units. Another issue is whether, in the interests of economic growth, the Federal Government should promote recreation and tourism in the coastal areas of the United States. Should the Federal Government decide to foster and develop recreational opportunities, other issues will need to be resolved, including the form and location of recreational opportunities to be developed.

- *Determining the relation between coastal management and the management of ocean-based resources.*

The Federal coastal zone management effort, to date, has concentrated on land use. State coastal resources, however, extend to the limit of the 3-mile territorial sea. Beyond that, Federal jurisdiction extends, in some cases to a limit of 200 miles. Because these boundaries are artificial, it is important that consideration be given to the development of a consistent and coherent system of natural resource management that recognizes the natural relationships that transcend legal boundaries. The issues in this area concern the Federal role in providing for such a system where State and local jurisdictions are involved.

4. Conclusions

Because of the importance of coastal resources to the United States, concern has been shown in the past 10 years for the way in which those resources are used and protected. The Federal Government has been a major factor in developing an awareness of the importance of the coastal region through the establishment of environmental policies, its encouragement of coastal zone management, and its emphasis on the development of new energy sources. Over the years, Federal coastal policies have fluctuated widely in their emphasis between development and preservation. If the Nation's goals for both coastal resource use and protection of the coastal environment are to be met, a coherent Federal policy must be developed soon, and processes must be devised for ensuring a balanced approach to meeting the goals. Further, a Federal policy must be developed which also provides for a consistent and coherent approach to the treatment of resources that are closely related to coastal resources. Of particular importance are resources of the continental shelf and adjacent deep ocean, and related freshwater and inland resources that affect the coastal environment.

Marine Transportation

1. Background

Marine transportation is one of the predominant uses of the ocean. America has long depended on its shipping and shipbuilding industries for trade, jobs, and security. Today the United States is the largest trading Nation in the world, with almost all foreign commerce transported by sea, and an economy that depends more than ever before on ocean shipping.

Throughout the Nation's history, this important use of ocean and coastal resources has received prominent attention from Government. The earliest Congresses recognized the importance of a reliable merchant marine to the economy and national security. In 1789, Congress enacted a law limiting U.S. ship registry to vessels built in American shipyards. The same year the U.S. Lighthouse Service was established to help merchant vessels safely operate, and in

1790 the Revenue Marine was created. The Revenue Marine, a predecessor of today's Coast Guard, was a maritime law enforcement agency, but soon began making rescues at sea and providing aid to ships in distress. At about that time, the United States imposed discriminatory duties on foreign ships engaged in U.S. coastal trade. Later, in 1808, foreign vessels were totally excluded from participation in American coastal commerce. So important were maritime concerns that 5 of the first 11 laws enacted by the First Congress contained provisions to regulate shipping and encourage the growth of the U.S. merchant marine.

This governmental interest, which started as trade protection for a budding national industry, has evolved over the years into a complex and sophisticated Federal role in marine transportation. Although various programs have been pursued over the years, and many governmental entities have been involved, the overall goal has remained to provide a safe and efficient marine transportation system in support of U.S. commerce and adequate to meet shipping needs during periods of national emergency.

2. Current Status of U.S. Marine Transportation Policy

In recent years this overall goal has been pursued as an end in itself, not as an element of U.S. ocean policy. Although this situation is beginning to change with the enactment of new laws governing ocean and coastal use management and marine environmental protection, today's Federal policy is still dominated by interest in three traditional transportation activities. These are:

- Provision of facilities and services that support merchant shipping,
- Regulation of ocean shipping rates and competitive practices, and
- Promotion and protection of U.S. shipping and shipbuilding interests.

a. Provision of Facilities and Services

An adequate merchant shipping capacity requires not only ships but ports, harbors, navigational aids, and a range of services to support ship operations. Many facilities and services, collectively termed "infrastructure," are provided by the private sector. However, the Federal Government also is involved, especially where the safety of operations is at stake. Key Federal policies in this area seek to:

- Improve navigability through port, channel, and harbor improvements,
- Ensure safe and efficient marine transportation operations, and
- Control and reduce the adverse impact of marine transportation on the environment.

The first two objectives have long been mainstays of Federal maritime policy, whereas the third is of more recent origin.

Federal policy toward port and harbor development has been dominated by two basic principles: avoiding preferential treatment of one state or region over another and refraining from interference with State, local, and private functions. Consequently, Federal activities have emphasized the general expansion and improvement of marine waterways throughout the country, while leaving shoreside development to others. The result of the Federal approach has been a port system that is largely owned by private concerns and by State and local governments. Today, about 60 percent of the 2,400 commercial marine terminals in the United States are privately owned. About 36 percent are operated by State and local governments. The rest are operated by nonprofit organizations and civilian Federal agencies.

At the same time, the Federal Government has played a significant role in harbor expansion and port access in recognition of the economic and strategic importance of ocean shipping. Since 1824, the Army Corps of Engineers has participated in the construction of 25,000 miles of inland and intercoastal waterways, 107 commercial port facilities, 400 small-boat harbors, and 261 locks. The Departments of Transportation and Commerce also contribute to port and harbor development. Both promote improvement of intermodal (ship-to-rail and ship-to-truck) transportation. The Department of Commerce also has programs to help port interests assess trade opportunities, and the Department of Transportation is in charge of the licensing and regulation of offshore deepwater ports.

The Federal Government has always played a role in ensuring the safe and efficient conduct of marine transportation. Today's programs seek to accomplish this objective through:

- Conduct of search and rescue operations on and over the high seas and waters under U.S. jurisdiction;
- Development, deployment, and maintenance of aids to navigation, including buoys, lighthouses, and radio navigation systems;
- Regulation of marine operations in order to prevent maritime accidents and protect life and property at sea; and
- Enforcement of maritime laws and the provision of supporting services to other Federal ocean activities.

In the past, these Federal activities have been conducted by numerous specialized agencies, such as the U.S. Life Saving Service and the Steamboat Inspection Service. Now these functions are largely performed by a single agency—the multimission U.S. Coast Guard within the Department of Transportation. In carrying out its civilian missions in 1976, the Coast Guard:

- Responded to 74,714 search and rescue cases, preventing over 5,000 deaths and saving over $318 million worth of property;
- Maintained nearly 26,000 buoys and over 22,000 fixed aids to navigation (such as radiobeacons and light stations);
- Inspected 10,471 U.S. commercial vessels, processed 16,400 vessel license applications, investigated 7,200 marine casualties, and made 325,000 courtesy motor boat examinations; and
- Boarded nearly 34,000 cargo vessels in port, conducted 7,659 hours of domestic icebreaking operations, and devoted over 78,000 hours of cutter operations to fisheries enforcement.

In addition to these civil responsibilities, the Coast Guard serves as one of the Armed Forces of the United States and annually carries on military readiness operations.

Other Federal agencies also provide important aids to the safety and efficiency of maritime operations. The Commerce Department's National Oceanic and Atmospheric Administration produces maps and charts that are necessary for navigating U.S. coastal and offshore waters and provides marine weather observations and forecasts that contribute both to the safety and efficiency of operations. The Department of the Interior and the Corps of Engineers carry out programs to license offshore structures, such as oil rigs, so that they do not interfere with marine navigation. The task of ensuring the safety and efficiency of marine transportation is one of the largest and most visible Federal ocean efforts.

The newest Federal responsibilities in the area of marine transportation concern environmental protection. Federal environmental laws and policies, which have been developed largely over the past 10 years, have had a major effect on marine transportation operations. Emphasis to date has been on reducing or preventing damage to the marine environment from shipping operations, particularly those involving the transportation of oil and hazardous substances. Three Federal agencies have major environmental protection responsibilities that affect marine transportation.

- The Council on Environmental Quality (CEQ) which reports to the President, has broad advisory responsibilities for setting overall Federal environmental policy. In recent years, CEQ has had an active role in developing policies toward oil and hazardous materials pollution and toward deepwater port siting.
- The Environmental Protection Agency administers a permit program aimed at eliminating the discharge of pollutants in navigable waters of the United States by 1985, and establishes overall water quality standards.
- The Coast Guard is charged with the prevention of damage from shipping and with the improvement of the overall quality of the marine environment including the removal of oil spills.

These environmental policies and programs have placed new restrictions on both shipping and port operations.

A closely related, but different, Federal concern—resolution of ocean and coastal use conflicts—is now beginning to emerge. It is likely to have a major impact on marine transportation in the future. New Federal emphasis on the development of planning and management processes for ocean and coastal use will almost certainly have an increasing effect on port expansion, new facilities siting, harbor dredging, offshore structure location, and other elements of the marine transportation system. To date, Federal policy in this field has concentrated on assisting the States in planning and developing long-term programs for coastal zone management. So far, only limited attention has been paid to the management of the offshore ocean region, but this situation is beginning to change. Future Federal policies increasingly will seek to provide a means of balancing the interests and needs of a wide variety of ocean and coastal resource uses. As a major competitor for the use of ocean and coastal space, marine transportation will be greatly affected by whatever policies and procedures are developed.

b. Regulatory Policy

The second major element of Federal marine transportation policy is the economic regulation of ocean shipping. A 20th century development, extensive Federal regulation was first authorized by the Shipping Act of 1916. Although intended mainly to control unacceptable competitive practices that were then prevalent, this Act established a key policy by subjecting international common carrier shipping to U.S. regulation. Despite objections from foreign nations, whose vessels are subject to regulation when engaged in U.S. commerce, this policy has continued to the present day and makes the United States

unique among the major maritime nations of the world.

Today's Federal policies toward the economic regulation of ocean shipping seek to provide equitable rates for both shippers and shipping companies, and to preserve competition within the shipping industry. Like most Federal regulatory efforts, the regulation of ocean shipping is highly technical and replete with complex laws, policies, rules, and exceptions, all of which have great significance to the shipping industry. From the standpoint of overall public policy, however, a few basic tenets are most important. First, regulatory policies differ according to the origin and destination of goods being shipped. There are different rules for domestic shipping, which includes all trade between U.S. ports and its territories, and for international shipping, which covers all trade between the United States and foreign nations. Second, regulatory policies differ according to the type of service offered by the shipper. Broadly, there are three basic types of service.

- Private service, which involves the carriage of an individual company's goods on company-owned vessels. Tankers that are owned and operated by oil companies are an example of a private service.
- Tramp service, which involves the provision of shipping services on a contract, or charter, basis, No fixed schedule or service is offered, and ships may move freely from trade to trade in pursuit of bookings upon completion of a contract.
- Liner service, which involves the provision of common carrier services to the general public in accordance with a fixed, published schedule. Internationally, rate structures for this type of service are commonly set by "liner conferences," which are made up of shipping companies that participate in the same trade.

The following approaches are used to regulate these trades and to achieve the Federal objective of ensuring fair prices and a reasonable degree of competition:

- Private service is not regulated, because it is not offered to the general public.
- Tramp service is not regulated in international trade. Domestic tramp service is regulated only to the extent necessary to protect other common carriers from unfair competition.
- Liner services are regulated, both in domestic trade and in international trade. Because liner conferences could act to restrain competition or set rates at unreasonable levels, the Federal Government has acted to impose strict requirements on this type of service.

The Federal Maritime Commission has primary Federal regulatory authority over ocean shipping, although the Interstate Commerce Commission also has a significant role. The current practice is to ensure that the Federal regulatory function is independent from other Federal marine transportation activities, although this practice is of relatively recent origin. From 1936 to 1961, regulatory responsibility was vested in the same agency that had responsibility for the promotion of merchant shipping and shipbuilding. Under a 1961 Federal reorganization the two functions were separated, and remain so today.

The Federal Maritime Commission, which has five members, carries out a full range of regulatory activities to implement Federal policy. These activities include: approving agreements filed by liner conferences, regulating the practices of common carriers of waterborne commerce, accepting or rejecting tariff rates, and promulgating rules and regulations to assure compliance with specific statutes.

The Interstate Commerce Commission, which has general regulatory authority over domestic interstate trade, is responsible for regulating several different aspects of domestic waterborne commerce. These include the common carriage of freight other than bulk cargo, the common carriage of dry bulk cargo on the high seas and Great Lakes, and intercoastal contract carriage of dry bulk cargo when these ocean services compete with other common carrier services. Further, the Commission regulates various common carriage support activities such as storage and transfer services.

c. Promotion of Shipping and Shipbuilding

The third major element of Federal marine transportation policy is the promotion of U.S. merchant shipping and shipbuilding. While the basis for Federal involvement in this function has varied over the years, it has generally been justified in terms of one or more of the following objectives:

- Fulfilling national security requirements,
- Providing support for the national economy, or
- Promoting U.S. international political aims.

In recent years, primary attention usually has been given to meeting national security needs. This involves ensuring that adequate shipping capacity is available to meet defense requirements and to assure the continued operation of essential components of the U.S. economy during periods of national emergency. At the same time, the ability of U.S. shipping and shipbuilding industries to support jobs for American workers and to provide an international political presence continue to be important reasons for Federal promotion of these industries.

Over the years, many kinds of aids have been used to further U.S. shipping and shipbuilding objectives. Early assistance was largely of the indirect variety, including discriminatory tariffs on foreign shipping and restrictions on foreign participation in U.S. trade. Later, more direct forms of aid were instituted, such as Federal insurance and limited subsidies. The mainstays of today's Federal promotional program are the direct subsidies and other forms of assistance that were inaugurated with enactment of the Merchant Marine Act of 1936. This Act reaffirmed the national policy of Federal support for a private merchant marine and set forth the broad goals of Federal support. These broad goals included the development of a merchant marine that would be capable of carrying U.S. domestic waterborne commerce and a substantial portion of U.S. international trade, and which would also serve as a naval and military auxiliary in time of war. In 1970, the 1936 Act was amended to provide, among other things, a more specific Federal goal: a 10-year, 300-ship construction program to revitalize the declining U.S. merchant marine.

A very broad program of Federal promotional assistance has been provided since 1936. The types of aid which are or have been available include:

- Direct cash payments, in the form of ship construction and ship operating subsidies;
- Tax assistance, through special provisions allowing tax deferral on income set aside for new ship construction;
- Credit aid, in the form of direct government loans for ship construction and Federal loan guarantee programs;
- Benefit-in-kind subsidies, such as selling Federally owned vessels to private operators at bargain prices after major wars;
- Regulatory subsidies, such as restrictions on the carriage of U.S. domestic waterborne commerce; and
- Purchase subsidies, in the form of U.S. flag preference requirements for the transportation of Government-sponsored cargoes.

The principal Federal agency responsible for administering programs to foster, promote, and develop the American merchant marine is the Maritime Administration, an operating unit of the Department of Commerce. In addition to administering the subsidy and loan guarantee programs, the Maritime Administration

- maintains, in cooperation with the Navy, a National Defense Reserve Fleet, which consists of government-owned merchant ships that have been deactivated, but which are kept in various states of readiness for use in the event of national emergencies;
- conducts general support activities in areas such as research and development, maritime labor/management relations and workforce development, market development, and environmental protection; and
- operates the U.S. Merchant Marine Academy at Kings Point, N.Y., and provides Federal assistance to the six State maritime schools. Both of these activities are designed to encourage careers in merchant shipping.

Promotional and regulatory activities were carried out by the same organization until 1961. Since then, promotional functions have been the responsibility of the Department of Commerce, and regulatory functions have been performed by the independent Federal Maritime Commission.

3. Results of U.S. Policy and Current Issues in Marine Transportation

Of major concern has been the decline of the U.S. shipping industry since World War II. It is a fact that the United States emerged from the war with 60 percent of the total world shipping capacity. Today the U.S. ranks 10th in the world, having only 2.6 percent of the world's total number of ships. These statistics do not tell the whole story, however, since:

- The U.S. shipping and shipbuilding industries continue to provide substantial employment—21,000 seagoing personnel, 127,000 shipyard workers, and 57,000 longshore personnel.
- As of June 30, 1977, the U.S. shipyard orderbook ranked third in the world with nearly 6 million deadweight tons on order or under construction.
- Foreign trade carried by U.S. flag vessels has increased since enactment of the Merchant Marine Act of 1970. In 1969, the U.S. fleet carried 19.8 million tons of U.S. foreign trade. In 1976, the U.S. fleet carried 34.2 million tons, an increase of 73 percent. At the same time, total U.S. foreign trade was increasing. Consequently, the U.S. share rose by only 0.2 percent, from 4.6 percent of the total to 4.8 percent. It is significant, however, that the U.S. fleet did not lose further ground to its foreign competitors during this period, thus reversing a 25-year trend.
- The U.S. fleet has been substantially modernized since passage of the Merchant Marine Act of 1970. Under the Act, 62 new vessels have been built. Together, these new ships represent 45 percent of the carrying capacity of the U.S. fleet. Further, 22 conventional general cargo

ships have been converted to modern container ships under the Act.

The objective of the 1970 Act, 300 new ships by 1980, probably will not be achieved. Nevertheless, major gains in U.S. ocean shipping capacity will be made, largely because of the construction of newer types of ships (container ships, roll-on/roll-off van ships, and barge carriers). Construction of dry bulk ships, however, will fall considerably short of the goal.

Over the next few years, Federal policymakers will face a number of issues of major significance to the U.S. marine transportation system. These issues are summarized below.

- *Integrating the needs of the transportation system with emerging social objectives, such as environmental protection and coastal zone management.*

A major challenge will be to assure that full and systematic consideration is given to each of the competing, and often mutually exclusive, demands placed on marine and coastal resources. Already, environmental protection requirements have increased the cost of building and operating ships. Larger facilities are needed to accommodate today's larger vessels. These facilities will compete with other possible uses of valuable coastal land and water resources. New safety requirements (such as those for liquefied natural gas carriers and disposal requirements for new dredged materials) will add to the cost of port development. The Federal role must be reexamined, and existing processes improved, to maintain a balance between national and local interests, economic needs and environmental concerns, and similar conflicting or competing considerations.

- *Obtaining an equitable resolution of transportation infrastructure financing issues.*

Several specific issues exist in regard to financing port, harbor, and waterway development. These include selecting appropriate discount rates for use in evaluating Federal water projects that affect navigation, determining to what extent user charges should offset the cost of Federal waterway programs, and evaluating the need for a greater Federal role in financing port development projects.

The discount rate issue has been vigorously debated for the past several years and promises to remain a point of controversy in evaluating future navigation and other water resource projects. Basically this controversy centers on the selection of an appropriate discount rate for determining the present value of the future benefits expected from a particular water project. The objectives of the associated cost/benefit assessment are to assure selection of the best projects and to assure a yield on water resource projects at least equal to the yield that could be expected if the same resources were devoted to a secure long-term investment. While the discounting procedure is technical, the discount rate issue is not simply a technical problem. Because the established discount rate can influence significantly which water projects will be approved, political considerations have played a significant role in its determination.

The issue of waterway user charges has also been a major area of controversy with respect to waterway transportation system financing. In recent years, pressure has grown for some form of Federal tax on waterway users to help defray at least part of the cost of these Federal water transportation programs and to reflect more accurately the total cost of water transport services in the rates charged for water carriage. While recognizing that in some cases it may be desirable, in support of other objectives, to provide certain transportation services and facilities free or below cost, the Department of Transportation has become a particularly strong proponent of the user charge concept for all transport modes including water transportation. Although water carriers have vigorously opposed the concept of user charges in the past, it now appears that a limited Federal tax on commercial waterway users is possible in the near future.

Although some degree of reluctant agreement on the waterway user charge concept now seems to have emerged, much remains to be resolved with respect to the amount and nature of the charges. These issues are likely to provide fertile ground for continuing controversy in this area for some years to come.

While deliberations continue on how most appropriately to fund traditional Federal water transportation services, growing support has emerged for a larger Federal role in funding the cost of certain new programs mandated by the Federal Government. In this area, port interests have expressed particular concern for the high cost of complying with new Federal requirements associated with port security, environmental protection, and safety. These interests have urged that the Federal Government help support these increasingly expensive programs. Thus, while there is growing support for more industry cost sharing of traditional Federal assistance programs through user charges, there is simultaneously increasing interest in an expanded Federal role in funding new Government requirements imposed on State, local, and private waterway interests.

- *Implementing Federal regulatory reforms.*

The improvement of Federal regulatory approaches and processes is expected to be an impor-

tant effort of government as a whole over the next several years. As a partially regulated industry, marine transportation will be affected by whatever goals and programs are established. Specific issues that are expected to arise in marine transportation regulation include the problem of unclear jurisdiction over intermodal shipping between the Federal Maritime Commission and the Interstate Commerce Commission and the overall adequacy and appropriateness of the existing U.S. ocean shipping regulatory system.

Jurisdictional problems relating to the authority of the Interstate Commerce Commission and the Federal Maritime Commission (FMC) are likely to grow as containerization and other unitized cargo handling operations continue to expand. The increasing use of through bills of lading and single rates for movements having both international and domestic components will continue to tax the traditional domestic-trade/foreign-trade division of responsibility between these agencies.

Another major regulatory issue that will continue to receive close consideration relates to the problem of controlling the competitive practices of State-owned shipping companies that, in recent years, have been aggressively seeking a larger role in the carriage of U.S. foreign commerce. Such carriers, primarily of Soviet registry, have been charged by their competitors with cutting rates to levels that are not fully compensatory in order to achieve rapid trade penetration gains which, it is suggested, are motivated more by political objectives than by commercial considerations. Proposals for resolving this problem have focused on providing the FMC with greater regulatory authority to police minimum rates filed by State-owned shipping firms.

Even more fundamental regulatory concerns are emerging which strike at the philosophical foundations of the current U.S. regulatory system. The Justice Department and others have frequently criticized the policy of granting antitrust immunity to regulated shipping conferences and have suggested that conference abuses have not been controlled effectively by either market forces or Government regulation. Such critics have urged major changes to current shipping legislation with the aim of increasing competition in the shipping industry.

Supporters of the present regulatory philosophy, on the other hand, have identified shortcomings in existing law which limit the ability of the United States to enforce effectively U.S. laws on foreign-flag operations. These proponents of the present system have urged a basic strengthening of the system to give FMC expanded authority to deal more effectively with such illegal practices as rebating.

Among proponents of the current regulated conference system, growing support has emerged for possibly allowing the use of some form of "closed conference" system in the U.S. liner trades as a means of fostering greater stability and controlling illegal practices. The closed conference system, which is common in most world trades and under which shipping conferences are allowed to limit membership, is now illegal in the U.S. trades. Adoption of some form of regulated closed conference system would be contrary to the desires of those who seek a more competitive system, and as a consequence, consideration of this issue is likely to be highly controversial.

- *Providing for expansion of the U.S. dry bulk fleet.*

Existing U.S. dry bulk shipping capacity falls considerably short of what would be needed to maintain the American economy during war. Further, the Merchant Marine Act of 1970 has not provided much stimulus to this sector of the industry (only two ore/bulk/oil carriers have been built under the program). Consequently, special policies and programs must be considered if the United States is to expand its dry bulk shipping capability. Now under consideration are a number of legislative initiatives that would alter various provisions of existing subsidy programs in an effort to make them more responsive to the special needs of the dry bulk carriage industry.

- *Determining the future of liquefied natural gas (LNG) ship construction.*

The United States is now a world leader in the development and construction of LNG vessels—U.S. shipyards now have contracts for half of the LNG ships now being built worldwide. Commercial prospects are excellent for further LNG construction and use, depending on the outcome of two major policy issues. One is the extent to which the United States is willing to permit itself to rely on imported LNG as a source of energy. The other is the widespread concern over the safety of LNG transportation and handling procedures.

- *Resolving longer term questions about Federal programs and policies for promoting the U.S. merchant marine.*

Over the next few years, a number of specific matters are expected to be debated which, in aggregate, could alter significantly the overall Federal policies toward the U.S. maritime industries. Included among these are matters such as: the sanctions and assistance provided in support of U.S.-owned

foreign-flag shipping and the utility of U.S.-owned foreign vessels in meeting national security requirements, the need to renew the National Defense Reserve Fleet or develop a suitable alternative to this important emergency surge capacity, the future outlook for U.S. shipyards in view of the recent decline in new orders, and the appropriateness of certain restrictive provisions in current contracts for Federal operating subsidies in light of contemporary trends in the liner industry toward greater operating flexibility.

At a much broader level, there is likely to be renewed debate over the fundamental adequacy of existing Federal maritime programs to achieve national maritime objectives, particularly in light of the mixed results attained to date under the Merchant Marine Act of 1970. One manifestation of this emerging search for new approaches is seen in recent efforts to enact cargo preference legislation that would reserve for U.S. flag vessels a specific share of U.S. commercial oil imports.

In reassessing Federal maritime aid programs, it can be expected that a central focus will be on the ability of existing or proposed programs to meet specific public maritime objectives. While public benefits have long been cited as justification for these aid programs, the programs themselves have been criticized for their imprecision in attaining specific public goals. Fleet and shipyard adequacy has been assessed thoroughly from time to time, and specific deficiencies have been identified. For the most part, however, these assessments have not led to *specific* remedial action.

The source of this problem has been traced to the basic nature of current Federal assistance programs that are responsive primarily to private commercial demands rather than to public shipping and shipbuilding objectives. The terms under which operating and construction subsidies are offered, for example, provide limited opportunity for precise Federal control over the maritime resources being supported. While the Government may accept or reject individual subsidy requests, the private sector is offered no specific incentives to seek aid for projects with high public value. As a consequence, two projects yielding markedly different public benefits may receive equal Federal support simply because each makes some contribution to broad national maritime objectives.

Because of these concerns, it has been suggested that new assistance options need to be considered that incorporate clear incentives to the private sector to build and maintain shipping and shipbuilding resources that maximize specifically identified public objectives. Currently the White House Domestic Policy Staff is sponsoring a thorough interagency reassessment of national maritime policy, both regulatory and promotional. It is likely that the issue of public responsiveness will receive attention in the course of this maritime policy review.

4. Conclusions

Because overall Federal policy toward marine transportation was revised in a fairly comprehensive way in 1970, few major Federal policy issues in this area have emerged in the past few years. However, this situation is now beginning to change because of new environmental laws, new energy requirements, a new Federal emphasis on regulatory reform, changes in the general economic situation, and the failure of maritime promotional programs to live up to expectations. New issues of major significance are beginning to arise. At least in part, these issues will have to be resolved in the context of an overall U.S. ocean policy. In addition to marine transportation considerations, this larger policy context will require consideration of marine environmental objectives; State coastal zone management plans; competing uses for ocean space; and local, regional, and national economic development objectives.

The Marine Environment

1. Background

The highly developed state of American industry, agriculture, and trade subjects the U.S. coastal environment to pollution from contaminated rivers and streams, shipping operations, vessel casualties, land runoff, sewage, power-plant discharge, and even acid precipitation from the atmosphere. Open ocean areas, while more insulated, are also subject to degradation from coastal pollutants that are carried seaward by the currents as well as by waste dumping, oil and gas drilling, and shipping operations.

Until well into the 20th century, the United States pursued a relatively simple policy toward marine environmental pollution. That policy, which originated with the "Refuse Acts" of 1888 and 1899, was aimed at preventing impediments to navigation. The need for these measures arose in the 1870s and 1880s,

when urban growth produced visible, and hazardous, pollution in the harbors of many northeastern cities.

Today's needs, and today's policies, are radically different. Over the past three decades, there has been increasing recognition that the oceans do not have an infinite capacity to absorb wastes; that marine pollution results largely from economic development, technological progress, and demographic changes; and that the real cause for concern is not only the amount of pollution in the environment, but also the nature and behavior of pollutants. As a result, new laws have been enacted over the past 30 years that provide a more comprehensive approach to the reduction of marine environmental pollution. Among other things, these new laws recognize the many different forms that pollution can take, seek to reduce pollution through the control or elimination of its sources, and seek to mitigate the effects of pollutants through the treatment of effluents before their discharge into ocean waters.

Even with these new laws, however, marine pollution problems are likely to continue because of:

- Difficulty in locating acceptable and economical land sites for waste disposal, and the attractiveness of ocean dumping as an alternative;
- Continued use of new, and often toxic, materials in industrial processes and in consumer products;
- Growth of oceanborne petroleum transport, including very large single shipments, which increases the potential for acute pollution from oil spills and adds to the chronic effects of accummulated oil in the marine environment; and
- The increasing amount of heat energy discharged into the marine environment from production of electricity and the growing number of industrial processing plants in coastal areas.

The Federal Government has the primary responsibility for controlling and preventing pollution of the marine environment. This is because all offshore waters are common property resources, owned and controlled by governmental entities, and because environmental degradation in one region can profoundly affect the waters of another region.

2. Current Status of U.S. Policy

The overall goal of Federal water quality policy, as contained in the Federal Water Pollution Control Act of 1972, is "to restore and maintain the chemical, physical and biological integrity of the Nation's waters." In the marine area, a more specific goal is to eliminate the discharge of pollutants into the navigable waters of the United States by 1987.

In addition to this overall goal, several specific Federal marine environmental policies have been established through the enactment of separate laws governing various sources of pollutants. These include:

- Eliminating or regulating discharge into the ocean of untreated wastes, dredged material, harmful amounts of toxic pollutants, and other nondredged materials;
- Preventing or limiting the open dumping of materials into the ocean which would adversely affect human health, the marine environment, or the oceans' economic potential;
- Protecting U.S. navigable waters, and their resources, from pollution by the discharge of oil or oily mixtures from ships, accidental damage to vessels or structures, construction or operation of a U.S. deepwater port, or collisions or other navigational incidents on the high seas; and
- Preserving, protecting, developing, and, where possible, restoring or enhancing the resources of the coastal zone.

These policies are embodied in 10 different U.S. laws and about a dozen international agreements and conventions. No comprehensive marine environmental quality statute exists. With several exceptions, these policies and authorities have been enacted within the past decade.

Federal activities that carry out these policies fall into three broad categories:

- Environmental research and monitoring,
- Prevention and regulation of marine pollution, and
- Provision of remedial action or assistance.

a. Environmental Research and Monitoring

While the distinction between marine environmental research and marine environmental monitoring is not always clear, research is generally intended to gain knowledge about the form, fate, or effect of an agent in the environment, whereas monitoring seeks to observe, trace, or measure the environment over a period of time. Taken together, these two types of activities constitute a significant portion of the total Federal effort in the area of marine environmental quality. In fact, of the $957 million total Federal ocean program identified by the Federal Council for Science and Technology in 1976, $248 million, or 26 percent, could be classified as marine environmental research and monitoring activities. Further, at least eight departments and eight independent agencies are involved in research and monitoring work.

To date, Federal ocean pollution research and monitoring has been carried out in accordance with individual agency missions on an ad hoc basis, often without extensive coordination among agencies. Under the National Environmental Policy Act, for example, individual agencies have had to assess the environmental impacts of all Federal activities significantly affecting the quality of the environment. Under the Federal Water Pollution Control Act, the Environmental Protection Agency (EPA) is responsible for promulgating guidelines and issuing permits for the discharge of nondredged pollutants into the marine environment. Under the same Act, the Corps of Engineers is responsible for issuing permits for the disposal of dredged or fill material into U.S. navigable waters. The Marine Protection, Research and Sanctuaries Act of 1972 (The "Ocean Dumping" act) further requires EPA to regulate ocean dumping of nondredged wastes and the Corps to regulate the dumping of dredged wastes. The Act also requires the Department of Commerce to carry out comprehensive and continuing programs of research and monitoring on the short-term ecological effects of marine pollution, overfishing, offshore development and other ocean-based activities. Federal responsibilities for research and monitoring associated with outer continental shelf oil and gas development are vested in no less than four agencies: EPA and the departments of Commerce, Interior, and Transportation. Research, monitoring, and other functions related to vessel source pollution are largely the responsibility of the Department of Transportation under several different statutes. Because of this situation, there has been no dominant policy thrust or theme governing Federal marine environmental research and monitoring activities. Instead, these efforts have been conducted as needed to support other (and mostly regulatory) agency missions. A recent development could, eventually, change this situation. The Ocean Pollution Research and Development and Monitoring Act, which was approved in 1978, is intended to coordinate Federal efforts through:

- The preparation, every 2 years, of a comprehensive 5-year plan for Federal ocean pollution, research, and development and monitoring programs. Among other things, the plan is intended to improve Federal program planning and coordination in this area, reduce duplication, and increase the dissemination of marine environmental information.
- The establishment of a comprehensive, coordinated, and effective ocean pollution research, development, and monitoring program.
- The authorization of a program of financial assistance to any appropriate institution for projects or activities which are needed to meet priorities set forth in the plan if such priorities are not being adequately addressed by the Federal Government.

The National Oceanic and Atmospheric Administration of the Department of Commerce has primary responsibility for administering this new law in collaboration with the Office of Science and Technology Policy in the Executive Office of the President.

Until the first plan is prepared under the new Act, however, Federal marine environmental research and monitoring policy will continue to be dominated by ongoing program priorities. In the research area, Federal efforts have been focused on petroleum hydrocarbons, heavy metals, and manmade hydrocarbons (such as insecticides and herbicides). Petroleum hydrocarbons are an important problem, and it has been estimated that 5.5 million metric tons of these pollutants enter the ocean annually as a result of man's activities. Accordingly, intensive Federal research is aimed at determining the sources and amounts, and fates and effects, of oil in the marine environment. Departments and agencies involved in this effort include: the National Science Foundation, the Environmental Protection Agency, the Department of Commerce, the Department of the Interior, the Department of Transportation, the Department of Energy, and the U.S. Navy.

Heavy metals in the marine environment—including arsenic, cadmium, copper, mercury, nickel, silver, and zinc—are also an important subject of Federal research. Heavy metals can kill marine organisms or so contaminate them that they become a hazard to human health. Research in this area, therefore, focuses on the physiological and biochemical effects of heavy metals, the identification of metals in seafoods and sediments, and studies of the transfer and cycling of metals in the marine environment. This research is performed by the Department of Commerce, Department of Health, Education, and Welfare, and Environmental Protection Agency.

Synthetic hydrocarbons are receiving attention in the Federal research program, because they tend to persist in the marine environment and are toxic at low levels of concentration. These chemicals accummulate in aquatic food webs and can adversely affect fish, fish-eating birds, and humans. A well-known example of this type of problem is the contamination of Virginia's lower James River by Kepone, an insecticide. Federal research in this field is being carried out by the Department of Commerce, Department of the Interior, Environmental Protection Agency, and National Science Foundation.

On a comprehensive scale, Federal marine environmental research is also being carried out in the form of major regional studies of ocean pollution, international marine pollution projects, and studies of the environmental effects of offshore development. Major regional studies by the National Oceanic and Atmospheric Administration of the Department of Commerce include in-depth investigations of the New York Bight area, the Great Lakes, and Puget Sound. Major international studies include the National Science Foundation's International Decade of Ocean Exploration (which includes a significant environmental research component), the multi-agency Integrated Global Ocean Station System, and a planned project entitled Global Investigation of Pollution in the Marine Environment.

Four major categories of offshore development are also the subject of Federal environmental research programs: offshore drilling, ocean mining, deepwater ports, and nuclear powerplants. The environmental effects associated with accelerated OCS oil and gas development are receiving the highest priority attention. The research program in this area, which is under the general direction of the Department of the Interior's Bureau of Land Management, seeks to provide scientific information as a basis for:

- Management and leasing decisions,
- Predicting how oil and gas exploration and development affect the marine environment, and
- Predicting how oil and gas activities affect frontier areas.

The program, carried out jointly by the Department of the Interior and the Department of Commerce, involves establishing environmental baselines prior to exploration, monitoring the environment during exploration to detect changes, and making special studies as needed.

The Federal Government has a special ocean mining environmental research program. Its objective is to identify and satisfy environmental concerns before beginning commercial mining operations in the 1980s. U.S. industry has already spent millions of dollars to identify possible mining sites, develop deep ocean mining technology, and design processing plants. At stake is the recovery of significant quantities of manganese nodules, which lie on the deep seabed and which contain cobalt, copper, nickel, and manganese. The economic and strategic importance of these metals has made the legal regime for their recovery a major unresolved issue of international politics. In the meantime, the National Oceanic and Atmospheric Administration (NOAA) is conducting a research program to determine the environmental effects and hazards of nodule recovery and processing. NOAA and the Department of the Interior are also performing research on the environmental effects of nearshore mining, which would provide new sources of minerals such as sand, gravel, and phosphates.

Protecting the coastal environment from the potential adverse effects of deepwater ports and coastal and offshore nuclear powerplant development is also receiving Federal attention. The Department of Commerce, the Department of Transportation, and the Environmental Protection Agency are making environmental assessments related to deepwater port construction. Research on the environmental effects of floating nuclear powerplants involves decisions on sites as well as the determination of how chemical effluents and waste heat affect the marine environment. This research is being carried out by a variety of agencies, including the Nuclear Regulatory Commission, Corps of Engineers, Coast Guard, Environmental Protection Agency, Department of Energy, and Department of Commerce.

Much of the marine environmental monitoring being done by the Federal Government is associated with the same problems noted in the research area. Monitoring, however, is usually done in conjunction with the Federal regulatory process, both before permits are issued (baseline studies) and after the permitted activities begin. Monitoring programs of major importance are associated with:

- The Environmental Protection Agency's sewage treatment and nondredged materials discharge permit program under the Federal Water Pollution Control Act and the Ocean Dumping Act;
- The Corps of Engineers' dredge and fill permit program, conducted under the same statute; and
- The Department of the Interior's OCS oil and gas development program, conducted under the Outer Continental Shelf Lands Act of 1953.

Much of the actual monitoring under these programs is performed by the National Oceanic and Atmospheric Administration, because it has a fleet of research vessels.

b. Prevention and Regulation of Marine Pollution

The principal Federal statutes pertaining to marine pollution prevention and regulation have already been noted. They are the Federal Water Pollution Control Act, as amended, the Marine Protection, Research and Sanctuaries Act, and the Oil Pollution Act of 1961. Together, these acts authorize the Federal Government to control, through regulation, the nature and amounts of almost any conceivable harmful material which might be released into the marine environment. Further, these statutes contain

requirements (such as those for the treatment of sewage and those establishing tanker construction standards) which are designed to prevent the accidental discharge of environmentally harmful materials. The policy of these national requirements is clear: to reduce the threat of damage to the marine environment to the absolute minimum level consistent with other social and economic goals.

The principal Federal agency responsible for administering programs of marine pollution prevention and regulation is the Environmental Protection Agency (EPA). EPA sets guidelines and standards, issues permits, and enforces regulations for the discharge of all nondredged materials (except oil) into the navigable waters of the United States. This includes effluents from both fixed point sources (such as land-based sewage outfalls), mobile point sources (such as vessels and ocean dumping), and nonpoint sources (such as agricultural runoff). Under the Clean Water Act of 1977, EPA jurisdiction in this area now extends as far as 200 miles offshore in some cases.

To date, EPA activities and, therefore, Federal policy, have focused on the reduction of pollution from point sources. Federal regulations and criteria promulgated by the Agency establish four classifications for the disposal of nondredged waste material: absolutely prohibited, prohibited in excess of trace contaminants, strictly regulated, and less strictly regulated. Further, several classes of permits (such as general permits, emergency permits, and interim permits) have been established. For open ocean dumping, deepwater dumpsites have been designated and are being assessed. Through these procedures, two broad classes of ocean pollution are now being brought under control: industrial waste disposal, and pollution from sewage sludge and ocean outfalls. The objective is to meet the 1978 deadline for eliminating harmful pollution from these sources. Current plans also call for placing greater emphasis on nonpoint sources of marine pollution in the near future.

By weight, dredged materials account for over 90 percent of the total waste disposed of in the marine environment. The disposal of dredged materials in general, and polluted dredged materials in particular, into the ocean has been increasing over the years as available land disposal sites have dwindled. Under the Federal Water Pollution Control Act and the Ocean Dumping Act, the Army Corps of Engineers is responsible for the regulation of dredged materials disposal. The Federal policy on dredged materials, as contained in these acts, is that the dumping of dredged materials will be permitted unless "there is evidence that the proposed disposal will have an unacceptable adverse impact on municipal water supplies, shellfish beds, wildlife, fisheries (including spawning and breeding areas), or recreational areas." Recent amendments to the Federal Water Pollution Control Act exempt Federal projects from the permit requirements, subject to procedural limitations (such as direct Congressional authorization for the project and the preparation of an environmental impact statement). This is an important policy, because over 90 percent of the dredged materials dumped into the ocean result from projects undertaken by the Corps of Engineers. Another important policy in this area concerns the extent of coverage of the Corps permit program. After a 1975 court decision, several interim administrative decisions, and Congressional hearings, regulations were published in 1977 which extended the coverage of the permit program from navigable ocean waters to include all waters of the United States. The significance of this policy to marine environmental quality is that it brought coastal waters, wetlands, and mudflats under the permit program. These fragile areas were previously subject to use as disposal sites for dredge spoil without regulation.

Preventing and regulating marine oil pollution is a primary responsibility of the Coast Guard under the Oil Pollution Act of 1961, the Ports and Waterways Safety Act of 1972, and other statutes. Ship and tanker operations, together with river and urban runoff, account for nearly two-thirds of the petroleum hydrocarbons entering the marine environment. Federal policy in regard to oil pollution focuses on preventing the release of oil, oily wastes, and oily mixtures from shipping operations. For example:

- Regulations promulgated by the Coast Guard under the Water Quality Improvement Act of 1970 seek to reduce the probability of an accidental discharge of oil during normal vessel operations, transfer operations, and certain accidents. These regulations contain standards for such items as bilge and ballast piping, and oil transfer hoses. The regulations apply primarily to tank ships and barges, but also include provisions for merchant ships, fishing vessels, and recreational boats.
- The Federal Water Pollution Control Act of 1972 prohibits the discharge of a harmful quantity of oil or hazardous substances, in any form, into or upon U.S. navigable waters, shorelines, and contiguous zone. Further, the Coast Guard must be notified in the event a harmful discharge occurs.
- The Coast Guard has also promulgated regulations under the Ports and Waterways Safety Act

that govern the design, equipment, and operation of U.S. tank vessels. Additionally, regulations have been published that extend the rules to U.S. vessels carrying oil in foreign trade and to foreign tank vessels entering U.S. navigable waters.

- Under the same Act, the Coast Guard has established advanced vessel traffic services in five major port areas to improve navigation safety and reduce the chance of spills resulting from accidents.

With major exceptions (such as the blowout from offshore oil wells in the Santa Barbara channel in 1969), oil pollution of the marine environment from sources other than vessel operations has not yet been a significant problem for the United States. Most spills from these sources are small. The problem is that one or two large incidents can discharge enormous quantities of oil into the marine environment before the spill can be brought under control. Expanded offshore drilling in the future is expected to increase the probability of oil spills from these sources. Regulations covering prevention of this type of pollution are the responsibility of the Department of the Interior as well as the Coast Guard.

c. Provision of Remedial Action or Assistance

The third major category of Federal policies pertaining to marine environmental quality provides for remedial action or Federal assistance in the event of a pollution incident. Specific activities encompassed by this category include:

- Enforcement and surveillance,
- Containment and removal,
- Liability and compensation, and
- Restoration.

The enforcement and surveillance of marine environmental pollution laws and regulations is, almost without exception, a responsibility of the Coast Guard. A recent report of Coast Guard workload data indicates significant increases are being achieved in marine environmental protection enforcement and surveillance activities. For fiscal year 1978, for example, the Coast Guard estimated that it would:

- Conduct 1,300 aerial oil pollution patrols (up from 340 in 1976).
- Conduct 9,500 pollution investigations (up from 8,600 in 1976).
- Assess 5,100 civil penalties for pollution violations (up from 4,500 in 1976).
- Perform 800 ocean dumping surveillance missions (up from 687 in 1976).
- Receive 14,500 reports of oil and hazardous substance spills (up from 12,000 in 1976).

The objective of Federal enforcement and surveillance activities varies from year to year in accordance with existing conditions and available resources (budget, personnel, and equipment). While total surveillance and enforcement is not possible, high goals have been set, if not achieved, in most areas. In the ocean dumping area, for example, the Coast Guard's objective is to monitor 75 percent of dumping activities at mixed industrial waste sites and 10 percent of all remaining operations. These objectives are largely being acheived. Although research into advanced surveillance techniques is being performed, the current ocean dumping enforcement policy is to rely on validating permits, examining records and logs, and investigating incidences in which dumping vessels failed to notify the Coast Guard in advance of their departure. In the oil pollution area, direct physical inspection and surveillance techniques are more commonly used. In 1976, for example, the Coast Guard boarded and inspected 33,500 cargo vessels, 7,400 tank vessels, and 11,600 barges. In addition, it monitored over 17,000 cargo transfer operations.

Pollution containment and removal, an activity pertaining primarily to oil spills, is also a Coast Guard responsibility. Over 3,500 oil pollution removal operations were made in 1976, aided by a "pollution information response system" which was placed in operation in 1973. In addition, the Coast Guard has developed a "national strike force," consisting of highly trained personnel, to respond to major or unusual discharges. The general policy in this area is to respond to as many hazardous pollution incidents as occur. A special "pollution fund" has been established within the Coast Guard budget to provide for immediate cleanup of spills of oil or other hazardous substances. Expenditures from the fund are later to be reimbursed by the responsible owner or operator.

Oil spill liability and compensation is currently covered by a number of different statutes, including the Outer Continental Shelf Lands Act Amendments of 1978, the Trans-Alaska Pipeline Act, the Deepwater Port Act, and the Federal Water Pollution Control Act Amendments. While there are differences in the approaches taken under these individual laws, they generally establish some liability for damages due to spills. At the same time, many State statutes establish different types or limits of liability for damage. Accordingly, there have been frequent calls for a comprehensive, national system of liability and compensation for oil pollution. While no comprehensive policy or system has yet been enacted, the Congress is giving serious consideration to various bills.

Restoration of the environment subsequent to damage by pollution is an objective of the Coastal Zone Management Act. The original intent of the Act was further strengthened in 1976 with the enactment of amendments providing financial assistance, including grants, to States which suffer (or which have already suffered) environmental damage due to OCS oil and gas activities. Additional information on policies and programs in this area is contained in the section on "coastal resources."

3. Results of Existing Policies and Current Issues in Marine Environmental Protection

As a result of the numerous environmental protection laws enacted by the Congress since 1972, there is now a very broad base of legal authority that can be used in dealing with marine pollution. However, progress under these authorities has not been dramatic. For example:

- Oil spillage from vessels increased from 9,600 metric tons in 1973 to 27,500 metric tons in 1976.
- The amount of dredged materials dumped in the ocean has remained fairly constant over the past 4 years.
- The dumping of untreated sewage, sewage sludge and industrial wastes into the ocean continues, with particularly severe environmental effects in some areas (such as the New York Bight region). At the same time, the amount of industrial waste dumped declined by about 1 million tons between 1975 and 1976.

There are many possible reasons why more has not been achieved: not enough time has passed since enactment of the legislation; the problems (and required actions) are scientifically, legally, and economically complex; Government programs to deal with the problems are fragmented among too many different agencies; resources, budget, and personnel available for program implemention have often been less than required; and there are limitations on the control that can be exercised over foreign flag vessels. Overall, however, there appear to be reasons for optimism that the national goal of cleaning up the marine environment will be acheived eventually: significant sums are now being spent, Federal regulations are in place and are beginning to be enforced, and plans are now being made for the coordination of Federal pollution research and monitoring efforts.

The ultimate achievement of these goals could be facilitated by resolution of the following outstanding issues.

- *Need for a comprehensive Federal strategy and a clear Federal role for maintaining and improving ocean and coastal water quality.*

Firm goals and effective strategies for protecting the quality of the oceanic environment—which includes not only the water, but also related air and land resources—must be an integral part of the Nation's overall ocean policy. Although the many recent laws noted above have addressed the need for marine environmental protection, and numerous Federal agencies now carry out programs to implement these laws, the United States still lacks a comprehensive and coherent approach to long-term protection of the marine environment. As a result, there have been repeated conflicts between environmental goals and developmental pressures, and these have been resolved on a case-by-case basis instead of in accordance with an overall goal and strategy. Specific subissues in this area include:

(1) Nature of long-term Federal policy toward the disposal of chemical, municipal, nuclear, and other potentially hazardous wastes in ocean waters.

At question here is whether all ocean dumping is to be terminated, and if so when, or whether it is to be allowed to continue under adequate regulation and supervision. Current policy favors discontinuing ocean dumping within the next several years. While this would unquestionably benefit the marine environment in several geographical areas, this approach is not without its problems. One problem concerns the availability of economical and politically acceptable alternatives to ocean dumping. Disposal sites on land are becoming increasingly scarce and expensive. Proper treatment of wastes followed by their disposal at sea may well prove to be the best all around solution to an ever increasing problem. Resolution of this issue will center not only on the environmental impacts of alternatives, but also on their economic and social impacts.

(2) Need for a comprehensive Federal policy, and the appropriate Federal role, in dealing with hazardous materials (such as oil and insecticides) in the marine environment.

One major problem in regard to hazardous materials is that research investigations have not yet yielded enough information to permit the development of reasonable goals and policies. For example, adequate information is still lacking on such basic problems as how much oil enters the marine environment and from what sources, how to assess oil spills in an adequate manner, and how much hazardous materials can be absorbed by the ocean without undue damage to the environment. Lacking the answers to these

questions, the Federal approach has been one of overprotection of the environment. This can be expensive, for instance requiring double bottoms in tankers, without actually providing much extra protection. Further, the question of discharges, of hazardous materials, their prevention, and their cleanup is subject to different regulations promulgated by different agencies under different laws. Accordingly, consideration needs to be given to the development of a comprehensive and coherent policy in this field that will provide the necessary levels of protection at the least cost to the economy as a whole.

(3) Need for a Federal policy on comprehensive liability and compensation for damage from spills of hazardous materials.

The existence of several overlapping Federal statutes pertaining to liability and compensation, differences in standards and liability limits among the different acts, and a multiplicity of widely varying state laws in this field have given rise to an urgent need for a comprehensive and consistent Federal liability and compensation policy. Several bills have been introduced in the Congress during the past few years which would provide a comprehensive system, but none has yet been enacted. Resolution of this issue centers on several provisions, including liability limits, types of vessels and facilities to be covered, establishment of a compensation fund, demonstration of financial responsibility, and designation of a responsible Federal agency for administering the Act.

- *Need for a Federal policy on controlling air pollution, including acid precipitation, beyond the territorial sea.*

There is a growing awareness of the relation between the ocean and the world's weather and climate patterns and of the relation of both to critical economic factors. Yet the natural interaction among the oceans, atmosphere, and climate are not well understood, nor is the effect on climate of both oceanic and atmospheric pollution well known. There has been increasing concern about the possible effects of the growing level of atmospheric carbon dioxide and the corresponding capacity of the ocean to absorb greater amounts in its role as a carbon dioxide sink. There is also concern about how acid precipitation caused by inland air pollution affects the marine environment, including the water in the Great Lakes. Although research into this problem is at a relatively rudimentary stage, it may already be time to consider an interim Federal policy which would provide a greater measure of air pollution control than now exists in order to protect ocean resources beyond the 3-mile territorial sea. Resolution of this issue will depend on the extent to which a need can be demonstrated, specific sources of pollution identified, and technological solutions made available at an acceptable cost.

4. Conclusions

While marine environmental quality goals and statutes abound in the United States, the government's overall efforts to prevent, control, and reduce ocean and coastal pollution suffer from a fragmentation of responsibilities and activities. There is no comprehensive marine pollution control statute, no coherent Federal strategy for achieving the various goals, and no coordinated Federal program for carrying out the required activities in order of their priority. Because of this situation, progress toward achieving the goals has been slow and is becoming increasingly expensive. For the most part, the legislative authorities required to improve marine environmental quality have been provided. The greatest need now is for a unified Federal strategy and program that will ensure the timely achievement of legislatively mandated goals in an effective, economical, and consistent manner.

Marine Science and Technology

1. Background

The relatively unknown character of the seas and the difficulty of working in a hostile marine environment have made scientific and technological activities an important part of the overall national ocean effort for many years. Modern marine science began to develop in the United States in the 1930s, under the leadership of universities and private oceanographic institutions. Substantial Federal involvement in marine R&D efforts did not begin until the mid-1950s. In fact, except for military research projects, Federal oceanographic work during this period was limited largely to fishery investigations and coastal mapping surveys.

Major Federal interest in marine science and technology began in 1957, with the occurrence of the International Geophysical year and the launching of Sputnik I by the Soviet Union. Over the next 10 to 15 years, the Federal Government, gave high priority to

research and development in general and marine science and technology was no exception. In fact, marine science and technology was so emphasized during these years that it became nearly synonymous with the term "ocean policy."

The prevailing view in this era was that the oceans were a last frontier—a region where vast resources went unused owing to a lack of adequate scientific knowledge and technological capability. A basic tenet of the Federal approach to this situation was that stimulating advances in marine science and technology would lead to a greater realization of the oceans' economic—and social—potential. Accordingly, Federal ocean programs during the 1960s concentrated on acquiring scientific knowledge and exploring the ocean's unknown aspects.

The 1970s have seen major changes in this basic Federal policy approach to ocean resources. The limits of the world's ocean resources, once thought to be inexhaustible, have been recognized, and the fragile nature of many ocean and coastal areas has been acknowledged. New laws and policies have been established which seek to achieve such goals as conserving and managing fishery resources, reducing the adverse effects of marine pollution, and providing active management of coastal areas. Occurrences such as the increased recovery of offshore oil and gas and the discovery of seabed mineral resources have also shown that, for the most part, industry will make the technological advances needed to recover ocean resources once sufficient commercial potential has been established.

These changes have profoundly effected marine science and technology. U.S. ocean policy no longer is dominated by scientific and technological concerns. Especially in the Federal sector, these activities are viewed as supporting programs—efforts that provide new and improved tools to be applied to the achievement of other ocean policy goals and objectives.

2. Current Status of U.S. Marine Science and Technology Policy

The rapid change of emphasis in overall U.S. ocean policy during the 1970s has left the Federal Government without a policy for marine science and technology. No long-term goals, strategies, or priorities have been established to define a Federal role in marine R&D or guide Federal support for it. Instead, a wide range of separate Federal agencies, academic institutions, and industries pursue individual goals and strategies. The direction, priority, and length of commitment of Federal marine science and technology efforts are determined largely by the annual budget process. As a result of this overall situation, there have frequently been calls for a restatement of Federal ocean science policy and the establishment of new mechanisms to improve coordination and consistency among the various and diverse programs that exist.

At the same time, the overall level of Federal support for marine science and technology has remained firm despite the change in ocean policy emphasis and the lack of a cohesive marine R&D policy. From 1968 to 1977, for example, expenditures for ocean-related R&D increased, in terms of constant dollars, while overall national R&D expenditures declined. Total Federal expenditures for oceanographic research and for general purpose ocean engineering now exceed $200 million a year. Further, a significant fraction of the total Federal ocean program of over $1 billion a year is spent on supporting R&D work. Eleven major Federal departments and agencies support marine R&D activities.

Since most R&D activities, including marine R&D activities, are generally thought of as multipurpose, it is difficult to define an overall policy for marine science and technology in terms of mutually exclusive categories. For descriptive purposes, however, it appears most useful to view the Federal marine R&D effort in terms of the following three purposes.

- Activities which provide scientific and technological support for individual agency missions and operations.
- Activities which seek to advance basic knowledge and understanding of the oceans and the marine environment.
- Activities which aim to improve the state-of-the-art of marine technology or ocean engineering techniques.

As a practical matter, however, it should also be recognized that the boundaries between these categories are often indistinct and that an individual program or laboratory may be engaged in all three types of work simultaneously.

a. Mission-Oriented R&D

Throughout the 1970s, Federal emphasis has been on the support of marine science and technology that is necessary for the achievement of agency goals or the conduct of agency operations. Activities in this category tend to have the following characteristics.

- The work is short term in duration, problem-oriented in scope, and highly applied in terms of its scientific content.
- Activities of a seemingly similar nature vary widely from one agency to another and from one year to another owing to changes in objectives and priorities of the programs.

- The actual work is largely by Government personnel using Government facilities, because of the need to maintain a high degree of control over the work and flexibility in its direction.
- Activities tend to focus on problems of broad national interest rather than on local or regional concerns.

A total of nine Federal departments and agencies funded activities in this category amounting to an estimated $279 million in fiscal year 1977. This amount represented 29 percent of the total Federal ocean program budget for that year as identified by the Federal Interagency Committee on Marine Science and Engineering. A detailed breakdown of support activities by purpose and agency is shown in Table 1. Among the major Federal activities included in this category are:

- Department of Defense (DOD) marine research support programs—Since 1970, when the Mansfield Amendment to the Appropriation Act was passed, most DOD research has been mission-oriented. Most ocean research within DOD is by the Navy and is aimed at contributing to the Navy's primary mission. Current emphasis is on such topics as ocean dynamics and energy transfer processes, studies of chemical and biological relationships, acoustic and seismic studies of the ocean's seabed and the dynamics of sediment transport.
- Department of Commerce fishery research programs—Programs identify and predict the distribution and abundance of commercially important fishery stocks and determine how environmental changes affect fishery habitats. The results are used in managing fishery resources in the 200-mile zone, including the establishment of optimum yield and total allowable catch levels.
- The Outer Continental Shelf (OCS) Environmental Assessment Program—This program seeks to identify baseline environmental conditions in OCS lease areas and to predict and monitor the environmental effects of oil and gas production.The Department of the Interior manages the program which is carried out by a number of institutions, including the Commerce Department's National Oceanic and Atmospheric Administration.

b. Basic Oceanographic Research

Federal research programs which have as their objective the advancement of fundamental knowledge and understanding of the oceanic environment usually exhibit a different set of characteristics than mission-oriented programs. The following are typical of this class.

- Activities tend to be longer term in duration and seek to correct a lack of elemental knowledge about some aspect of the oceans. Most work of this type is directed toward the understanding of physical and biological phenomena rather than toward defined social or economic goals.
- Projects tend to be concerned more with a specific field of oceanographic research than with multidisciplinary investigations. Further, efforts tend to focus on individual or local marine ecosystems and their characteristics rather than on regional or national ocean areas.
- The actual work program is more often carried out by academic institutions than by in-house Federal laboratories.

Federal expenditures for basic oceanographic research in fiscal year 1977 were an estimated $145 million. Four Federal agencies fund most of this work: Department of Commerce, Department of Energy, National Science Foundation, and the Navy.

The basic ocean research program of the National Science Foundation (NSF) provides the broadest Federal support for basic marine science, particularly that conducted by universities. Over 100 academic institutions participate in NSF ocean research programs, although 15 major laboratories do most of the work. NSF supports over 300 grants for individual research projects each year. In addition, NSF funds a limited number of large, multi-institutional projects, such as the International Decade of Ocean Exploration and the Deep-Sea Drilling Project. It also provides funds for the acquisition and operation of ships and other facilities needed for academic research programs.

The Navy's ocean science program supports basic oceanographic research as part of its mission-oriented efforts, and is the oldest Federal program of university-based marine research. The program is organized according to scientific disciplines and encompasses marine geology and geophysics, oceanic biology, ocean technology, physical and chemical oceanography, and underwater acoustics. Although the work is basic and longer term, priorities within the program are changed from time to time to keep pace with the changing needs of Navy missions.

The marine science program of the Department of Energy (DOE) supports long-range studies and investigations of marine ecosystems and processes in order to facilitate the development of new energy systems and predict their environmental effects. Subjects of DOE research include the fate and effects of radioactive materials in the marine environment,

hydrocarbon cycling, marine damage and recovery rates, and the effects of powerplant discharges on the ecosystem.

The Commerce Department, through its National Oceanic and Atmospheric Administration, (NOAA), conducts basic oceanographic research programs in its own laboratories as well as through grants to academic institutions. Projects at NOAA laboratories include a variety of investigations of coastal and deep-ocean biological, chemical, geological, and physical subjects. The principal academic research effort sponsored by NOAA is the Sea Grant program, which provides matching grants to universities for research related to the development of marine resources, advancement of marine technology, and understanding of the marine environment. The Sea Grant program also provides for marine educational development, socioeconomic and legal research, and advisory (extension) services.

c. Marine Technology Development

In most areas of marine science and technology, the relative roles of Government, industry, and academic institutions overlap and are indistinct. In the area of technology development and ocean engineering, however, a policy has evolved over the years which defines, at least in part, a Federal role. The policy is to avoid Federal involvement except where:

- Disaggregated industry structures discourage the application and development of research and technology;
- The Government is the consumer of the technology; or
- Federal support is required, because of national interest and because the work is costly and long-term and involves high risks.

This policy has tended to keep Federal funding for general purpose ocean engineering and marine technology development at a relatively low level (an estimated $64 million in 1977). Four agencies currently sponsor major marine technology efforts: the National Aeronautics and Space Administration, the Department of Energy, the Department of Defense and the Department of Commerce.

Both Commerce and NASA are developing technology for remote observation of ocean environments. The present major effort in this area is the development of an oceanographic observation satellite named SEASAT.

Additionally the National Oceanic and Atmospheric Administration of the Department of Commerce has undertaken under all three aspects of the overall policy, a program to foster and develop advanced ocean technology and marine instrumentation. This program includes critical ocean engineering development for the Department of Energy's ocean thermal energy conversion program described below.

The Department of Energy has initiated, with strong Congressional support, a major effort to develop the technology for ocean thermal energy conversion. This program is already authorized at $33 million a year (1979), and could involve hundreds of millions of dollars to demonstrate commercial potential which is the Federal objective. Several Federal agencies, in addition to universities and private companies, are already involved in this project. Present plans call for the demonstration of a prototype electrical power generation plant by 1984.

The Department of Commerce and Department of Defense also develop and operate major ocean technology facilities, including submersibles, deep ocean simulation, pressure test chambers, and test facilities. Further, NOAA has an ongoing program to develop and operate environmental data buoys.

3. Results of U.S. Marine Science and Technology Policy and Current Issues

The current Federal policy, or the lack of one, in regard to marine science and technology makes it difficult to assess either problems or progress in this area. In fact, inconsistencies in the definition of Federal marine science and engineering programs and in agency budgeting procedures make it difficult even to identify and categorize marine R&D activities. Several broad trends, however, appear to be clear.

- More Federal agencies perform or sponsor marine R&D work today than ever before. This situation is a natural outgrowth of the increase in offshore activities and the development of new Federal programs to deal with that increase.
- Individual marine R&D projects have proliferated, the current number is estimated at over 4,000. This growth has increased the concern about overlap and duplication, and has magnified the need for overall policy direction and improved coordination.
- Over the past decade, the trend has been toward the support of mission-oriented marine R&D and away from basic oceanographic research. This trend has placed stress on the capabilities of Federal laboratories and has resulted in the underuse of academic capabilities in some instances.
- Policy and budgetary constraints have limited the level of Federal investment in new general purpose ocean engineering and technology. As a

result, questions have been raised about the adequacy of the supporting technology and engineering capability likely to be available for future work in the oceans.

Some key issues in marine science and technology that reflect broad trends and the lack of adequate policies to deal with these trends are discussed.

- *Adequacy of overall Federal marine science policy.*

Federal marine science activities have grown and changed in an unguided way owing to the lack of a well-defined policy. As a result, the Federal marine science effort appears to be unfocused, and there is no adequate way of judging whether there is enough marine science effort of the right type to meet national needs. A marine science policy will need to be formulated if future U.S. ocean policy goals are to be met in a timely and effective way. This policy should address the following specific concerns:

(1) Long-term goals for the national marine research effort in the context of overall national ocean interests and goals;
(2) The broad Federal role in marine science in relationship to the roles of academic institutions and industry;
(3) The extent to which Federally supported research should be directed toward the accomplishment of specific goals and objectives; and
(4) The strategy to be adopted by the Federal Government for carrying out its role in marine science and for accomplishing its own marine research goals, including consideration of:
   —The desired balance between basic research and mission-oriented research;
   —The relative priorities among research fields (e.g., marine geology and geophysics versus marine biology) and the basis for setting those priorities;
   —The relative priority of marine research in relation to other Federal research programs; and
   —The organization and administration of Federal marine science, including program coordination and facility sharing.

- *Adequacy of current policy in regard to marine technology and ocean engineering*

Neither the current policy nor its practical application addresses the need for a Federal role in supporting the development of marine technology and general purpose ocean engineering. Further, the existing policy tends to be project-oriented and problem-oriented rather than goal-oriented. As a result, Federal programs in this area tend to be narrowly focused and relatively expensive. There is some indication that a broader policy is necessary and would be beneficial. This broader policy would address:

(1) Long-term national needs for increased marine technology development and for the improvement of fundamental ocean engineering capabilities;
(2) Relative role and goals of the Federal Government, industry, and academic institutions in meeting the national needs; and
(3) Federal strategy for carrying out its role, including:
   —Criteria for Federal involvement, including benefits and payback periods;
   —Extent and duration of Federal involvement and criteria for termination of Federal participation; and
   —Desired mix and relative priorities among general long-term development efforts and short-term agency mission activities.

- *Need for improved coordination of Federal marine science and technology activities.*

The number of departments, agencies, programs, and projects currently involved in the conduct or support of Federal marine science and technology argues strongly for the development of an effective process of coordination. Interagency coordination now depends largely on an informal communication system and the Federal budget process. Better coordination has frequently been called for by, among others, Cabinet Secretaries and the General Accounting Office. At the same time, recognition must be given to the fact that too rigid a system of coordination can impede program development and can be expensive to administer. In resolving the coordination issue, the following should be taken into account:

(1) Current policy in regard to shared or common use of unique or special oceanographic facilities (such as research vessels and submersibles) and the need for changes;
(2) Adequacy of Federal marine research laboratories and the need for a coherent policy in regard to consolidating, closing, or expanding laboratory facilities;
(3) Adequacy of current Federal policies regarding the transfer of research results and technology from the producer to the user and from the military to the civilian sector; and
(4) Adequacy of existing and previous coordination mechanisms, and the need for new mechanisms or processes in the future.

4. Conclusions

On the whole, marine science and technology has fared somewhat better over the past decade, in terms of national investment, than has science and technology as a whole. At the same time, marine science and technology has undergone important changes, including a deemphasis of its heretofore dominant role in ocean policy and a shift in focus from undirected research to mission-oriented research. Science and technology are common elements of nearly all Federal ocean endeavors and will continue to play a significant part in the evolution of U.S. ocean policies. To ensure the maximum benefit from Federal marine science and technology, a reformulation of marine R&D policy will be needed. This policy must define and clarify the Federal role and objectives in this area in the context of overall national ocean interests and goals.

Table 1.—Federal mission-oriented R&D by purpose and agency

Purpose and agency	Estimated FY 1977 budget
	(in millions of dollars)
National Security	
Marine science support for defense systems (DOD)	50.8
Ocean engineering for defense purposes (DOD)	21.5
SUBTOTAL	72.3
Living Resources	
Fishery resources research (Commerce)	33.9
Endangered species and marine mammals research (Commerce)	5.3
Contaminants research (Commerce)	1.0
Use of marine life in biomedical research (HEW)	6.0
SUBTOTAL	46.2
Transportation	
Advanced ship engineering development (Commerce)	9.7
Development and Conservation of the Coastal Zone	
Marine pollution abatement and control—Water Quality Standards (Commerce, DOD, Energy, EPA, Interior)	19.5
Regional environmental systems research (Commerce, DOD, NSF, Smithsonian)	37.7
SUBTOTAL	57.2
Nonliving Marine Resources	
OCS environmental assessment (Commerce, Interior)	36.8
Environmental impact of mining (Commerce)	1.5
SUBTOTAL	38.3
Environmental Observation and Prediction	
Data acquisition, processing and dissemination (Commerce, DOD, Transportation)	37.3
Model studies and development (Commerce, Energy)	4.3
SUBTOTAL	41.6
Ocean Exploration, Mapping, Charting and Geodesy	
Nautical charts, coastal mapping, and marine geodesy (Commerce)	6.2
National Centers and Facilities	
Oceanographic data and instrument centers, sorting centers (Commerce, Smithsonian)	7.6
TOTAL	279.1

Marine Employment, Education, and Training

1. Background

Today over 2 million people work in the marine and maritime fields, including commercial fishing and seafood processing (372,000), marine recreation occupations (585,000), commercial shipbuilding (246,000), marine construction and engineering trades (272,000), and other occupations (592,000). In addition, the Federal Government employs some 587,000 uniformed Navy and Coast Guard personnel. The education and training these people receive varies widely, but, for the most part, Federal involvement is minimal.

The dominant theme of education policies in the United States is that public education should be the primary responsibility of States and localities, not the Federal Government. This overall philosophy has prevailed in marine education and training as well as in other fields. The Federal Government, however, has played a role

- as an employer and trainer of marine professionals,
- in meeting national needs for trained military officers,
- in providing limited assistance to States and localities where resources are lacking, and
- in providing limited assistance to vocational institutions.

This role has developed gradually. Direct Federal employment and training of marine professionals began in the mid-1800s, first with the establishment of the Coast and Geodetic Survey and later with the creation of an Office of Fish and Fisheries. Both of these organizations, now part of the Department of Commerce's National Oceanic and Atmospheric Administration, continue to hire and help train marine scientists and other professionals. The direct education and training of military officers also dates from the 19th century. The Naval Academy was established in 1845, and the Coast Guard Academy in 1876. Eventually, the armed forces and their academies became important centers for research and training related to civilian as well as military needs. Limited Federal assistance to States and localities in marine education began in 1874, with provision of Federally owned ships to State maritime academies. World Wars I and II led to major growth in this Federal role, including the establishment of the U.S. Merchant Marine Academy. Later the National Science Foundation, the Office of Naval Research, and the Sea Grant College program significantly increased Federal aid to marine education.

2. Current Status of U.S. Marine Employment, Education, and Training Policy

The current policy is, as it has been in the past, for State and local governments and private organizations to have the primary responsibility for marine employment, education, and training. The Federal role, which is one of limited involvement, concentrates on:

- Providing assistance to higher education and the training of marine professionals;
- Educating merchant marine officers;
- Assisting in the provision of marine and maritime vocational training; and
- Providing for general public education, public information, and public participation in marine policy making.

a. Education and Training of Marine Professionals

The education and training of marine professionals in the United States is performed primarily by the universities. Over 160 colleges and universities offer programs in marine science, ocean engineering, and related fields. More than 1,000 students are enrolled in marine graduate programs at these institutions every year, including students from abroad.

The Federal role, while minimal, is very important, because of the need for financial support. Thus, Federal policies in this area have three broad objectives:

- Ensuring an adequate supply of marine professionals, particularly scientists and engineers, to conduct programs important to national defense and economic development;
- Supplementing the capabilities of the existing decentralized system of marine education and training; and
- Increasing the supply of trained marine public policy specialists, including economists, lawyers, and planners.

The objective of ensuring adequate numbers of scientific and technical personnel dates from the National Science Foundation Act of 1950. It is augmented by the Sea Grant College and Program Act of 1966. Under these two statutes, the education and training of marine professionals has generally been linked to Federal support of university-based research. Most, but not all, Federal assistance to graduate students is in the form of research assistantships rather than direct fellowships or loans.

Three of the Federal agencies involved in the support of higher education programs in the United States have traditionally supported efforts in marine areas: the U.S. Navy's Office of Naval Research (ONR), National Science Foundation, and the National Sea Grant Program operated by the Department of Commerce's National Oceanic and Atmospheric Administration. As the first Federal research organization established after World War II, the Office of Naval Research has had a major effect on marine science. Through its support of basic marine research, both at universities and at the Navy's own laboratories, the Office has played a major role in the education and training of marine professionals. Although the 1970 Mansfield Amendment altered ONR's role in university research by terminating efforts not closely related to military functions or operations, about $26 million of applied research projects are still funded each year. In addition, ONR spends about $5 million each year for research assistantships related to its contracts with universities.

Since 1970, the National Science Foundation has been the major source of basic research support for U.S. universities. The Foundation now spends about $1 million a year for fellowships and training grants to students in the marine sciences, another $15 million a year to support about 1,800 graduate and postdoctoral students, and about $60 million a year for basic oceanographic research at universities. The National Science Foundation also operates a number of undergraduate and teacher-training programs which include coverage of marine science and engineering topics.

The Sea Grant program provides funds to institutions, rather than directly to individual researchers, on a matching fund basis. Grants are provided for institutional capacity-building purposes, for the operation of marine advisory services, and for a wide variety of basic and applied research projects in ocean-related fields. Funds to develop marine education and training curricula are also provided. In recent years, the Sea Grant program has funded participation in its work by about 1,800 faculty members and professionals, 800 graduate students, and 400 undergraduate students each year. To date, 12 schools have been designated as "Sea Grant Colleges," a formal recognition of their status as centers of excellence in marine research, engineering, and education. The annual budget for the Sea Grant program is about $28 million.

b. Merchant Marine Officer Training

The Federal Government has long played a significant role in the education and training of deck and engineering officers for the U.S. merchant marine. Today's policy concentrates on ensuring sufficient numbers of trained officers to meet national defense and commercial requirements. This goal is achieved through

- the direct education of about 1,000 students each year, and
- the provision of financial assistance to several thousand more students in State-operated maritime academies.

The Federal Government also provides some basic safety training for merchant marine officers and is responsible for the licensing of U.S. merchant mariners. The Federal role in this field does not extend to decisions concerning the total number or actual employment of officers in the U.S. merchant marine. These decisions are governed by other factors, including the enrollment policies set by the States, union contracts and agreements, and other private sector considerations.

The four sources of new merchant marine officers in the United States are:

- The U.S. Merchant Marine Academy, at Kings Point, New York, operated by the Department of Commerce's Maritime Administration;
- Six State-operated maritime academies in Maine, Massachusetts, New York, Michigan, Texas, and California;
- The Calhoon Engineering School, in Baltimore, Maryland, operated by the Marine Engineers Beneficial Association; and
- The "hawsepipe," which consists of individual self-help study and on-the-job training.

The Federal Government is involved with education and training which occurs at the first two types of institutions, and spends about $18 million annually for their support. The primary basis for this Federal involvement is the assumption that national defense needs require an adequate supply of trained officers at all times to meet possible emergencies.

The largest single source of new officers is the U.S. Merchant Marine Academy, with an average annual enrollment of about 1,000 students. All student costs are Federally funded. The Academy offers a 4-year undergraduate program leading to a Bachelor of Science degree and to a merchant marine license as a Third Mate or Third Assistant Engineer. In addition, the students are enrolled as midshipmen in the U.S. Naval Reserve and, if eligible, are commissioned upon graduation as ensigns in the U.S. Navy Reserve.

In addition to operating the U.S. Merchant Marine Academy, the Maritime Administration provides assistance to the six State-operated merchant marine academies, which have a combined average annual

enrollment of about 2,600 students. Payments of $1,200 per year to each student (up to a limit of 673 students per entering class) are provided by the Federal Government to defray the costs of uniforms, books, and subsistence. Further, grants of $75,000 a year are made to each of the academies for operation and maintenance, and Federally owned training vessels are provided to five of the schools. The State academies, through their own admission and enrollment policies, largely determine how many new officers will be entering the job market each year. Likewise the unions and the shipping companies, through their formal agreements, largely determine how many of the new officers are actually employed as seagoing deck and engineering officers.

The Maritime Administration also provides supplemental training of both officers and other merchant mariners. This Federal activity stems from safety requirements and the need for retraining of shipboard personnel to keep pace with technological advancements. Short courses are now provided on firefighting and on the use of radar, gyrocompass, and loran navigation equipment. A fee is charged for most courses. Federal emphasis on crew standards, safety training, and licensing requirements is expected to increase in the future under orders issued by President Carter in 1977 following a series of tanker accidents off the U.S. coast.

c. Marine and Maritime Vocational Training

Traditionally, the vocational training system in the United States has been decentralized and the Federal role has been minimal. Most vocational training occurs outside the regular educational system, through on-the-job training, apprenticeship programs, and industry and labor schools. Some training, however, is provided through high schools, private vocational schools, community colleges, and a few programs offered by colleges and universities. The armed services also operate large vocational training programs. The Federal role in this system is largely limited to the provision of financial assistance, and has been aimed at helping to ensure sufficient supplies of trained personnel in various fields.

Two types of Federal activities affect marine and maritime vocational training: general Federal vocational programs, and vocational programs specifically targeted on marine and maritime employment training. General Federal vocational programs include the efforts of the Office of Education in the Department of Health, Education, and Welfare and the Comprehensive Employment and Training Act programs of the Department of Labor. These two efforts seek to provide ready access to high-quality vocational training and retraining in general and, more specifically, to reduce unemployment and underemployment. While these programs do not seek to meet specific marine employment needs or goals, they do provide support for vocational schools that supply many skilled workers to ocean-related industries.

Programs that deal specifically with marine vocational education and training include the Sea Grant program and the Maritime Administration's training schools and maritime academy support programs. Sea Grant operates two programs related to vocational education and training. One has provided $400,000 a year for the support of 23 technician training projects at community colleges. This program trains individuals for work in such fields as commercial fishing, commercial diving, marine electronics, and engine maintenance and repair. Another Sea Grant program, the marine advisory services program, provides for the transfer of research results and engineering developments from the laboratory to the ultimate users. This program is patterned after the agricultural extension program, and provides for the support of approximately 225 "field agents" around the country who supply technical advice and information to working fishermen, ocean engineering firms, and other marine businesses. The Maritime Administration's vocational, educational, and training programs have already been summarized under "merchant marine officer training."

d. Public Education

The newest area of Federal involvement in marine education and training is generally termed "public education." This field includes:

- Precollege education for students who may become specialists in marine science, marine affairs, or related fields;
- General precollege, college, and adult education for people interested in marine topics, but not in becoming marine specialists; and
- Public information programs intended to improve citizen awareness and aid public participation in the formulation of marine policy.

Federal involvement in public education programs is even more limited than its involvement in other areas. This is because the field is quite new, because there is a fine line between public information and government "propaganda," and because both the public and the Congress are quite wary of greater Federal involvement in public education.

Precollege public education is the responsibility of the National Science Foundation. The foundation spends about $4 million a year on precollege science education. For the most part, the courses and materials developed by the Foundation through its pre-

college programs do not focus specifically on marine science subjects. Rather, the programs focus on the traditional science and social science disciplines (such as physics, biology, and chemistry) that have general applicability. Under its Secondary School Student Science Training Program, however, the National Science Foundation has offered several marine-related summer courses to high school students.

General marine education (precollege, college, and adult) is now being assisted by several Federal agencies, including the National Science Foundation, the Office of Education, the U.S. Coast Guard, and the Office of Sea Grant. The principal programs in this field are those operated by the Sea Grant program, which provides about $2 million a year in matching grants for the development of new marine courses and curricula.

Public information on marine programs is provided by nearly all agencies that have ocean-related functions. The dominant Federal policy in this area has been to provide the information to intermediate institutions, such as the press, rather than to inform the public directly. However, a new trend is developing, which involves increased Government efforts to aid public participation in the Federal decisionmaking process. The objective is to increase public access to Government information and to structure Federal processes so that citizens can have a greater effect on decisions. In the marine area, citizen participation is being actively encouraged in the administration of the Coastal Zone Management Program, the implementation of the Fishery Conservation and Management Act of 1976, and in outer continental shelf oil and gas development.

3. Results of Existing Policies and Current Issues in Marine Employment, Education, and Training

The current view appears to be that the existing educational system, and the limited Federal role in it, works well in terms of meeting the need for educated and trained workers in marine fields. The interchangeability of marine professional occupations with those in other, more traditional, disciplines, for example, has resulted in there being neither shortages nor surpluses of marine professionals over the years. Likewise, the supply of merchant marine officers has occasionally been more than needed, but never less than needed, over the past two decades. Even in the absence of rigorous forecasting and planning, the need for workers in marine fields has been adequately met by the "free market" without extensive Government involvement.

Because of this situation, no major policy issues need to be addressed now in the area of marine employment, education, and training. However, a number of current concerns may warrant further observation and study. These include:

- A concern that Federal financial support to university-based marine research is dwindling, or at least not keeping pace with inflation. This type of erosion, it is felt, causes long-term problems in the maintenance of basic facilities such as laboratories, research vessels, and scientific equipment. As noted in the marine science and technology area, there is also a concern that Federal support for university-based marine research tends to emphasize applied research at the expense of basic research.
- A concern that the number and type of assistantships supported by Federal research programs may result in students being trained in disciplines or specialities for which the future demand is not great. This situation results from the relatively easy availability of funding for short-term work on today's problems at the expense of research on broader, long-term problems.
- A concern that adequate data to project future marine employment needs do not exist; therefore, there is no firm basis for educational planning or training curriculum development.
- A concern over the nature and extent of the Government's role in the training of officers for the deep-sea merchant marine. This concern arises from the fact that the Federal Government, the States, and the unions all train merchant marine officers. This occasionally produces more officers than industry needs. The key question is whether the Government can or should play more of a role in balancing the supply with the demand.

4. Conclusions

Federal policy toward marine employment, education, and training is one of strictly limited involvement in a highly decentralized system. The main Federal role involves the provision of financial assistance to educational institutions, sometimes for specific purposes, but often not targeted in any way. This policy approach is consistent with Federal policy in other fields of employment, education, and training. Further, this policy approach appears to be effective in that there are no major shortages or surpluses of trained individuals in marine occupations, and no major policy issues to be resolved in the immediate future.

Organizing The National Ocean Effort

1. Background

For many years members of the ocean community have been critical of the absence of a single ocean focus within the organizational structure of the Federal Government. These critics have cited the failure of the United States to adopt an explicit "national ocean policy," the alleged lack of coordination among agencies administering ocean programs, and the absence of what advocates term an "ocean commitment" as evidence of the critical need for such an organizational focus. Despite the establishment of the National Oceanic and Atmospheric Administration (NOAA) in 1970 in response to the recommendations for consolidation contained in the 1969 Stratton Commission Report, critics point to the multitude of agencies still involved to varying degrees in carrying out Federal ocean-related activities.

In 1969, the year that *Our Nation and the Sea* was issued by the Stratton Commission, Federal ocean programs were located in 6 departments, 4 independent agencies, and 17 agencies or subagencies within the departments. Ocean programs today are administered by 10 departments, 8 independent agencies, and 38 agencies or subagencies (fig. 1).

Although it is clear that Federal ocean programs are widely scattered, evidence of dispersion alone is not enough to warrant a major restructuring. The basic issues with regard to possible reorganization of ocean programs center less on the fragmented nature of ocean responsibilities among the Federal agencies than upon pragmatic questions such as: Is the ocean a sensible integrating theme around which to organize? Is the ocean important enough to justify reorganization? Are the deficiencies perceived in the administration of ocean-related programs best cured by reorganization or other means? And finally, are the benefits of reorganization sufficient to outweigh the very real, often under-estimated costs of disruption inevitably associated with restructuring the Federal Government?

2. General Trends in Government Organization

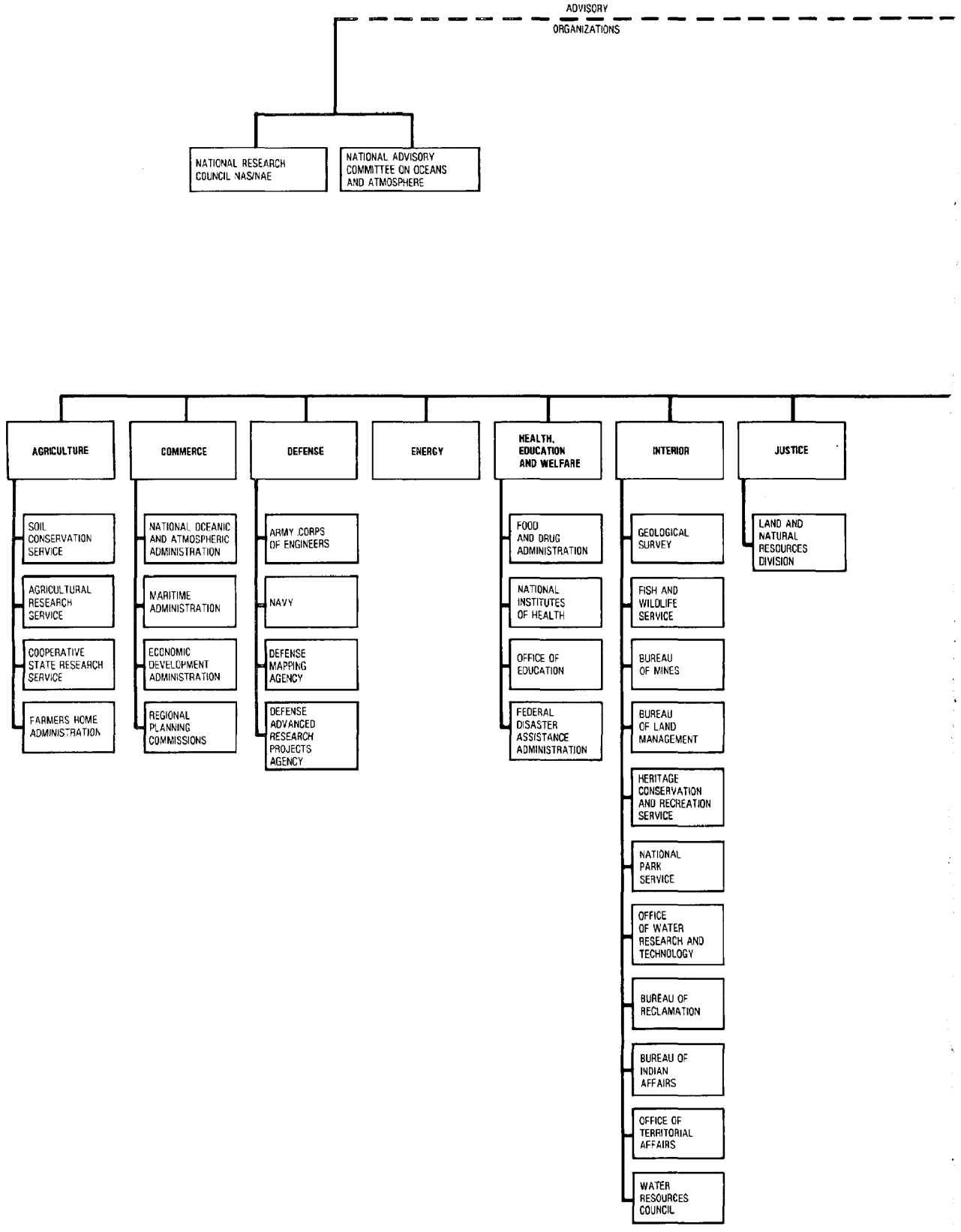
Reorganization of the Executive Branch of the Federal Government has often been seen as an attractive means of solving an array of problems associated with the management and implementation of Federal programs. Through reorganization, proponents of new structural arrangements have sought to emphasize specific problem areas, improve efficiency, reduce waste, and realign political power. Success in achieving these ends through reorganization, however, has been mixed and it has become increasingly clear that organization alone is not the key to sound policy and effective program execution. While good organization can enhance the prospects for successful government programs, it does not assure them.

In addition, while many proposals for restructuring the Executive Branch have been made, few have been fully implemented. Because government reorganization is not without substantial cost, proposals involving major change are seldom implemented except in the face of a clear deficiency in attaining a primary national goal.

To date virtually all of the major reorganization proposals to emerge from the various special committees, commissions, and councils, which have considered the subject of Government reorganization in depth, have been predicated on three broad basic assumptions. First, it has been assumed that organizations should be structured by like function and purpose. Second, it has been assumed that overlapping functions should be minimized. And finally, it has been assumed that control should be unified. Inevitably these underlying assumptions have led to proposals for larger Cabinet-level departments as a means to unify control and consolidate authority.

In spite of the general trend toward recommending consolidation, a small number of public administration scholars have emphasized that the consolidation and unity achieved through larger departments may not be without significant cost. Gains in unified control, consolidated authority, and broad-based policy-making may be achieved at the expense of clearly focused program management aimed at specifically identified program objectives. The goal, of course, is to coalesce related functions into a unit of government of sufficient critical mass to influence high-level policy but which is small enough to pursue identifiable goals and flexible enough to adapt to changing requirements.

In assessing the organization of any governmental activity, there are three distinct executive functions to be considered. The first is *policy formulation* which, in the Executive Branch, is centered in the White House. The second, *program implementation,* involves execution by the agencies. The third, *priority establishment,* is the function of the budget process. Each of these three government functions must be considered separately and jointly in assessing the effectiveness of existing or proposed organizational arrangements for discharging Federal ocean and coastal responsibilities.


ADVISORY
ORGANIZATIONS
NATIONAL RESEARCH COUNCIL NAS/NAE
NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE
AGRICULTURE
SOIL CONSERVATION SERVICE
AGRICULTURAL RESEARCH SERVICE
COOPERATIVE STATE RESEARCH SERVICE
FARMERS HOME ADMINISTRATION
COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
MARITIME ADMINISTRATION
ECONOMIC DEVELOPMENT ADMINISTRATION
REGIONAL PLANNING COMMISSIONS
DEFENSE
ARMY CORPS OF ENGINEERS
NAVY
DEFENSE MAPPING AGENCY
DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
ENERGY
HEALTH, EDUCATION AND WELFARE
FOOD AND DRUG ADMINISTRATION
NATIONAL INSTITUTES OF HEALTH
OFFICE OF EDUCATION
FEDERAL DISASTER ASSISTANCE ADMINISTRATION
INTERIOR
GEOLOGICAL SURVEY
FISH AND WILDLIFE SERVICE
BUREAU OF MINES
BUREAU OF LAND MANAGEMENT
HERITAGE CONSERVATION AND RECREATION SERVICE
NATIONAL PARK SERVICE
OFFICE OF WATER RESEARCH AND TECHNOLOGY
BUREAU OF RECLAMATION
BUREAU OF INDIAN AFFAIRS
OFFICE OF TERRITORIAL AFFAIRS
WATER RESOURCES COUNCIL
JUSTICE
LAND AND NATURAL RESOURCES DIVISION

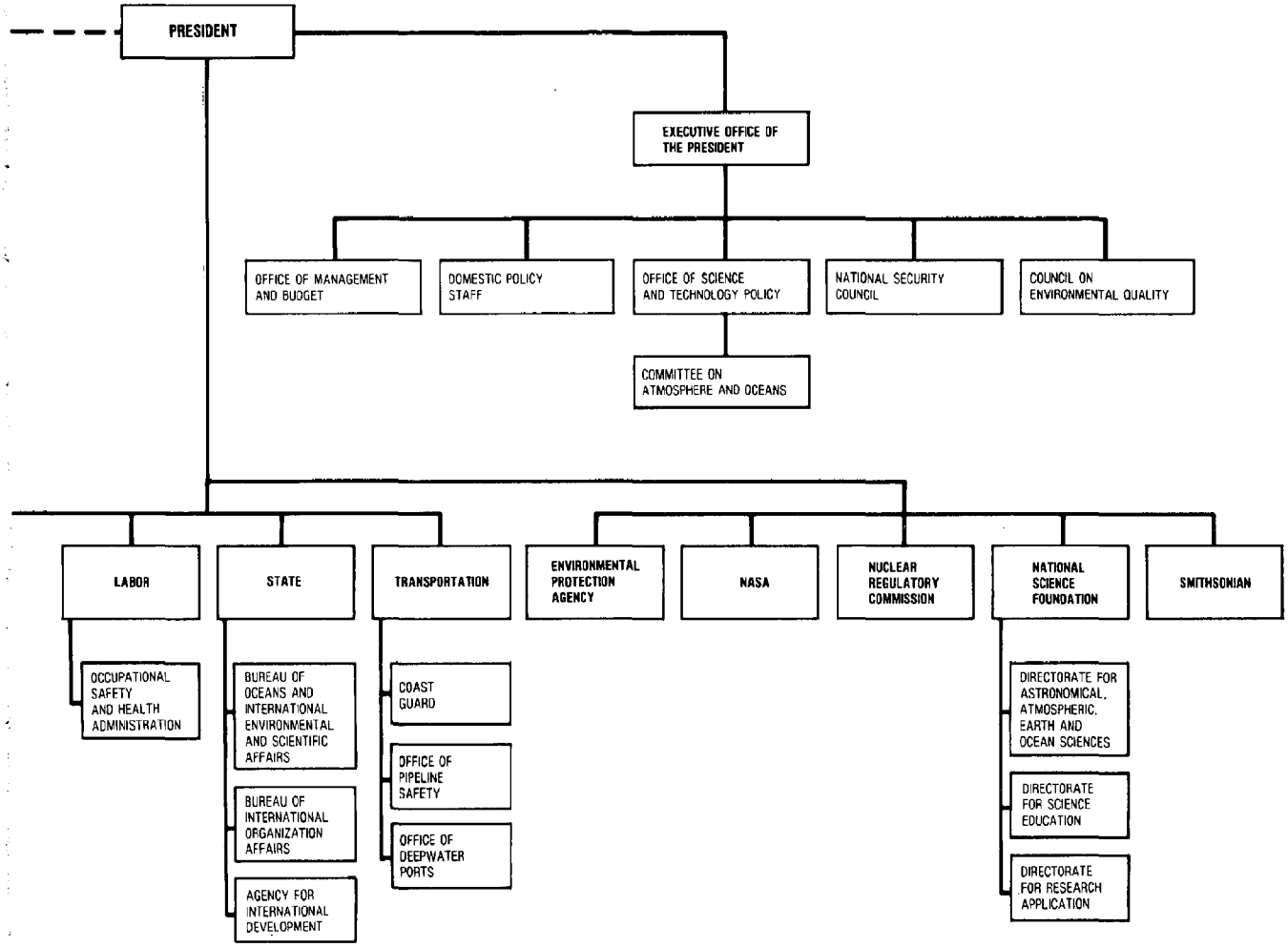


Figure 1. - Departments and agencies administering ocean programs in 1977.

3. Formulation of Ocean Policy

By definition, policy includes the goals, plans, and processes of a government body and therefore encompasses both substantive and procedural matters. While Federal governmental policy is frequently considered to be based on broad national goals, the translation of these goals into specific policies is often frought with conflict. The weighing and balancing of these conflicts is the essence of the U.S. political process. Because the U.S. is a pluralistic society operating through a representative government, it is not surprising that, at times, simultaneous pursuit of conflicting goals may occur.

The Federal policy formulation machinery with respect to ocean affairs is diffused in both the Executive Branch and in the Congress. While ocean programs are scattered through more than 50 agencies, jurisdiction over ocean-related legislation is shared by 39 subcommittees in 12 standing committees of the House of Representatives and 36 subcommittees in 10 standing committees of the Senate.

This diversity in the policy formulation process has led many observers in the ocean community to conclude that a more active role needs to be played by the White House in the development and oversight of a consolidated ocean policy. This conclusion is based in part on the important role that the Executive Office of the President has played in ocean affairs from time to time in the past and in part on the concern that ocean matters today do not receive sufficient high-level attention on a consistent and continuing basis.

Historically, 1966 through 1971 was the period in which ocean policy received the most focused attention at the White House level. With creation of the National Council on Marine Resources and Engineering Development (the Marine Science Council) by the Congress in 1966, a Cabinet-level interagency body was established in the Executive Office of the President with responsibility for the development and advancement of a comprehensive program dealing with all aspects of marine science activity. Under the chairmanship of Vice President Humphrey, the Council was visible, and according to observers, at least partially successful and active in exercising leadership in ocean science and technology policy. In 1971 the Council was terminated allegedly for "lack of interest" within the Administration at that time.

With the termination of the Marine Science Council, the responsibility for marine science oversight within the Executive Office of the President was shifted to the Office of Science and Technology (OST) until its elimination in 1973. Since that time, and until the creation of the Office of Science and Technology Policy in 1976, the Executive Office of the President was without in-house counsel for marine science and ocean affairs.

With enactment of the National Science and Technology Policy, Organization, and Priorities Act of 1976, a science policy mechanism was reinstated within the Executive Office of the President. The Office of Science and Technology Policy (OSTP) was established and assigned responsibility for providing input to the Presidential decision-making process for science policy and budget decisions. In light of the active role that the science advisory structure has played in the development and articulation of ocean policy in the past, it is anticipated that OSTP will assume a major role in this area as well.

The policy formulation system within the White House generally reflects the style and character of the President. However, each modern President has inherited a number of special policy councils that have been established in the Executive Office of the President by statute, reorganization plan, Presidential memorandum, and executive order. Before Reorganization Plan 1 of 1977, under which the Executive Office of the President was restructured, 19 policy units dealt with general and specialized issue areas. Before reorganization, various aspects of ocean policy were considered by four Cabinet-level councils that were responsible for formulating general policy: (1) Domestic Council, (2) National Security Council, (3) Energy Resources Council, and (4) Council on International Economic Policy.

Reorganization Plan No. 1 eliminated both the Energy Resources Council and the Council on International Economic Policy. The functions of the Domestic Council were assumed by a Domestic Policy Staff within the White House Office which was given responsibility for managing the processes that coordinate the development of domestic and economic policy.

This new system of policy integration within the White House places the responsibility for coordinating ocean policy with the Domestic Policy Staff and the National Security Council. Additional input to policy formulation comes from the Office of Science and Technology Policy and the Council on Environmental Quality, both of which reside in the Executive Office of the President.

In addition to internal Federal policymaking bodies, the use of Federal advisory committees has expanded greatly in recent years. In the quest for public participation in the governmental decision process, departments and agencies have created many general and specialized advisory groups to counsel administrators on the execution of govern-

ment programs. In 1976, some 75 advisory committees, councils, and commissions dealt with ocean-related matters. The National Advisory Committee on Oceans and Atmosphere (NACOA) and the quasi-governmental committees operating under the National Academies of Science (NAS) and Engineering (NAE) through the National Research Council (NRC) are particularly important in the development of national ocean policy because of their role in the formulation and assessment of broad policy options.

Inevitably, the quest for an improved process for developing and assessing national ocean policy leads back to proposals for reestablishing a Cabinet-level White House policy unit with exclusive responsibility to oversee ocean affairs. The Marine Science Council was as much a symbol of national commitment to the oceans as it was an effective policy mechanism. Since termination of the Council in 1971, ocean policy, including marine science, has been determined in the context of functional problems within the framework of the domestic and foreign policy councils remaining in the White House.

The need seen by some for policy direction at the Presidential level has prompted a number of suggestions that an institution similar to the former Marine Science Council is again needed within the Executive Office of the President. To succeed, it is clear that proponents of this position must demonstrate that there are significant issues requiring the attention of the President that are not adequately handled now.

Whether a White House council would meet the expectations of its supporters depends on a number of considerations. First, there is little chance that such a council could be ordained by the Congress and be influential unless the President fully concurred in its creation, or unless it was formed at his initiative. Second, the relative success of the Marine Science Council, which has been used as a model for many of the new organizations that have been proposed, must be reexamined carefully to determine its actual effectiveness. It must be remembered that the Council and its counterpart, the Stratton Commission, were riding the crest of a wave during a period of expanding science activity; thus, the cause and effect of what transpired in Government during that period is difficult to assess objectively. Finally, it must be emphasized that trends in the Carter Administration are contrary to the concept of centralizing power in the Executive Office of the President. The abolition of all Cabinet-level policy councils save the National Security Council (NSC), would suggest that proposals for a White House policy council to oversee ocean affairs are not in keeping with present reorganizational trends.

4. Organization of Federal Ocean Programs

Although establishment of the National Oceanic and Atmospheric Administration (NOAA) was intended by proponents to provide a central focus for development of civil ocean-related affairs within the Federal Government, its establishment in 1970 under Reorganization Plan No. 4 fell far short of the Stratton commission recommendations for an independent ocean agency. In placing the agency within the Department of Commerce and limiting its functions primarily to research and development, the plan was essentially a compromise between Congressional supporters of a strong independent NOAA and a reluctant Administration.

In the years since its establishment, however, the character of NOAA's mission has slowly changed with the addition of new responsibilities assigned under the provisions of the Coastal Zone Management Act of 1972 (and 1976 amendments), the Deepwater Ports Act of 1972, the ocean dumping research and sanctuaries provisions of the Marine Protection, Research, and Sanctuaries Act of 1972, the Marine Mammals Protection Act of 1972, and the Marine Fishery Conservation and Management Act of 1976. All of these new missions, with the exception of ocean dumping, have been regulatory or developmental rather than research in nature and reflect the growing public concern for resource protection and management which emerged in the early 1970s.

In spite of this expanded role in ocean and coastal regulation and development, NOAA today remains a small part of the total Federal civilian ocean program. As a consequence, proponents of consolidation have continued to press for additional reorganization, citing the continued absence of coordination among ocean programs as evidence of the failure of the present dispersed and fragmented organizational scheme. The absence of close coordination, they contend, impedes the development of needed national ocean policies, reduces administrative efficiency, and promotes lack of accountability. In rebuttal, opponents of broadscale reorganization have suggested a need only for limited consolidation of some programs and the establishment of an interagency coordinating mechanism to facilitate the formulation of high-level policy and to ensure better interagency collaboration.

One group of ocean programs presents unique organizational problems that stand above the general concern for overall program coordination. These are the programs that split responsibility for implementation among two or more agencies in different departments. Several ocean programs are of this character—marine mammal protection, various re-

sponsibilities under the Endangered Species Act, ocean dumping regulation, management of anadromous fish, and the regulation of the placement of structures in navigable waters. Such jointly administered programs clearly need special attention, whether considered in the context of overall ocean reorganization or as incremental measures to consolidate the most troublesome coordination problems. While some of these programs are characterized by a complementary division of responsibility, all too often the division has been artificially drawn—leading to program overlaps and omissions.

If large-scale reorganization of Federal ocean affairs is ultimately determined to be warranted based on a thorough consideration of all costs and benefits, several questions relating to form and level will remain to be solved: (1) Should the entity be independent, or part of an existing department? (2) If independent, should the organization be an agency, administration, or a Cabinet-level department? (3) Should the organization be based upon functional responsibilities, resource objectives, disciplines, or regional services? (4) How should responsibility for development and regulation be allocated to the new entity?

The Stratton commission strongly recommended the creation of an independent agency to manage the Nation's ocean affairs. Others, however, have urged other organizational forms. Often the debate on form turns on how much influence or "clout" an independent agency could muster as compared to a Cabinet-level department. Frequently, however, influence depends less on the rank of the administrator than on his personal influence in the Administration. Nonetheless, it is generally believed that Cabinet-level officers have greater access to and are more influential with the President and other Cabinet officers than are administrators of independent agencies or sub-Cabinet-level administrations.

Whether Government organizations should be based on functional responsibilities (e.g., energy, food, transportation, and labor), or whether they should be organized on the basis of resources (e.g., land, water, people, and oceans), is a fundamental question. While most Government activities today are functionally organized, many ocean programs have been organized on a resource basis.

It is clear that by singling out the ocean as an integrating theme for a resource-oriented organization, there is a tacit implication that there are characteristics and factors that sharply distinguish ocean resources from land and other resources. Four characteristics that set ocean activities and resources apart have been identified.

- Ocean resources are common property resources and are therefore wholly in the public domain.
- Ocean activities interact and impact one another in a more direct way than comparable land-based activities.
- Technology needed for development of marine resources is significantly different from that associated with similar land-based resource development.
- Because the ocean constitutes an area in which U.S. interests butt up against the interests of other countries, there is an important international ingredient involved in resolving ocean problems.

In pursuing reorganization based on the ocean as an integrating theme, proponents of this approach must be able to argue successfully that these distinctions are important enough to the Nation to warrant a consolidated resource focus in this area of governmental affairs and that the benefits of this improved focus outweigh the costs of change.

Finally, in addressing the question of organization form, specific attention must be directed to the issue of appropriately separating developmental and regulatory activities in order to avoid conflict of interest problems. While ocean reorganization proposals have generally urged the separation of these functions, there is an emerging acceptance (notable in the case of the recently established Department of Energy) of the coexistence of these two functions under some circumstances. This acceptance is based on a distinction which has been drawn between two types of regulatory activity: (1) that which is intended to control the economics, production, and competition within an industry, and (2) that which is designed to protect other values such as the environment, public health, and safety. It has been suggested that the former can safely be integrated with promotion, while the latter should remain separate. In this view, it is the quality of the regulatory activity that determines the compatibility rather than the mere regulatory label.

In recent years, a number of recommendations for executive reorganization have been made which, if adopted, would significantly affect various Federal ocean activities. Those of the Stratton Commission and NACOA, for example, concentrated exclusively on Federal ocean programs. The Ash Council, with a mandate to look broadly at programs related to natural resources, on the other hand, proffered recommendations that would encompass all natural resource, ocean, atmosphere, and earth sciences. Professor John Norton Moore addressed not only the problems of organizing Federal ocean programs

within the Federal agencies, but also suggested changes in the organization of the Department of State's Bureau of Oceans and International Environmental and Scientific Affairs, and urged creation of a Cabinet-level Marine Affairs Council in the White House. Senator Ernest F. Hollings introduced S. 3889 in the Second Session of the 94th Congress in which he proposed the creation of a Department of Environment and Oceans (DEO). Together these efforts represent the conventional wisdom on reorganizing the Government to execute the Nation's ocean policy.

5. Setting Priorities—The Budget Process

While congressional authorizations, in a sense, determine the "qualitative" characteristics and content of Federal programs, it is the budget process and appropriations that determine the "quantitative" aspects of such programs. Priorities of Government are set by the budget process. In a real sense, the budget process is also a major determinant in establishing ocean policy. Budget decisions not only serve to allocate funds among major governmental activities, but decisions also must be made among alternative programs within each major budget category. These decisions influence the magnitude and direction of the Federal programs. In addition, the budget process plays a significant role in resolving key issues that filter through the agencies and into the Office of Management and Budget (OMB) via the budget process.

The budget process is, of course, not wholly internal to OMB. Departmental review of agency budget proposals during the budget process involves a series of budgetary decisions on programs and directions as the proposals pass from agency submission to final secretarial approval. In this process offices compete actively in support of their respective programs. Whether policy decisions are consciously part of the departmental review process largely depends on operating procedures. Nevertheless, policy decisions are made at every stage of the review process from initial proposal to final submission of the President's budget to the Congress. And, the process does not stop there. Congress imposes its own set of priorities through the budget resolution-authorization-appropriation process.

The politics of the budget in the Executive Branch are similar to the politics of appropriations in the Legislative Branch. Enactment of the Congressional Budget Control and Impoundment Act of 1974, which requires the Congress to set a Congressional ceiling on Government spending just as the President must do, has made the Congressional budget process more analogous then ever to the budget process within the Executive Branch.

The organization of OMB for budget purposes reflects a modified functional breakdown of government activities. Ocean programs are fragmented among eight divisions: International Affairs; Energy and Food; Economics and Government; Natural Resources; National Security; Human Resources; Science, Space, and Energy Technology; and Community and Veterans Affairs. On the surface of the OMB budget organization there is even less consolidation in dealing with ocean-related budget items than there is in the overall organization of ocean programs in the agencies. The OMB budget organization is, in part, dictated by the organization of the President's budget document and, in part, by the jurisdictions of the appropriations subcommittee in the Congress.

Although it would be difficult, it is possible to reassign budget responsibilities among the functional divisions of OMB to improve the comprehensiveness of the "ocean budget" review. This could be achieved even in the absence of general governmental reorganization. The question obviously is whether the improved examination would be worth the difficulty in bringing about the reorganization, and whether it could be done without disruptive effects on other review requirements.

6. The Reorganization Issue

The Carter Administration has placed high priority on reorganizing the executive departments in order to streamline government by reducing the number of operational units. The President's Reorganization Project (PRP) within the Office of Management and Budget has undertaken a broad review of Government organization from which proposals for reorganization will emerge.

The Environment and Natural Resources Task Group has responsibility for appraising ocean-related programs in the context of other natural resource and environmental programs. At the date of this printing, three organizational options have been identified by PRP:

- A Department of Natural Resources in which ocean responsibilities would be merged with other natural resource activities,
- An independent ocean agency, and
- A Marine Affairs Council that would coordinate ocean functions which remain in the departments.

These options are similar to earlier proposals made by others, with possible minor modifications, and therefore are consistent with the conventional approaches prescribed for ocean organization.

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