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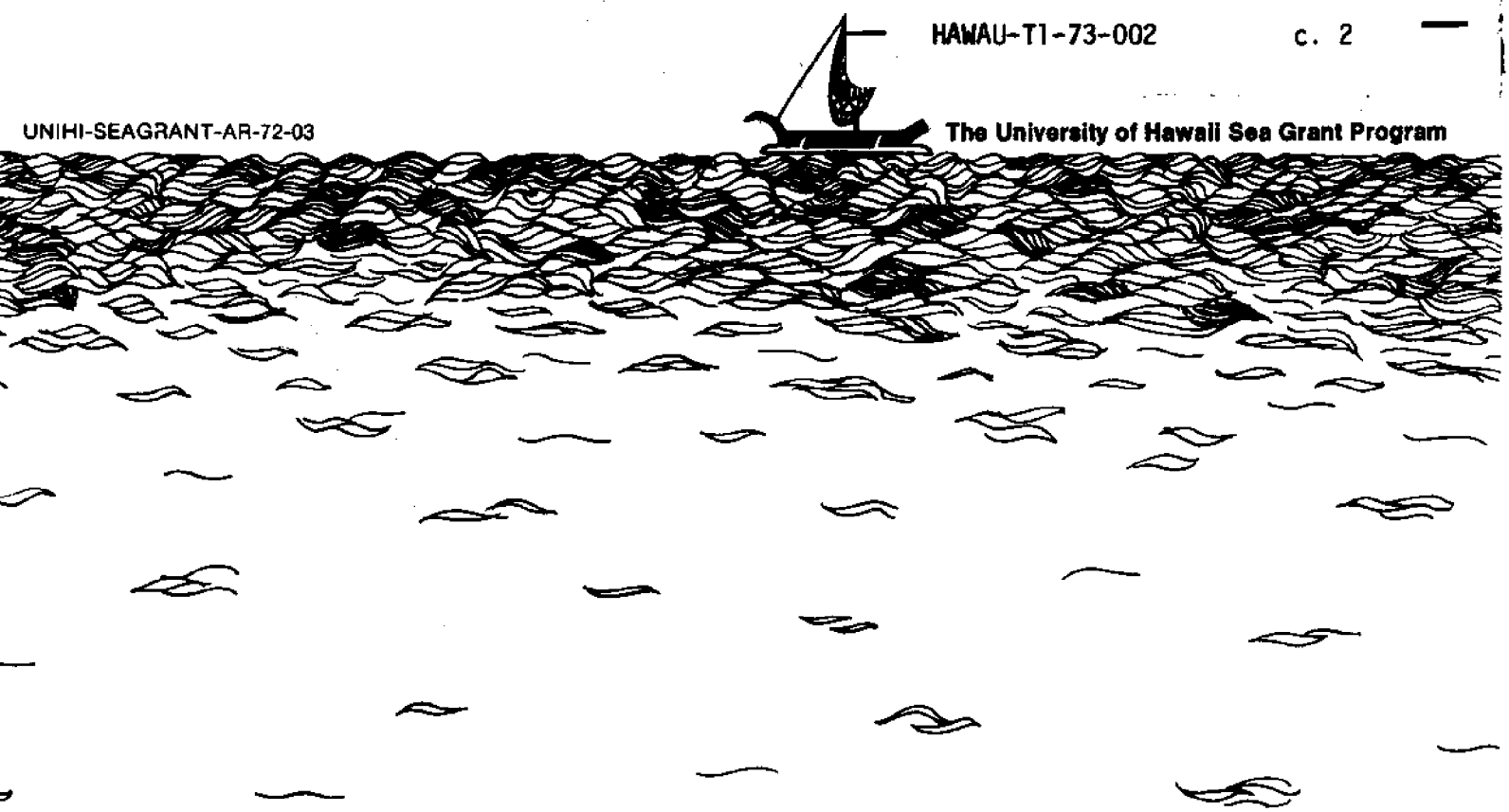

The University of Hawaii Sea Grant Program

Spheres of Influence in Hawaii's Coastal Zone

Volume 1. Federal Agency Involvement

Justin Rutka and Chennat Gopalakrishnan

March 1973

SPHERES OF INFLUENCE IN HAWAII'S COASTAL ZONE

Volume 1. Federal Agency Involvement

by

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PREFACE

Hawaii and the nation have entered a period when the need for coordinated participation in establishing guidelines for orderly future growth is being recognized by all levels of government and concerned citizenry. This report, the first part of a two-volume series, outlines the general issues of coastal-resource management, and provides an overview of federal agency programs in Hawaii's coastal environment. The multi-facet dimensions of state and county involvement in this environment will be highlighted in a separate report at a later date. Taken together, these reports are intended to serve as focal points for coordinated coastal planning efforts in the near future.

The need for coordinated, comprehensive planning for the coastal environment is especially urgent, since the growing use of the ocean and the land that borders it has led to a sharp intensification of management dilemmas. The influx of new residents, the growth of tourism, and the resultant spread of suburban and resort complexes have seriously eroded the already limited amount of open shoreline from public use, despite the fact that state law clearly specifies that Hawaii's beaches and shoreline belong to the public and as such should always be available for public use. Access to shoreline areas is at a premium. The use of coastal waters as a receptacle for agricultural, industrial, and human pollutants remains a subject of concern. Given the limited land area of the islands, several plans to use the offshore coastal zone for aviation purposes and other functions with large spatial requirements have been proposed. Concurrently, expansion of affluence and leisure time have caused a significant increase in marine-based recreation, thus intensifying the conflicts among the multitudes of activities taking place in the ocean or near the water's edge.

In response to these pressures, an awareness has grown on many fronts that the coastal zone cannot possibly support all uses or users harmoniously. Indeed, the much-beloved phrase "balanced development" quite often has reflected a failure to recognize the physical limitations of the coastal zone and the inherent tolerances and capacities of the ecosystems therein. More and more segments of society are now demanding that institutions be shaped not only to meet the conflicts arising from obtaining access to the use of coastal resources, but also by the ecological factors relating to the needs of the resources themselves. Although this awareness has been sporadic and slow in coming, it nonetheless has already resulted in the shaping of social machinery needed to handle some of the problems of conflicting use.

Of particular note are the National Coastal Zone Management Act of 1972 (Public Law 92-583), and the proposed National Land Use Policy Act (which Congress is currently considering and which has the support of the Nixon Administration), both of which allow states to take over planning functions currently assigned primarily to local areas. These measures highlight the importance of the nation's coastal zone in terms of two distinct but related regimes of land and water. The National Coastal Zone Management Act emphasizes protection of the ecosystems of the shoreline environment, and authorizes federal grants-in-aid to states for the development and implementation of comprehensive coastal zone management programs. On the other hand, the pending national land-use bill stresses accommodation and

coordination of all land uses, particularly "areas of critical environmental concern". Significantly, the pending land-use bill lists coastal wetlands as the first among "areas of critical environmental concern" which are to receive priority attention. Under the Administration's proposal, states which fail to develop adequate land-use programs would lose from 7 to 21 percent of federal funds for highway construction, airport building, and land and water conservation. This bill also authorizes hefty federal grants-in-aid for states to develop and implement coordinated systems of land and water use.

While most mainland states have either geared up to the task of providing focus and direction to specific aspects of coastal resource utilization or have enacted truly comprehensive coastal zone legislation similar to the national Act, Hawaii has waited for Washington to move first and has not yet formulated a comprehensive policy in this sphere. On the other hand, Hawaii was the first state in the country to adopt a centralized land-use law almost a decade before the inception of the pending federal land-use bill which calls on other states to adopt somewhat similar measures. Under the present system the state's Land Use Commission and the State General Plan provide land-use boundaries and broad guidelines for counties to do detailed planning and implementation.

Despite the optimistic developments in federal law and state administration, it is questionable whether coastal zone planning as a problem apart from overall land-use planning will be easily resolved. In defining the coastal zone, the basic problem has been one of isolating a single part of a natural continuum as needing special attention for planning and managemnet purposes. The National Coastal Zone Management Act recognizes that society's use of the interface between the sea and the land represents a sharp contrast with general land utilization, and it advocates a comprehensive system of state management in this realm. However, the federal Office of Management and Budget has refused to seek funding for implementing the provisions of the Congressionally mandated coastal zone law in favor of the all-encompassing National Land Use Bill. Proponents of the land-use bill have argued that since the environmental system of the earth comprises one ecosystem, there should thus be only a single policy and one system of management.

The Nixon Administration's land-use proposal rests on the fact that fragmentation and proliferation of government entities exercising land-use planning powers are contradictory to the real concern of sound national land-use policy, which is to "assist States to more effectively exercise their constitutional responsibilities for the planning and management of their land base through the development and implementation of state land-use programs designed to achieve economically and environmentally sound uses of the Nation's land resources." The impetus of this proposal seems to involve conditions that do not exist here. The county-state government structure in Hawaii is extremely simple compared with other states. Hawaii lacks cities, townships, and other smaller governmental subdivisions, and hence, more easily avoids the problem of the formulation of conflicting land-use plans. While highly appropriate for mainland states, the pending federal land-use bill seems to be somewhat redundant for Hawaii. Conversely, the National Coastal Zone Management Act reinforces the accomplishments of most mainland coastal states, and offers an opportunity for Hawaii to develop an effective statewide system of management for the coastal zone.

Although there are problems and public concern over the conditions of Hawaii's coastal region, the general state of this zone is not yet of critical proportions in comparison with Lake Erie or even San Francisco Bay. The absence of crisis situations, however, does not imply that the need for management and associated political arrangements for the coastal zone is less apparent or politically marketable. To the contrary, the need for some kind of coastal management at the state level has already made itself felt since the state's coastal zone has experienced a period of accelerated growth and associated use conflicts, trends that are very likely to continue into the foreseeable future.

A debate on land use and coastal zone planning could very likely take place in the State Legislature this year. There are several coastal zone and land-use measures in the legislative hoppers at the moment. Instead of dealing with land-use and coastal zone planning as competing entities, the goal should be to synchronize the two planning functions. It is expected that there will be some disagreement on whether coastal zone planning should be subsumed under general planning. What will emerge from the Legislature is still uncertain.

The Advisory Services component of the Sea Grant Program is entrusted with getting research results and marine-related issues before the public. This report contains, under a single cover, considerable information that is not widely known to the citizens of Hawaii. It should also be of interest to most public agencies at the state and county levels. It is also possible that some federal agencies are not fully aware of other federal agencies' involvement in the coastal zone.

The cooperation of federal agency officials is gratefully acknowledged. Their assistance has made possible the compilation of information in this report.

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Advisory Specialist
March 12, 1973

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PART I

INTRODUCTION

This section provides historic and sociological background, states the problem, describes the intent and scope of the study, and highlights the indistinct character of the coastal zone. It considers the attempts to regulate coastal zone activities through legislation at the federal level, and defines the areas of federal concern.

BACKGROUND

THE PROBLEM

It is often generalized that the policies of government instrumentalities are ambiguous with respect to regulating activities and developments in the coastal zone so as to conform to the best standards of public welfare. It is frequently charged that sound bases for rational and orderly planning in the development of the coastal zone are lacking, that common policy regarding coastal zone legislation and effective administration at the county, state, and national levels are presently not available, and that agency responsibility and jurisdiction over activities in the coastal zone are uncoordinated and overlapping to a serious degree. All of this, according to at least one expert (Dr. Edward Wenk), results in "an anarchy of utilization" in the coastal zone (*Coastal Zone Management: Newsletter of Coastal Resource Exploitation, Conservation and Enhancement*, November 1970, p. 1). Moreover, the consensus of experts seems to reflect the fact that current laissez-faire approaches to managing the coastal zone fall far short of providing for the highest feasible, long-term social and economic good.

The above generalizations may overstate the actual state of affairs with respect to Hawaii's coastal zone. Nevertheless, statements of this kind are increasingly heard in Hawaii from various levels of government, from academia, and from representatives of special-interest groups.

Beginning in 1966 with the enactment of the Marine Resources and Engineering Development Act (Public Law 89-454), a number of studies were made that brought into focus the uniqueness of what is now called "the coastal zone." The most widely known of these studies was published by the Commission on Marine Science, Engineering and Resources entitled *Our Nation and the Sea* (1969), and further elaborated in the "Report of the Panel on Management and Development of the Coastal Zone," in *Science and Environment* (1969):

> Man's past actions affecting estuaries and shorelines have been poorly and incompletely planned, often unimaginative and frequently destructive. Present priorities in uses of the coastal zone often do not reflect the best interests of the public. Many State and Federal agencies have overlapping and fragmented authority. The limit of State and local responsibility is often obscure· the authorities are often without real power. Under such circumstances it is particularly difficult for plans to be designed, made authoritative, and enforced (*Science and Environment*, 1969, p. III-2).

Some months after the Commission completed distribution of *Our Nation and the Sea*, Hawaii became the first state in the nation to issue a parallel and complementary report called *Hawaii and the Sea* (1969):

> In its discussion of the coastal zone management problem, the Task Group recognized that various responsibilities for each of its (coastal zone) facets were fractionated among Federal, State, County and military entities in Hawaii. As a result of this overly broad dissemination of responsibilities, there is no individual agency that can establish policy and delegate authority in dealing with problems ranging from water pollution to beach sand removal (*Hawaii and the Sea*, 1969, p. 95).

INTENT AND SCOPE OF THE STUDY

The Task Group on Role of State and Local Governments[1] generalized that many uses of the coastal zone are subject to a variety of public and private actions and fall under several overlapping government jurisdictions, resulting in uncoordinated efforts to derive maximum social benefit from Hawaii's coastal zone. However, since the publication of the national and Hawaii reports, the National Oceanic and Atmospheric Administration (NOAA)[2] has been established bringing together major federal programs dealing with the atmosphere and the oceans under a single integrated agency. A companion organization, the Environmental Protection Agency (EPA),[3] was created to control pollution on an integrated basis. Parallel moves at the state level in Hawaii were the recent establishment of the Office of Environmental Quality Control (Act 132-1970) and the Office of Marine Affairs Coordinator (Act 137-1970). By Law, the former is entrusted to coordinate all state departments and agencies in matters concerning the environment and ecology; the latter is responsible for the development of an optimum plan for marine resource use. Thus, both 1969 reports are now partially obsolete.

Despite these integrative developments in federal organization and state administration, the various responsibilities for coastal zone activities such as water pollution control, land use management, natural resource conservation, and shoreline development are still dispersed in various ways both within and between agencies of government. Centralized institutions for coordinating, guiding, and directing decisions in the coastal zone proper do not exist.

Moreover, it is often conceded that certain alignments in the overall organizational structure of government agencies hamper the development of truly comprehensive systems of coastal resource management. This awareness has sparked calls for the creation of new institutions, or the consolidation or modification of existing institutions, in the spirit of more effective coastal management. Ultimately, management decisions for the coastal zone will be made through political channels.

A crucial implication of the presence of numerous government agencies operating in Hawaii's coastal zone is this: If new vehicles for coordinated and comprehensive planning and management for Hawaii's coastal zone are to be created, then the agencies that presently manage the resources and uses of this zone must first be clearly understood. It is thus necessary to identify those government agencies which currently participate in Hawaii's coastal zone affairs and determine where existing agency responsibility lies.[4]

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[1]This Task Group was responsible for Chapter 7 of *Hawaii and the Sea*, pp. 93-106.

[2]Established by Presidential Reorganization Plan No. 4 of 1970. NOAA became effective on October 3, 1970.

[3]Established by Presidential Reorganization Plan No. 3 of 1970. EPA became effective on December 2, 1970.

[4]The Department of Agricultural and Resource Economics, with support from the Office of Sea Grant Programs at the University of Hawaii, undertook an initial survey of government agencies which participate in Hawaii's coastal activities. Drawing on various sources, an identifying list of agencies was compiled. Using this master list as a base, a letter was sent to appropriate agency representatives requesting

The primary objective of this report is to delineate the current interests and jurisdictions of the federal government in Hawaii's coastal zone. The report is limited to a descriptive inventory of essential information concerning federal involvement in this environment. It is anticipated that such information will be of interest and value to the broad array of federal, state, and local agencies engaged in development and regulation within this zone, as well as to locally based environmental action organizations, the general business community, and to the public at large. State and local agency involvement in the coastal zone environment will be outlined in a separate report.

THE INDISTINCT CHARACTER OF THE COASTAL ZONE

The coastal zone means many different things to different people. Since the Commission on Marine Science, Engineering and Resources[5] opened its discussion of the coastal zone, the formulation of an acceptable definition of what constitutes the coastal zone has remained a complexity. Some examples will serve to illustrate the variety of meanings attached to the rubric, "the coastal zone":

> I frequently characterize the Coastal Zone as the girl next door, who grew up and matured and suddenly became attractive and desirable not only to me, but to all the other boys in the neighborhood. Each saw in her different attributes, each described her in different terms, each had different estimates of her dimensions, but all agreed she was something pretty special (Adams, 1969, p. 87).

> The Coastal Zone is the interface between land and sea, the land adjacent to the sea, and the sea and sea bed adjacent to the land.
>
> The Coastal Zone is the edge of sovereignty where the rights of the nation give way to freedom of the seas.
>
> The Coastal Zone is a place where more people live than any other place.
>
> The Coastal Zone is unique because of the degree to which activity in one area of the Zone affects uses at great distance from where the action takes place.
>
> The Coastal Zone is unique because of the difficulty in determining boundary lines between private and public ownership of land and water.
>
> The Coastal Zone is unique. . .(because of) the degree to which the value of privately owned land and other resources is dependent upon close juxtaposition of non-marketable common resources held in trust for the use of all citizens (McBroom, 1969, pp. 80-81).

> The coastal zone is an abstraction reflecting human appraisal of a sub-region which in turn includes a complex mix of other sub-regions (Fisher, 1970, p. 403).

---

a detailed statement covering the legalistic or statutory mission that each agency may have in the coastal zone, its scope of work, and its various programs as they relate to the coastal zone. Information derived from the mail survey was supplemented by personal interviews with many agency heads having offices in Hawaii.

[5]Popularly known as the Stratton Commission, after Julius A. Stratton, chairman of the numerous task groups comprising the commission body.

In all of these descriptions, the underlying common theme implies a region of transition between the land and the sea, encompassing a wide heterogeneity of physical features and a broad array of activities occurring therein. As generally delineated, it includes the outer reaches of the territorial sea as the seaward boundary, and extends inland to the landward extent of marine influences. The term is subject to definitional argument. No one can state precisely where the zone begins ashore, or where it ends at sea, in such a way that everyone else agrees or in such a manner as to provide a clear legal definition. The coastal zone is simply a matter of viewpoint. It is an organizing concept for looking at a part of our environment that represents an irreplaceable and extremely valuable asset. Thus, the promotion of coastal zone consciousness is an investigatory device undertaken to advance understanding, planning, and administration...assuming, of course, that such a zone has operational meaning.

The delineation of the boundaries of the coastal zone calls for personal judgment. Obviously the intertidal zone and the uplands adjacent to the high-water mark are properly within the area of discussion. Likewise, there is a consensus that the traditional three-mile belt of marginal sea which is within state boundaries falls in the realm of the coastal zone. Beyond the outer limit of the territorial sea, the concept of the coastal zone begins to lose some of its meaning. However, the nature of extensive offshore uses and developments being planned or undertaken in the United States, and their effects upon the environment, have led to a number of proposals to expand the offshore area of the coastal zone (Knight, 1970; Krueger, 1970). Moreover, to understand federal-state responses to historical and current problems and uses of the coastal environment, including conflicts of jurisdiction,[6] it is desirable to go further ashore. Consequently, the coastal zone can be viewed as including two somewhat arbitrary subzones:

Zone A: Primary coastal zone (zone of immediate first-order impacts). This area extends three geographic miles seaward from the high-tide line--primarily an area of state jurisdiction--and extends landward from the high-tide mark to the "extent of marine influences".

Zone B: Secondary coastal zone (zone of foreseeable future impacts, currently treated as a zone of second-order impacts). This area extends from the outer seaward limit of Zone A to the outer limit of the "continental" shelf or Hawaiian ridge systems.

[6]During February 1972, Dr. John P. Craven, State Coordinator for Marine Affairs, advised the Governor that the Hawaii Legislature should declare that the state has property rights in the vast biological and mineral resources of the sea around the Hawaiian Archipelago. Dr. Craven's resolution calls for state control over mineral and non-pelagic biological resources within a corridor 400 miles wide, generally centered at the highest points of elevation along the Hawaiian Archipelago.

ATTEMPTS AT FEDERAL COASTAL ZONE LEGISLATION: A HISTORICAL REVIEW

The birth of coastal zone consciousness at the national level can be traced to the 89th Congress which passed the Marine Resources and Engineering Development Act of 1966 (Public Law 89-454). This Act created the Commission on Marine Science, Engineering and Resources (the Stratton Commission) and charged it to develop a long-range program for greater use of the resources of the seas. From the outset, the Commission recognized the overriding importance of the coastal zone and designated one of its panels to prepare a report on this environment (*Science and Environment*, 1969). The Commission highlighted the significance of the coastal zone by examining the economic and social values derived from the many uses of the zone, and pointed out the often conflicting demands on the resources occurring therein. The panel report identified the opportunities and problems in the coastal zone environment and the roles played by the various participants, and outlined measures to be taken for a balanced approach to the development of coastal resources. It went as far as suggesting sample legislation to accomplish the goals of coastal zone management (*Science and Environment*, 1969, pp. III-183 to III-187).

When a social problem of national importance becomes urgent, congressional bills are soon introduced to alleviate or resolve the problem. In response to the Commission's recommendations calling attention to the critical aspects of the nation's coastal environment, Senator Magnuson introduced S. 2802 late in the first session of the 91st Congress. Hearings were held on the subject in December of 1969. Subsequently, in the second session of the 91st Congress, other bills were introduced, including S. 3183 by Senator Boggs on behalf of the Administration, and S. 3460 by Senator Tydings.

Alerted by numerous scattered reports on the critical problems of water pollution, the Congress, in passing the Clean Water Restoration Act of 1966 (Public Law 89-753), directed the Secretary of the Interior to study the problems surrounding the pollution of the estuarine zone and to make recommendations to Congress for an effective national estuarine management program. The Secretary of the Interior delegated the Federal Water Pollution Control Administration to carry out the study. The completed report was published in November of 1969 (*National Estuarine Pollution Study*, 1969). S. 3183 was based largely on the recommendations of this study, performed pursuant to the Clean Water Restoration Act (Public Law 89-753) and the subsequent Estuary Protection Act (Public Law 90-454).

The three Senate bills, S. 2802, S. 3183, and S. 3460, each to some degree, attempted to establish a national policy and comprehensive program for the management, beneficial use, protection, and development of land and water resources of the nation's estuaries and coastal zone. The Subcommittee on Oceanography, chaired by Senator Hollings, held seven days of hearings (U.S. Senate, 1970) from March through May of 1970, at which 29 witnesses testified. In addition, 55 articles, letters, and statements[7] were received by the Subcommittee and

[7]Including testimony by Governor Burns on behalf of the State of Hawaii, Dr. Shelley Mark on behalf of the Hawaii Department of Planning and Economic Development, letter from Mayor Fasi (City and County of Honolulu), statements from Mayor Vidinha (Kauai), Mayor Cravalho (Maui), Bruce McCall on behalf of Mayor Kimura (Hawaii), and statement by Senator Fong.

incorporated into the record. Each of these bills clearly recognized that the states must take a major role in coastal zone development. The specific measures outlined in S. 2802, S. 3183, and S. 3460 are not so much a matter of contrast as of emphasis.[8]

On the House side, recent attempts at coastal zone legislation were no less complex. During October of 1969, Congressman Alton Lennon, Chairman of the House Subcommittee on Oceanography, conducted a two-day congressional conference designed to assist the states in finding a workable method for local, state, federal, and public involvement in land and water use regulation. Representatives from 30 coastal and Great Lakes states were at the conference. Shortly following the October meeting, Congressmen Lennon and Mosher jointly prepared and introduced H.R. 14730, H.R. 14731, and H.R. 15099. These congressional bills differed in substance only with respect to the agency or department that would in each case be assigned the primary responsibility for administering federal grants to assist coastal states in the development and implementation of a comprehensive management program for the coastal zone. This somewhat unorthodox approach to the generation of legislation was designed to stimulate an active response from the representatives of the coastal states in attendance (Clingan, 1970, p. 4).

The initial momentum toward coastal zone management, established by the panel report of the Commission on Marine Science, Engineering and Resources, rapidly dissipated near the end of the second session of the 91st Congress. With congressional interest and executive support, one may be puzzled as to why no legislation reached the floor during this period. A few observations can be offered on why legislative efforts to create a national focus on the coastal zone were stalled.

The problem is basically institutional in nature. The breadth and vast magnitude of coastal zone management at the national level call for special authorizing legislation, bringing into play numerous federal agencies and several committees of Congress. Each of these has its own special interests and each is potentially affected by the enactment of sweeping coastal zone management legislation. Several committees have legitimate interest in the coastal zone: e.g., the Committee on Merchant Marine and Fisheries, the Public Works Committee, and the Committee on Interior and Insular Affairs. Any attempt at integrating ocean management, resources development, and environmental quality control into a cohesive coastal zone framework could mean that several committees in both the Senate and House would have to yield some of their jurisdiction in coastal zone matters.

During the same period, the administration's moves to create larger and more comprehensive spheres of federal influence (e.g., NOAA and EPA) further confused the established pattern of congressional committee jurisdiction and instigated interplays between affected executive departments and agencies.

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[8]"Summary of Principal Provisions of Coastal Zone Management Bills -- S. 2802, S. 3460, S. 3183." This comparative summary was submitted to the Senate Subcommittee on Oceanography on April 14, 1970, with statements on the bills by Harold F. Wise on behalf of the American Institute of Planners.

"Summary of Statement of Sydney Howe, President of the Conservation Foundation on National Coastal Zone Management Programs As Proposed on Senate Bills 2802, 3183 and 3460," submitted to the Senate Subcommittee on Oceanography on April 14, 1970, on behalf of the Conservation Foundation.

The combination of committee jurisdictional problems and the apprehension created by reorganizations in the executive branch departmental structures was instrumental in delaying passage of national coastal zone legislation during the 91st Congress.

The hearings held during the 91st Congress provided new ideas that were incorporated in redrafted Senate and House bills on the coastal zone subject. Early in the 92nd Congress, Senator Hollings introduced S. 582 (a successor to Senator Magnuson's S. 2802), a revised version of which is currently under consideration. Shortly thereafter, Senator Tower introduced S. 638 which was drafted to obviate some of the objections voiced by representatives of the Nixon administration at the hearings conducted during the 91st Congress.

On the House side, Congressman Lennon introduced H.R. 2492 and H.R. 2493, both bills being revised and expanded versions of the coastal zone bills jointly introduced by Congressmen Lennon and Mosher during the 91st Congress. Subsequently, in the first session of the 92nd Congress, other House bills on the coastal zone subject were introduced, including H.R. 3615 by Congressman Dingell and H.R. 6005 by Congressman Dellums.

The name of the game has changed during the last year. A further and much more serious complication in the already bewildering legislative process is the recent administration-backed drive to enact an overall land use plan rather than separate coastal zone legislation. Between the 91st and 92nd Congress, the Nixon administration became convinced that more broadly-based land-use management legislation was not only desirable but essential for effective planning, because of the interrelation of the hinterland to the coastal zone. The problem is one of conceptualization. Many people now view the coastal zone not as a distinct entity, but as part of the national whole. There have been recent strong indications that the Nixon administration is apprehensive about pursuing coastal zone management legislation because of its possible deliterious effect on comprehensive state land-use planning.

This belief is manifested by the introduction of S. 632 by Senator Jackson designed to result in federal support to the states for developing land- and water-use programs. S. 632 was shortly followed by the proposed National Land Use Policy Act of 1971 which was introduced by Senator Jackson (by request) as S. 992. The House counterpart to S. 992 is H.R. 4332, introduced on behalf of the Administration by Representative Aspinall.

On May 5, 1971, Russell E. Train, Chairman of the Council on Environmental Quality, advised the U.S. Senate Commerce Subcommittee on Oceans and the Atmosphere that:

> The Administration is sensitive to the concern of this Committee that the issues of coastal zone management be given priority attention. We are likewise concerned that the States not complicate their reform of land use law by creating separate institutions over the coastal zone which might later compete with and complicate the ability of the States to address the total problems of land use planning and regulation within their borders. Certainly, the signs around us are unmistakable that States are now more willing to approach the land use regulatory issues on a broader basis. . . (U.S. Senate, 1971, p. 138).

At the outset, the now defunct Stratton Commission made it quite clear that coastal zone management responsibilities at the federal level should be undertaken by a new, independent agency for oceanic and atmospheric affairs. Succeeding events have demonstrated only a partial realization of that goal. The National Oceanic and Atmospheric Administration (NOAA) came into being on October 3, 1970, under Executive Reorganization Plan No. 4 of President Nixon, not as an independent agency, but rather housed in the Department of Commerce. There are a number of other developments in federal law and administration that reflect a dilution of attention to the highly vulnerable land-water interface of the coastal zone. In June of 1971, during hearings conducted by Representative Alton Lennon on H.R. 2492 and H.R. 2493, Dr. Robert M. White, Administrator of NOAA (who was a coastal zone panel member of the Stratton Commission), was asked for his current views on the subject. Dr. White responded that he still believes in the need for coastal zone management, but favors embodiment of that concept in a larger land-use approach (*Coastal Zone Management: Newsletter of Coastal Resource Exploitation, Conservation and Enhancement*, June 1971, p. 2).

Perhaps the most likely basis for federal involvement in coastal resources management may yet come in the form of the National Coastal Zone Management Act of 1972 (S. 3507, a successor to S. 582). On April 25, 1972, to the surprise of nearly everyone following legislative developments on the coastal zone subject, the Senate passed S. 3507 by unanimous vote. As with other coastal zone measures, S. 3507 elucidates the nature of the public interest in the coastal environment and authorizes federal aid to encourage states to plan for acceptable systems of controlling developments along the shoreline. Lead responsibility for administering federal grants to help coastal states develop and implement comprehensive management programs is assigned to NOAA, under the auspices of the Secretary of Commerce. This bill does, however, contain some substantial differences as compared with earlier measures. The coastal area covered is more closely defined, thus mitigating some of the criticism voiced by the Interior Committee which favors the enactment of the general land-use bill. Additional changes were drafted into S. 3507, giving local governments broader participation in the preparation and operation of coastal management programs.

Despite these optimistic developments, it is questionable whether coastal zone planning as a problem apart from overall land-use planning will be easily resolved. The National Land Use Policy Act of 1972, the Senate land-use bill under consideration, lists coastal wetlands as the first among "areas of critical environmental concern" which are to receive priority attention.

In defining the coastal zone, the basic problem is one of isolating one part of a natural continuum as needing special attention for management purposes. Opponents of special coastal legislation have argued that since the environmental system of the earth composes one ecosystem, there should be only one policy and one system of management. Conversely, the backers of separate coastal zone legislation have argued that society's use of the interface between the sea and the land represents a sharp contrast with general land utilization. Thus, the waters and narrow strip of land within the coastal zone deserve special consideration, and a diverse system of management is needed in this area.

Whether future duplication of effort by coastal planning agencies and general land-use planning agencies can be avoided is impossible to predict. There are indications that the Interior Committees of the House and Senate will try to reach some agreement on a general land-use bill (*Ocean Soundings: Newsletter of Marine Technology Society*, May 1972, pp. 1-2). If the National Land Use Act of 1972 is enacted, it may severely slow down consideration of coastal legislation now in conference between the House and Senate.[9] More seriously, the possibility also remains that if a general land-use bill is passed into law, it could very likely preempt coastal zone measures now under consideration.

[9]H.R. 14146 is the House version of S. 3507. On August 2, 1972, the administrative assignment in H.R. 14146 was changed from the Department of Commerce to the Department of the Interior. After altering H.R. 14146, the House went on to adopt the bill 376 to 6. Both bills are now in conference between House and Senate representatives to see if they can reconcile the differences in the versions passed by each.

AREAS OF FEDERAL CONCERN

LEGAL BASIS FOR FEDERAL INVOLVEMENT

The coastal zone embraces three types of natural real estate: (1) lands above the ocean, (2) lands which are periodically covered by the ocean, and (3) lands permanently beneath the ocean. Airspace and the water column overlying submerged lands must be added to any full inventory of the coastal zone.

While the coastal zone concept is a relatively new formulation, the federal government has had much experience and involvement in controlling uses and activities in this zone.[10] The principal justification for federal involvement rests chiefly on an expansive interpretation of four provisions of the Constitution. The first is the supremacy clause giving paramount rights to the federal government primarily on matters pertaining to international relations and to national defense. The second is the interstate commerce clause which extends federal jurisdiction to navigable waters of the United States. The third and perhaps most encompassing justification for federal involvement in the coastal zone is the Contitutional provision to promote the general welfare. Lastly, the federal property provision of the Constitution accounts for the extent of coastal uplands and submerged lands underlying certain portions of the ocean in federal ownership.

DELINEATION OF CURRENT OFFSHORE ZONES OF JURISDICTION

An important influence on government action in the coastal zone has been the division of powers between the federal establishment and the states. Legal questions concerning uplands and tidelands are documented in English common law principles, and are outside the scope of this report. On the other hand, the use and disposition of submerged lands and waters lack such a rich historical base of interpretation. Consequently, it is necessary to set forth some underlying legal and political considerations which have a direct bearing on the geographic extent of Hawaii's sovereignty and jurisdiction in the coastal zone.

Federal concern over maritime activities can be categorized into six somewhat overlapping zones: (1) internal waters, (2) territorial waters, (3) the contiguous zone, (4) the continental shelf, (5) international waters (high seas), and (6) airspace. It should be noted at the outset that these zones of delineation merely represent a frame of reference for authority to carry on offshore activities, and do not constitute a series of political entities as commonly found on land. Figures 1 and 2 are schematic representations depicting the zonal demarcations.

[10] United States policy on jurisdictional matters in the marine environment rests on three principal bases: unilateral proclamations ascertaining certain rights in offshore waters adjacent to the coast, international regulations in the four 1958 Geneva Conventions, and bilateral and multilateral agreements which the U.S. has made with other nations.

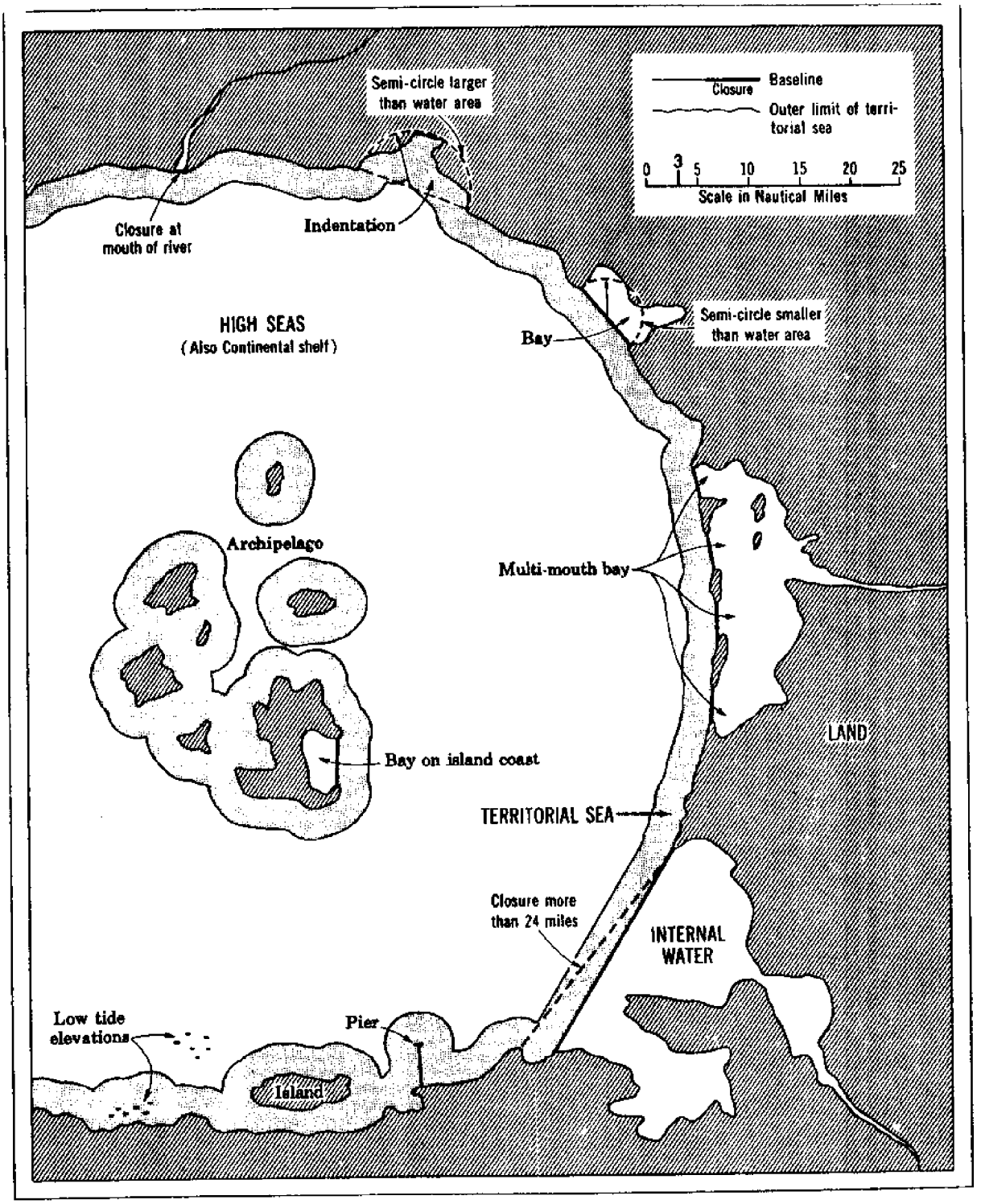

Figure 1. The baseline from which the territorial sea is measured.

(Source: U.S. Department of State, *Sovereignty of the Sea*, Geographic Bulletin No. 3, Revised October 1969, p. 31.)

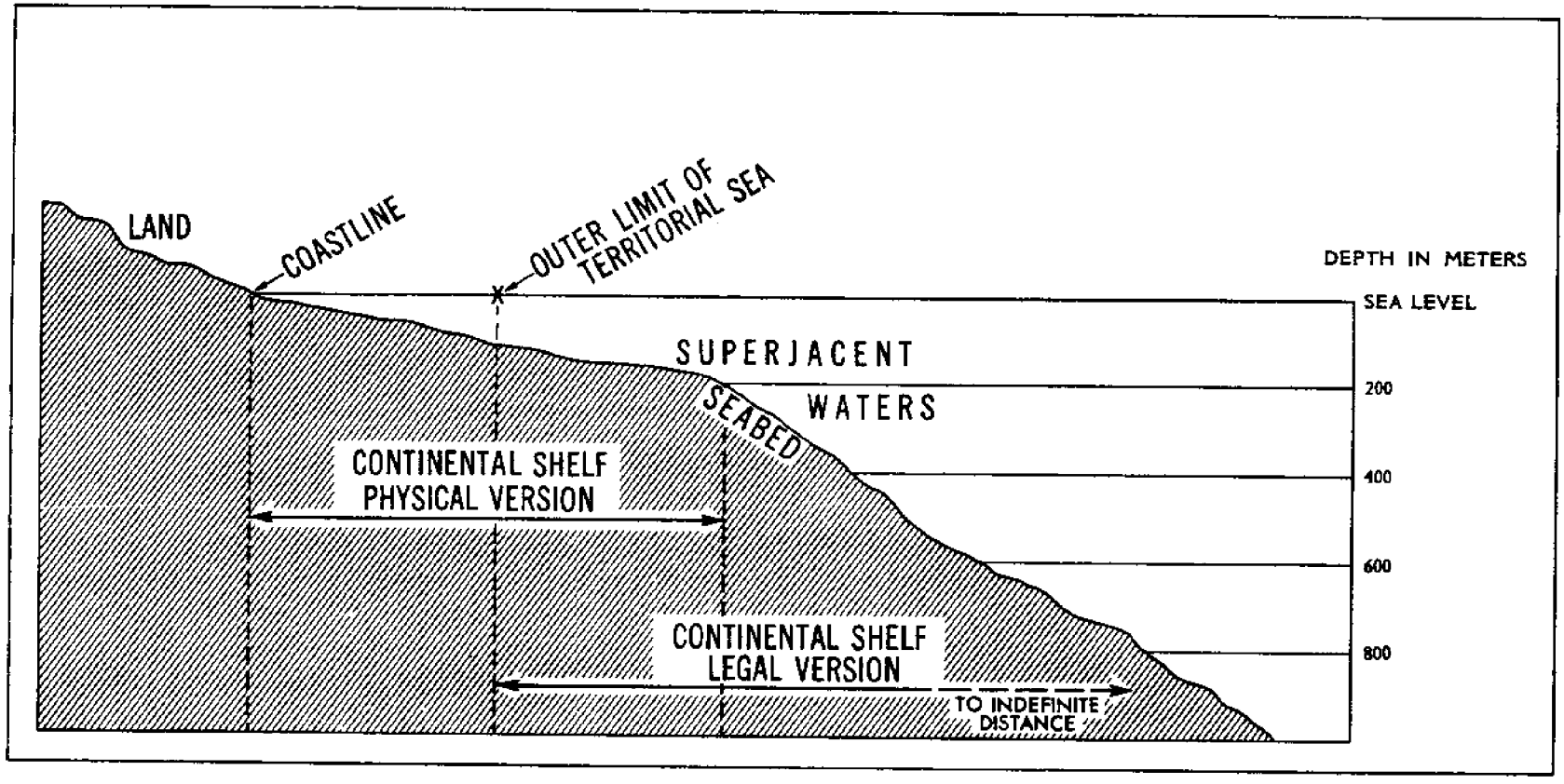

Figure 2. Continental Shelf in profile with vertical scale exaggerated.

(Source: U.S. Department of State, *Sovereignty of the Sea*, Geographic Bulletin No. 3, Revised October 1969, p. 30.)

Internal waters are those along a coast *inside* the baseline, which theoretically is the legal version of the coast. Thus, internal waters are those which include the waters of gulfs, bays, harbors, and other coastal indentations. Sovereignty over these waters is identical to the land area of the coastal nation along which they lie.

Beyond the internal waters, or where there are none, territorial waters encompass a strip of sea traditionally three miles wide, immediately seaward from the baseline. Complete sovereignty is maintained by the coastal nation, subject only to the right of innocent passage to ships of all nations ("Geneva Convention on the Territorial Sea and the Contiguous Zone," Part I, Articles 14-23, 1958).

The contiguous zone encompasses a band of water beyond the territorial sea, normally lying over a part of the continental shelf, in which a coastal nation may prevent infringement of its customs, fiscal, immigration, and sanitary regulations. It is measured from the same baseline as the territorial sea and may extend seaward no more than 12 miles ("Geneva Convention on the Territorial Sea and the Contiguous Zone," Part II, Article 24, 1958). Coinciding with the boundaries of the contiguous zone, the United States, under pressure to exclude alien fishermen, has recently claimed a fishing zone for the purpose of giving exclusive fishing rights to its nationals in the contiguous zone which is 9 miles in width, exclusive of the territorial sea (Public Law 89-658).

The continental shelf refers to the seabed area underlying coastal waters. The term has both physical and legal connotations. Geologically, the entirety of the coastal plain extending from the shoreline to the point at which the submerged area drops off into the ocean deeps is all continental shelf. From the viewpoint of international law, the continental shelf refers to the seabed area beyond the outer limits of the territorial sea and seaward to a depth of at least 200 meters and possibly beyond, depending upon the technological exploitability of the area in question ("Geneva Convention on the Continental Shelf," Article 1, 1958). Briefly, this zone may be explored and exploited exclusively by the coastal nation for mineral resources and those living resources which at their harvestable stage are either immobile or move in constant physical contact with the seabed ("Geneva Convention on the Continental Shelf," Article 2, 1958).

International waters refer to all water beyond the outer limit of the territorial sea, which for the most part are subject to a minimum of national control. Although international waters are in part inclusive with the waters of the contiguous zone, the fishing zone, and those over the continental shelf, traditional freedom of the seas is not invalidated by the zonal overlap ("Geneva Convention on the High Seas," Articles 1-4, 1958).

The sovereignty of a coastal nation extends to the airspace over its territorial sea ("Geneva Convention on the Territorial Sea and the Contiguous Zone," Article 2, 1958). Unlike the right of innocent passage of ships of all nations through the territorial sea, overflight of foreign aircraft may not take place over the territorial sea of any nation without its consent. Beyond the territorial sea, the freedom of the high seas, includes the unrestricted freedom of the air above the high seas, unaffected

by the existence of jurisdiction associated with contiguous or fishing zones ("Geneva Convention on Fishing and Conservation of the Living Resources of the Living Resources of the High Seas," 1958) or the continental shelf.

When viewed collectively, the international regulations found in the four 1958 Geneva Conventions and the aforementioned Constitutional clauses provide almost all of the direct legal bases for the assertion of federal responsibility in the coastal zone and beyond. Under most circumstances, state action can proceed in, on, or under all the land and water lying within its borders with the acquiescence of the federal government. However, the federal government has the authority to preempt state-initiated or state-regulated activities in the coastal zone if state laws conflict with federal laws.

PART II

FEDERAL ORGANIZATIONS

Federal instrumentalities concerned with multiple and highly varied aspects of the coastal environment are roughly delineated into three somewhat overlapping categories.

First, at the highest level of the federal government, are those bodies charged with taking an overview of problems affecting the coastal zone. Examples of such cabinet-level planning and coordinating bodies, which advise and assist the President in carrying out federal statutory responsibilities relating to marine science and environmental concerns, are the National Advisory Committee on Oceans and Atmosphere and the Council on Environmental Quality.

Second, there are more specialized independent bodies within the Executive Office charged with facilitating the administration of various programs. Examples of such agencies are the Environmental Protection Agency and the National Science Foundation.

Third, there are numerous agencies within traditional executive departments whose coastal zone programs are directed primarily to a functional emphasis. A few examples of such agencies include: the Corps of Engineers (Department of Defense), the Coast Guard (Department of Transportation), the Geological Survey (Department of the Interior), and the National Oceanic and Atmospheric Administration (Department of Commerce).

The various federal agency programs, legal responsibilities, and multiple activities, when viewed collectively, define the sphere of federal influence in Hawaii's coastal zone. However, the problem of defining the extent of federal influence is no simple matter, since there are only a few federal agencies which do not participate in some manner in coastal activities. Except for those bodies whose responsibilities relate almost exclusively to the marine environment, most federal agencies have an indirect involvement in the coastal zone. Their participation may include direct operations in research, in resource management on federally owned properties, and in direct control of coastal activities. Indirect participation is generally limited to setting and at times enforcing environmental standards, providing advisory services and technical assistance, and matching grants-in-aid to state and county agencies.

In the heavily marine-dependent State of Hawaii, federal agency participation in the coastal zone is so closely interwoven in the fabric of total state affairs that the problem of which agencies to include or exclude, on the basis of their relative impact on the coastal zone, calls for personal judgment. However, it is believed that all relevant federal agencies having an important direct or indirect impact on Hawaii's coastal zone have been included in this report.

OVERVIEW AGENCIES

The Marine Resources and Engineering Development Act of 1966 declared a national policy "to develop, encourage and maintain a coordinated, comprehensive, and long-range program in marine science" (Public Law 89-454), and to review the nation's activities in understanding and wisely utilizing the vast and varied resources of the sea. In addition, the Act created two separate but interrelated bodies: the Commission on Marine Science, Engineering and Resources and the National Council on Marine Resources and Engineering Development.

COMMISSION ON MARINE SCIENCE, ENGINEERING AND RESOURCES

The Commission on Marine Science, Engineering and Resources was composed of prominent men in industry, government, and education, and was charged to "make a comprehensive investigation and study all aspects of marine science in order to recommend an overall plan for an adequate national oceanographic program that will meet the present and future national needs" (Public Law 89-454).

The Commission approached this task by forming numerous working panels, each panel being responsible for a major marine area. An area of special interest to the Commission was the management and development of the coastal zone. The decision that the coastal zone should involve a separate panel report was based on the concern and public attention focused on this environment, and the awareness that our coastal lands and waters are a vital national resource being subjected to the growing pressures and conflicts of the modern industrial society.

The "Report of the Panel on Management and Development of the Coastal Zone" (*Science and Environment*, 1969), published in January of 1969, examined in detail the many uses of the coastal zone, the role played by various participants, and both the natural and man-made problems of this environment. The Panel Report has served as the principal basis for assessing the status of coastal zone matters, for identifying opportunities and problems, and for preparing measures to be taken. The Commission dissolved itself after submitting its report to the President and Congress.

THE NATIONAL COUNCIL ON MARINE RESOURCES AND ENGINEERING DEVELOPMENT

The National Council on Marine Resources and Engineering Development was established to implement the numerous provisions of the Act. The Council consisted of the Vice President as Chairman, the Secretaries of State, Navy, Interior, Commerce, Health, Education and Welfare, and Transportation, as well as the Chairman of the Atomic Energy Commission, and the Director of the National Science Foundation.

The duties and responsibilities of the Council are outlined in detail in the Act, and represent a wide-ranging mandate over the total national program in marine affairs, including the coastal zone.

The Council did not function as an operating agency; its purpose was to assist the President in identifying government-wide goals in marine affairs, in identifying issues, and in reaching informed decisions. It annually surveyed all significant marine science activities, including the policies, plans, programs, and accomplishments of all departments and agencies of the United States engaged in marine affairs. The Council served the government-wide interest by ascertaining the extent of involvement of various federal departments, bureaus, and specialized agencies in marine affairs. The Council was authorized to recommend that one agency assume responsibility for planning, guiding, and coordinating a multi-agency program, when missions are the statutory responsibility of more than one agency.

The Council was concerned with the broad area of coastal zone planning, conservation, and development, including erosion control and shore development activities, channel and harbor development, conservation of marine ecology, recreational development of marine areas, and pollution abatement in the marine environment.

In November of 1968, the Council established an inter-agency Committee on the Multiple Use of the Coastal Zone to explore the intergovernmental and intersector aspects of the present and proposed management systems in the coastal zone. The Committee's report (*Report on the Seminar on Multiple Use of the Coastal Zone*, 1968) was published in 1968. In addition, the Council has submitted to the President and to Congress an annual report (*Marine Science Affairs*, 1967-1971) of its findings and recommendations on marine science affairs, including the coastal zone. In April of 1971, the Council released its last annual report. It contains no surprises, but re-emphasizes the need for reform of the institutional framework in which resource-use decisions affecting the coastal zone are made. The Council has been essentially dormant during the past year under the chairmanship of Vice President Spiro Agnew ("Last Marine Council Report," May 1971, p. 20). The Council was disbanded shortly after releasing its fifth annual report, thus leaving a temporary void within the executive branch for the coordination of federal marine programs.

NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE

The mechanism chosen by the Administration to take over the defunct Council's marine science coordinating functions is the National Advisory Committee on Oceans and Atmosphere.

Section 4 of Public Law 92-125, August 16, 1971, charges the Advisory Committee (1) to undertake a continuing review of the progress of the marine and atmospheric science and service programs of the United States, and (2) to advise the Secretary of Commerce with respect to carrying out the mission of the National Oceanic and Atmospheric Administration.

The Advisory Committee is authorized to request from any department, agency, or independent instrumentality of the federal government any information and assistance it deems necessary to carry out its functions.[11] As

[11] Dr. John P. Craven, University of Hawaii Dean of Marine Programs, was one of twenty-five people named by President Nixon to serve on the new national body.

with the National Council on Marine Resources and Engineering Development, the Advisory Committee is required by law to submit a comprehensive annual report to the President and to Congress, setting forth an overall assessment of the status of the nation's marine and atmospheric activities. Whether the Advisory Committee will undergo a decided shift in emphasis away from concentration on exploration and scientific study, and toward concern with the quality of coastal waters and adjoining lands, remains to be seen.

COUNCIL ON ENVIRONMENTAL QUALITY

Out of a multitude of legislative proposals introduced in Congress in recent years having a bearing on environmental matters, the National Environmental Policy Act of 1969 (Public Law 91-190) was the most significant one signed into law. The Act created the Council on Environmental Quality, an entity composed of three members appointed by the President, charged with taking an overview of national environmental problems, obviously including environmental problems associated with the coastal zone.

In brief, the Act entrusts the Council with making recommendations to the President on national policies for improving environmental quality, and gives responsibility to the Council for appraising the effect of federal programs and activities on environmental quality.

A significant provision of the Act, bearing on present and future developments in the coastal zone, states that federal agencies must now consider explicitly the environmental effects of their actions before a project involving federal funding is undertaken. Appropriate federal officials are now required to prepare a detailed environmental impact statement, including the comments of state and local environmental agencies, as well as other federal agencies with environmental expertise. The environmental impact statement is then made available to the Council, the President, and the public, before authorization is granted or denied to undertake any federal agency project in the coastal zone or otherwise.

To further the purpose and policy of the National Environmental Policy Act of 1969, the President issued Executive Order 11514 (March 5, 1970) requiring heads of federal agencies to consult with state, local, and other federal agencies in carrying out their activities as they affect the quality of the environment. By this order, federal agencies were also directed to make available to the public information of proposed federal programs affecting environmental quality, to encourage state and local agencies to adopt similar procedures for informing the public of their activities affecting the environment, and to coordinate actions among agencies at all levels of government.

It is clear from the content of this Executive Order and the National Environmental Policy Act of 1969 that the Council on Environmental Quality was given a broad mandate for reform in environmental decisions of federal agencies.

WATER RESOURCES COUNCIL

The Water Resources Council is an independent body established by the Water Resources Planning Act of 1965 (Public Law 89-80) and is the principal coordinating council for federal water agencies. The Council is comprised of the Secretaries of the Departments of the Interior, Agriculture, Army, Health, Education and Welfare, and Transportation, and the Chairman of the Federal Power Commission. Associate members include the heads of the Departments of Commerce and Housing and Urban Development and the Environmental Protection Agency.

The Council has the responsibility for formulating principles, standards, and procedures to be used by federal planning agencies in water resources conservation and use. It also prepares a periodic assessment of water availability and needs. The first such assessment (*Nation's Water Resources*, 1968) was published in 1968, and the next one is scheduled for publication in 1975. The Council also monitors the preparation of regional studies which will include planning for water resources use in the coastal area in accordance with the policy adopted by the Council in November of 1967:

> It is the policy of the Water Resources Council that the use, preservation, or development, and management of coastal, lake, and river shorelines and islands and estuaries are to be given full consideration in the planning of water and related land resources by river basin commissions established under the Water Resources Planning Act, Public Law 89-80.[12]

A regional study is under way for Hawaii. It is under the leadership of a water resources coordinating committee chaired by the head of the Division of Water and Land Development, Department of Land and Natural Resources of the State of Hawaii.

In brief, the Council's function is essentially that of coordinating various government agency programs in the development of the nation's water resources (including coastal zone water resources). The Council is also authorized to make grants to states for comprehensive planning regarding state waters and related land resources.

[12]Correspondence with W. Don Maughan, Director, United States Water Resources Council, August 24, 1971.

EXECUTIVE DEPARTMENTS IN THE CABINET

DEPARTMENT OF COMMERCE

The Department of Commerce, with the establishment of the National Oceanic and Atmospheric Administration within the department, has become the key organization within the executive government in developing physical, environmental, and biological parameters which are essential to the understanding of the dynamics of coastal zone processes.

National Oceanic and Atmospheric Administration (NOAA)

On July 9, 1970, President Nixon sent to Congress a reorganization plan (Reorganization Plan No. 4 of 1970) to bring together the major federal programs dealing with the oceans and the atmosphere into a single agency. The President's accompanying message discussed the purposes of NOAA in terms of the "total environmental system" which comprised the oceans and the atmosphere, of the compelling need for protection from natural hazards, and of the need to develop marine resources (*Congress and the Nation's Environment*, 1971, p. 19).

NOAA came into existence on October 3, 1970. Its formation brought together the functions of the Environmental Science Service Administration (and its major elements -- the Weather Bureau, Coast and Geodetic Survey, Environmental Data Service, National Environmental Satellite Center, and Research Laboratories), Bureau of Commercial Fisheries, Marine Game Fish Research Program, Marine Minerals Technology Center (formerly of the U.S. Department of the Interior), the National Oceanographic Data Center and National Oceanographic Instrumentation Center (formerly administered by the U.S. Navy), the National Data Buoy Development Project (formerly of the Coast Guard, U.S. Department of Transportation), National Sea Grant Program (formerly of the National Science Foundation), and elements of the U.S. Lake Survey (formerly of the Army Corps of Engineers). Figure 3 illustrates the organizational structure of NOAA's major line components as of July 11, 1971.

An assessment of NOAA's role in Hawaii's coastal zone shows that there is considerable activity under way. However, not all elements of the total NOAA organizational structure have "field" offices in Hawaii. Only those line components having a current impact on the management of Hawaii's coastal zone are discussed.

National Ocean Survey (NOS)

The National Ocean Survey (formerly the Coast and Geodetic Survey) is the primary agency within NOAA which maps and charts American coastal waters and airspace. It is the lead agency within NOAA for providing and operating the ships needed for many of the agency's tasks. It conducts hydrographic, geodetic, oceanographic, and marine geophysical surveys, and predicts tides and currents for the Pacific region. It prepares and publishes navigational charts and related materials which serve mariners, fishermen, and other users of the coastal zone waters.

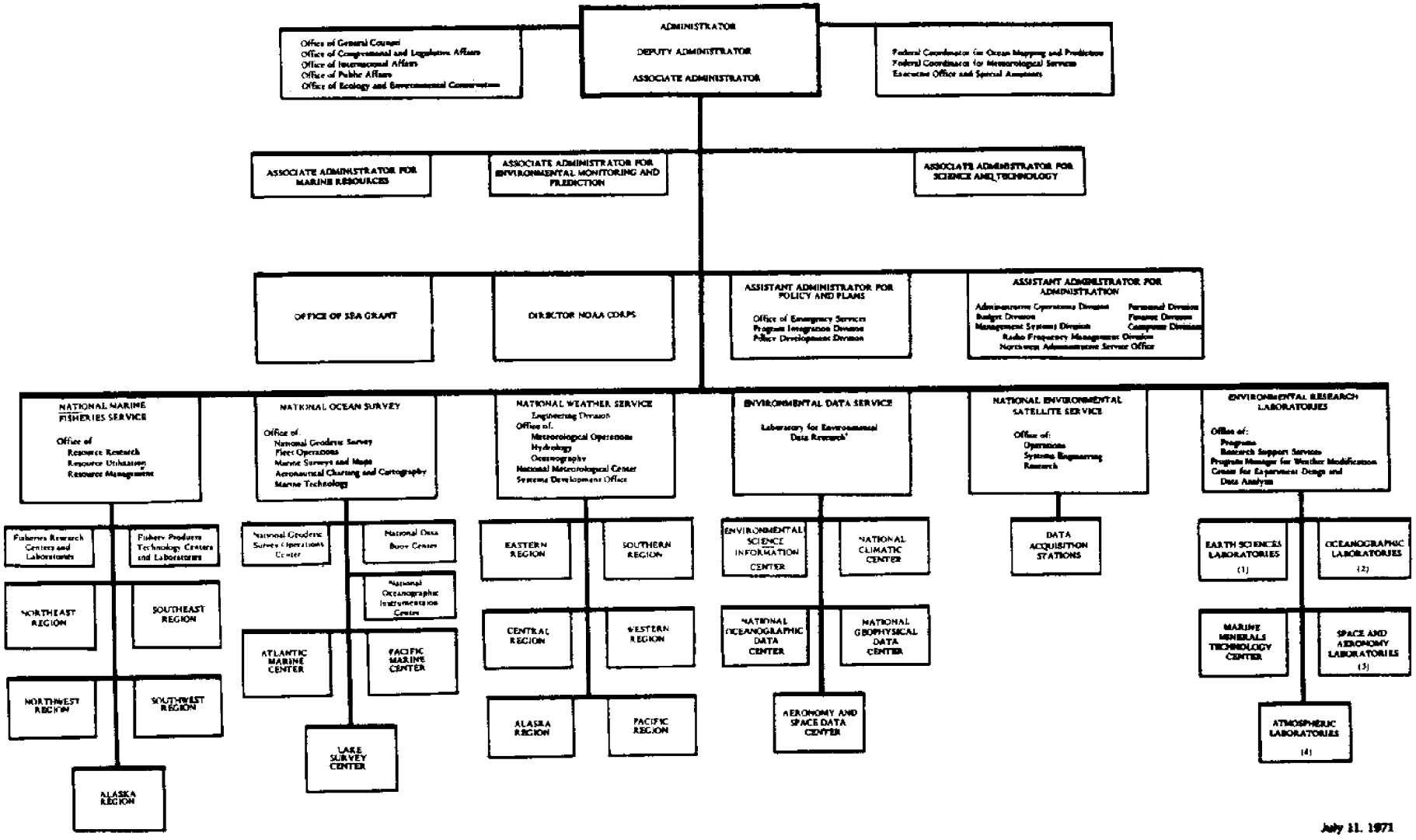

Figure 3. National Oceanic and Atmospheric Administration, U.S. Department of Commerce

(Source: U.S. Department of Commerce, *NOAA Week*, vol. 2, no. 29 (July 23, 1971), p. 2.)

A selective listing of NOS's publications includes:

- Harbor Charts -- used for navigation and anchorage in harbors and smaller waterways.
- Coast Charts -- intended for coastwise navigation inside offshore reefs and shoals.
- General Charts -- used for navigation of vessels whose position can be fixed by landmarks, lights, and buoys, but whose courses are well offshore.
- Coast Pilots -- a series of nautical books which provide navigational information to supplement the charts.
- Tide Tables -- predict times and heights of high and low waters for every day in the year for many of the more important harbors.
- Tidal Current Charts -- show the direction and velocity of currents overlayed on an abbreviated nautical chart.
- Bathymetric Charts -- give topographic details of submerged lands.
- Aeronautical Charts -- allocate navigable air space to commercial and non-commercial users.

NOS often works jointly with the University of Hawaii on research missions. On October 8, 1971, a NOAA ship, the FAIRWEATHER, arrived in Hawaii on a National Ocean Survey mapping and charting mission (*Sea Grant Newsletter*, November 1971, p. 4). The FAIRWEATHER worked along the Kona coast making magnetic and tidal observations, verifying landmarks, investigating reported chart deficiencies, and surveying "harbors of refuge" suitable for small craft in the event of emergencies. The FAIRWEATHER, which was concerned primarily with large-scale hydrography, continued a project initiated in 1968 to modernize offshore surveys in the State of Hawaii. The NOAA ship, RAINIER, will continue this work in 1972 to be followed by the FAIRWEATHER on a similar mission in 1973.

The national office of NOAA is planning some changes in the program management structure of the National Ocean Survey to support the national effort in developing the nonliving resources of the sea. The national office plans to establish a growing marine technology program within NOS. It will transfer management of the National Oceanographic Instrumentation Center and the National Data Buoy Development Project to NOS. Together with the existing engineering technological efforts of NOS, these will form the nucleus of a new marine technology program ("NOAA Administrator's Letter," July 1971, p. 9). It is too early to assess how this program will affect the development of Hawaii's coastal zone.

National Weather Service (NWS)

As with the National Ocean Survey, the National Weather Service (formerly the ESSA Weather Bureau) in Hawaii is not involved in managerial aspects of the coastal zone per se. It reports the weather for the Pacific

Ocean and adjacent areas, provides weather forecasts to the general public, issues warnings against tropical storms, hurricanes, high waves, and other atmospheric hazards, and provides a broad array of special services to maritime, aeronautical, agricultural, and other weather-sensitive activities in the coastal zone and elsewhere. These services are supported by a worldwide network of observing and forecasting facilities, communication links, aircraft, satellite systems, and computers.

The Honolulu office of NWS provides the latest forecasts for Hawaii coastal waters which can be received via automatic telephone from voice tape recordings and via VHF - FM radio on 162.55 and 162.40 MHZ on a continuous replay system. The Weather Service Forecast Office issues marine weather forecasts at several scheduled times daily for the conduct of coastal and marine operations, and may issue warnings at any time that weather or sea-state conditions warrant. Efforts are continuing to establish a cooperative surf-reporting network with the City and County of Honolulu.

Environmental Data Service (EDS)

The Environmental Data Service is the scientific data management and application arm of NOAA. As such, it serves as the historical data counterpart of the National Weather Service and other agencies which generate real-time meteorological and other scientific data. Once these data have served their immediate real-time purposes, however, they become part of the historical record and fall under EDS's jurisdiction. EDS's main business, then, has to do with collecting, archiving, retrieving, processing, interpreting, and publishing these vast amounts of environmental data and scientific information, and finally disseminating information to all who may have need for them.

Some of these historical data are of vital importance to private and governmental agencies interested in coastal zone problems and development. For example, the design and construction of small-boat harbors, breakwaters, and other coastal structures and facilities require taking into account the atmospheric and oceanic conditions affecting coastlines, such as storm waves and strong winds. In orienting a seaside hotel complex or in deciding whether to have windows or louvers, one needs to know something of the direction and speed of the wind, how often it rains, and whether the wind may carry rain through the louvers. There are many other coastal activities in which a host of similar questions arise. From its historical records, EDS can provide the user with information on the frequency and intensity of relevant meteorological events in the area in question. Decisions based on this information, however, are left primarily to the user.

EDS also operates for NOAA the National Data Centers in the fields of meteorology (climatology), marine affairs, and geophysics: specifically, the National Climatic Center, the National Oceanographic Data Center, the National Geophysical Data Center, the Aeronomy and Space Date Center, the Environmental Science Information Center, and the Laboratory for Environmental Data Research. In addition, under an agreement with the National Academy of Sciences, NOAA has responsibility for World Data Center activities in oceanography, seismology, gravity, tsunamis, geomagnetism, meteo-

rology, nuclear radiation, ionosphere and airglow, cosmic rays, auroras, and solar observations. The Director of EDS coordinates these activities within NOAA.[13]

National Marine Fisheries Service (NMFS)

The National Marine Fisheries Service traces its origin and basic mission to a joint resolution signed into law in 1871, establishing an independent agency, the U.S. Fish Commission, "for the protection and preservation of the food fishes of the coasts of the United States" (NMFS, no date). In 1903, it was placed in the Department of Commerce and Labor and renamed the Bureau of Fisheries. Over ensuing years, the Bureau experienced a number of name changes and realignments that expanded the scope of its programs. The latest realignment came in 1970 when the Bureau of Commercial Fisheries became the National Marine Fisheries Service and joined a number of other federal agencies in the newly formed National Oceanic and Atmospheric Administration in the Department of Commerce.

NMFS seeks to discover, describe, develop, and conserve the living resources of the sea. The Service conducts biological research on commercial and sport fishery species, analyzes economic aspects of fisheries operation, develops methods for improving catches, and cooperates with the U.S. Department of State in international fisheries affairs.

To insure that its efforts are responsive to local needs, NMFS is organized into regional coastal and offshore fishery research centers. The Central Pacific Offshore Fisheries Center, consisting of laboratories in La Jolla, California, and Honolulu, is headquartered in La Jolla. In Hawaii, NMFS consists of the Honolulu laboratory and its Kewalo Basin docking and research facility. The principal function of the Honolulu laboratory is to conduct research and oceanographic studies cheifly applied to the development of tuna fishery resources.

Research at the Hawaii center is organized into three investigations, each of which contributes to a partial understanding of biological phenomenon in the coastal zone and beyond. The Pelagic Fish Ecology Investigation studies the interaction of tropical pelagic fishes, chiefly tuna, with their environment; the Central Pacific Fishery Assessment Investigation develops methods for, and conducts, stock assessments of the fishery resources of the Pacific; and the Island Wake[14] Investigation studies the interactions and biological implications of the islands in the oceanic environment. NMFS also has responsibility for marine game fish research.

Some recent accomplishments of NMFS scientists which have implications for the future development of fishery resources in the coastal zone include the successful tracking of both skipjack and blue marlin tagged with electronic transmitters, establishment of threadfin shad in Wahiawa Reservoir and its commercial testing as supplementary live bait for Hawaii's skipjack tuna fishery, and the delineation of modest commercial shrimp resources off the Hawaiian Islands.

[13]Correspondence with Saul Price, Regional Climatologist, Pacific Region, June 21, 1972.

[14]Not to be confused with Wake Island. Here the term "wake" is taken in a similar context as a wake left by a vessel.

With specific reference to the nearshore coastal environment, the Coastal Fisheries Research Center based in Tiburon, California, is authorized to conduct coastal zone fishery research when warranted in the Hawaii area. However, such research and management responsibility of coastal fisheries is now largely assumed by the State of Hawaii Division of Fish and Game.

Naturally, NMFS is concerned with any deterioration in water quality arising from coastal development projects that may adversely affect fish populations. Any construction or programs undertaken in navigable waters of the United States are subject to the provisions of the National Environmental Policy Act of 1969 (Public Law 91-190) which requires an environmental impact statement. Under the current permit program of the Corps of Engineers, NMFS is authorized to review the environmental impact statement on its ecological appropriateness as submitted by either public or private agencies, before the Corps issues a permit.

In addition to providing inter-agency ecological expertise, NMFS maintains close relations with the University of Hawaii and other Hawaii research organizations such as the State of Hawaii Division of Fish and Game and the Oceanic Institute.

Environmental Research Laboratories (ERL)

The Environmental Research Laboratories conduct fundamental research to improve man's understanding of the physical environment. Nationwide, ERL programs range from investigations of ocean processes to studies of the upper atmosphere and space environments. The ongoing research efforts of two laboratories, the Marine Minerals Technology Center and the Joint Tsunami Research Effort, are indirectly involved in current and prospective developments in Hawaii's coastal zone.

Marine Minerals Technology Center (MMTC). With the passage of the Marine Resources and Engineering Development Act of 1966 (Public Law 89-454) a strong national impetus has been given to the development of marine mineral exploitation. There are four agencies within the federal establishment that are contributing efforts to the exploitation of marine mineral deposits. Under the Department of the Interior, the Geological Survey is concerned with the general characterization of marine mineral deposits. The Bureau of Mines is primarily concerned with techniques of resource evaluation and recovery technology. The Bureau of Land Management also has an active part in ocean mineral exploitation, as it is responsible for the leasing of lands on the outer continental shelf. Within the Department of Commerce, under the NOAA umbrella, the Marine Minerals Technology Center is similarly concerned with the development of marine mining and is primarily emphasizing the assessment of environmental effects from potential marine mining operations, as well as the commercial development of marine minerals. The Center's main facility is located in Tiburon, California, and its aquarium laboratory is located at Bodega Bay, just north of San Francisco.

The potential for damage to the coastal zone environment from extractive operations may be staggering: navigational hazards caused by bathy-

metric alterations at the mine site; turbidity increasing to the point of inhibiting or even destroying photosynthesis; deposition of current or wave-carried mine waste materials on shore; and harm to marine life from chemical wastes.

To find a set of socially and economically acceptable solutions to these anticipated offshore mineral extraction problems, the Center's research approach is based on the realization that as sea floor mining takes place a certain amount of turbidity is inevitable, whether it is from placer mining, sea-floor open cut, or sand and gravel dredging. The Center's concern is how much turbidity will be produced by such operations, how much bottom will be covered, and how far fine material will be carried by waves and currents before settling on the bottom. What effect -- detrimental or beneficial -- will the turbidity have on the ecology in the mining area?

A major effort at the Center is to develop prediction techniques to mathematically model the changes to be expected in the ocean system that may be created by marine mining. This project has two parts. The first is a turbid water aquariums system and the second is a simulated offshore mining operation.

The aquariums system is designed to study the tolerance of sea organisms to different levels of turbidity from clay minerals in an open-circuit seawater system. This system is designed to conduct bio-assays on marine organisms while they are exposed to concentrations of suspended, fine-grained mineral particles.

The second part of the project is a simulated open-cut mining operation at an actual site about two miles from the California coast where the Center has information on bathymetry, prevailing weather, and swell conditions. Researchers will be measuring soil properties to determine the height to which mine spoil can be piled, and its angle of repose. Studies will also be made to determine how the spoil pile and pit influence the wave refraction pattern under variable swell conditions. A measure of currents in the mine area will aid in determining the direction and distance fine material will travel before reaching bottom. Hopefully, researchers will acquire enough data on the mine to develop a dynamic model of the operation.

Such research endeavors by the Marine Minerals Technology Center have a bearing on prospective developments in Hawaii's offshore coastal zone. Several predictable developments are expected to make underwater mining economically attractive to Hawaii sand and gravel companies now largely operating on shore. Most obvious is the exhaustion of cheaply exploitable onshore beach deposits. There is also a growing conflict between the needs of sand for construction purposes and the needs of sand for beaches as part of the coastal zone recreational system. These factors have prompted the adoption of a state law (Act 136-1970) that, beginning in 1975, prohibits the mining of beach sand deposits.

The recent discovery of large deposits of manganese-rich crusts and nodules off the coast of Kauai may be indicative of Hawaii's future role in large-scale ocean mineral mining operations. However, jurisdictional uncertainties at the international level have delayed investment in ocean-

bottom mining operations. Agreements among nations are needed, clearly distinguishing national jurisdiction over ocean seabeds from international jurisdiction.

Joint Tsunami Research Effort. The Joint Tsunami Research Effort is involved with various aspects of physical oceanography: in particular, the hydrodynamics of waves. Its activities consist of measurement of wave height, temperature, atmospheric pressure, and other appropriate variables that affect physical processes in the coastal zone.

The Joint Tsunami Research Effort, housed at the University of Hawaii, provides advice as to potential tsunami hazards along the shoreline; such advice is useful to state and federal agencies, as well as private developers, insurance companies, and consulting firms.

The Office of Sea Grant

The Office of Sea Grant administers and directs the National Sea Grant Program which was authorized by the National Sea Grant College and Program Act of October 1966 (Public Law 89-688). The Act authorized grants from the National Science Foundation (now from NOAA) for three kinds of marine resource development: (1) education and training of marine scientists, engineers, and technicians; (2) programs of applied research in marine resource development; and (3) programs of extension services or marine advisory programs. The Office carries out these objectives by making grants to selected academic institutions after the pattern of "land grant colleges." The University of Hawaii is one such institution.

In general, the Sea Grant Program has focused its efforts on areas suggested by the numerous advisory panels of the now defunct Commission on Marine Science, Engineering and Resources. At the present time, the coastal zone and its resources constitute the principal focus of Sea Grant activity both in Hawaii and on the mainland.

The coastal zone in Hawaii includes shore areas, inshore waters, and reef ecosystems. A Sea Grant-sponsored "Quality of Coastal Waters" project is under way to help resolve the problems of inshore pollution. Other projects consider the economic, institutional, and legal aspects of coastal zone management.

Surveillance of seasonal and long-term sand loss or accretion, an inventory of offshore sand deposits, and development of techniques for replenishing denuded and eroding beach areas will provide needed information to manage Hawaii's valuable beaches effectively. Study of interrelationships between beach and surf parameters will provide guidance to protect the stability of beaches and insure preservation and enhancement of surfing areas.

A Sea Grant project which established the existence of manganese deposits with valuable trace minerals has drawn strong industry and state support for a thorough, definitive study. Precious coral, another ocean-bottom resource with economic potential, is being surveyed to determine its distribution and abundance. Research results at the end of the current

year's work should be sufficient to evaluate the economic potential for a commercial industry.

Animal aquaculture projects sponsored by Sea Grant at the University of Hawaii represent a coordinated interdisciplinary effort, stressing reproduction, growth, disease control, and nutrition of species of commercial and recreational value. Plant aquaculture includes development of farming techniques for pharmaceutically valuable seaweeds and the use of seaweed to reduce pollutant constituents.

Present tuna fishing operations rely on the fragile live-bait known as nehu. Techniques are being developed to slow the mortality rate of this bait and permit more fishing time per trip. Potentially superior species of bait fishes are also being studied. A new trapping method is being tested for a group of local nocturnal fishes which have a significant market demand.

The University of Hawaii is now closing its fourth year as a Sea Grant institutional award recipient. The goal of this program is to develop, conserve, and use the nation's ocean and coastal resources for the greatest social and economic benefit of mankind. Federal monies are provided to public and private institutions which meet the requirements of the National Sea Grant College and Program Act. Grant award recipients are required to match federal grants on a one-to-two basis.

Maritime Administration (MARAD)

A separate entity from NOAA, the Maritime Administration in the Department of Commerce, thus far has had little direct specific involvement in the planning of federal policy and overall national programs concerning the coastal zone. However, the Maritime Administration is directly involved with transportation (shipping, waterways, and harbors) and shoreline development (as it might affect harbor development) which, of course, are concerns of coastal zone planners. MARAD has certain well-defined legislative and promotional responsibilities for the administration of the Merchant Marine Act of 1936 (46 U.S.C. 1151-1161), as amended, together with certain related acts.

Title V of the Merchant Marine Act of 1936, as amended, calls for the promotion, development, and maintenance of the U.S. Merchant Marine by granting financial aid to equalize the cost of constructing a new ship in a U.S. shipyard with the cost of constructing the same ship in a foreign shipyard. The funds appropriated to the marine industry in the form of construction differential subsidies are specifically designated for ship construction or ship conversion and are limited to 41 percent of the domestic costs. By 1976 this subsidy will drop to 35 percent. To be eligible for subsidy, a U.S. flagship owner must agree to build the ship in the United States and operate it under the U.S. flag, with a U.S. citizen crew, for a period of 25 years.

MARAD also administers a related program for granting operating differential subsidies for U.S. flagships already engaged in foreign commerce.

Operating subsidies include wages, insurance costs, subsistence of officers and men, and repairs not covered by insurance. Under this program (subject to certain conditions and limitations), MARAD will pay the difference in wage and insurance costs between U.S.- and foreign-operated vessels. In terms of economic impact on the U.S. Merchant Marine, this is the most important subsidy given.

Further financial aid is available to the marine industry in the form of government insurance on commercial loans and mortgages, so as to make commercial credit more easily available. Insured loans are available to assist in financing vessels which are designed for commercial use or for research, subject to certain eligibility requirements and other restrictions.

MARAD also provides advice and counsel concerning port development and intermodal transportation systems. The provisions of the Merchant Marine Acts of 1920 and 1936, as amended, enable MARAD to provide such technical advice to other federal agencies, to private industry, and to state and municipal governments. In this connection the agency is in a position to provide technical counsel for the choice and implementation of various proposed water-based transportation systems between Honolulu International Airport and Waikiki.

In the field of water-pollution abatement, MARAD has initiated a provision of sewage-treatment facilities in its new ship-construction program, sponsored research concerned with the prevention of oil pollution, and initiated oil-pollution abatement in U.S. ports. Other activities of MARAD on the national and international levels include evaluation of offshore port-terminal concepts in anticipation of the advent of supertankers and the development of U.S. position papers on international port and intermodal transportation matters. MARAD also evaluates the Economic Development Administration's grant applications for port improvements.

MARAD is a lead member of the Department of Commerce Water Resources Coordinating Committee and consolidates views of other Commerce agencies on proposed navigation projects. It is expected that further direct involvement of MARAD in coastal activities will ensue, as federal planning activities in the coastal zone are expanded.

Economic Development Administration (EDA)

The importance of the Economic Development Administration with respect to current developments in Hawaii's coastal zone has been insignificant to date. In terms of future reference, however, it appears that EDA can have a more conspicuous impact on coastal modifications, at least in certain counties of the state.

EDA was established by the Secretary of Commerce to carry out the provisions of the Public Works and Economic Development Act of 1965 (Public Law 89-136), as amended. In brief, the Act provides for technical and financial assistance in the construction of public and private facilities in designated geographic areas where economic growth is lagging, and which are further characterized by severe unemployment or underemployment.

Because of the relatively low unemployment rate of Hawaii's counties in relation to the national norm, few counties have been eligible for EDA assistance in the past. Until 1972, only one county, the island of Hawaii, was eligible for assistance under a portion of the Act which required that every state be allowed one redevelopment county whether it met EDA's requirements or not. This was an amendment placed on the Act by Mrs. Patsy Mink, Representative from Hawaii, and is known as the "Mink Amendment to the Public Works and Economic Development Act of 1965."

The Economic Development Administration's program includes grants and loans for public works; business loans for industrial and commercial facilities; guarantees for private working capital; and technical, planning, and research assistance.

On the national level, EDA has funded about 200 coastal zone projects representing an investment of $178 million. Of these projects, 64 were technical studies, 20 were business loans, and 116 were for public works such as docks, piers, marinas, cargo-handling installations, roads, water and sewer systems, and the like (*Science and Environment*, 1969, p. III-93).

Applicants to the program may be states, local subdivisions thereof, private and public non-profit organizations, or associations representing a redevelopment area. In 1970, the Board of Water Supply, County of Hawaii, qualified for an EDA grant of $33,200 to construct a water system, including a pump, a control building, concrete reservoirs, and a pipeline to serve a state park.[15]

Due to recent increases in unemployment, two additional counties may become designated for EDA assistance in the near future under the general terms of eligibility, and thus be qualified to receive public works grants from EDA. Offhand, it appears that more rural sectors of Hawaii's coastal zone could qualify for EDA-assisted coastal zone development projects. However, unless there is a drastic change in the economy of the Islands, it is not expected that additional areas would soon be qualified.

[15]Information provided by Mr. Matsui, Coordinator, Office of the Federal Programs, Department of Budget and Finance, State of Hawaii, March 17, 1972.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

As with the Economic Development Administration, HUD's involvement in the coastal zone can appear to be either trifling or significant, depending on one's perception of the coastal zone's innumerable attributes. If this region is viewed mostly in terms of its natural-physiographic characteristics, then HUD's role in such an environment is minimal. If, on the other hand, it is perceived to be characterized by location and function as the preferred locale for the residence and livelihood of large numbers of people, then HUD's involvement takes on greater significance.

Organized under the authority of the Housing and Urban Development Act of 1965 (Public Law 89-117) and by amended legislation, the Department currently administers 73 programs and services (*Catalog of HUD Programs*, 1969), virtually all of which can be related in one manner or another to public management in the coastal zone. However, because of space limitations, only those programs which have special relevance to urban coastal areas are mentioned.

National Flood Insurance Program

This program was established in 1968 (Public Law 90-448) to make available to property owners a limited amount of flood insurance, which was previously unattainable from private insurers, by means of a federal subsidy. In return for this subsidy, state and local governments are required to adopt and enforce certain land-use control measures and building codes in those areas identified as flood zones -- those subject to inundation by tsunamis or by heavy runoff. Such measures are designed to reduce the potential for future flood damage to property, and simultaneously to reduce the amount of sediment deposited in coastal waters.

A move to amend the Hawaii County building code to meet federal regulations to qualify for tsunami insurance met opposition by some councilmen sitting on the Public Works Committee ("Big Island Code Revision for Flood Areas Opposed," 1971, p. D-20). Their objection centered around the increased costs of home construction resulting from federal restrictions. It was argued that using a frequency of one tsunami every 40 to 50 years, it might be cheaper for homeowners to sustain an uninsured loss than to pay contractors additional costs created by the building code amendments. Noting that failure to conform to federal rules could make Hawaii County residents ineligible to continue purchasing federally subsidized flood insurance, the County Council later voted 6 to 3 to make the code conform to federal regulations. This program is a prime example of the "carrot approach" in the regulation of land use having a direct bearing on the quality of coastal waters.

Comprehensive Planning Assistance

Section 701, Housing Act of 1954 (Public Law 83-560), as amended, authorizes HUD to make grants of up to two-thirds of the cost of a planning project to supplement state and local funds for comprehensive planning

for areas having common or related development problems. Applicants may be state agencies designated by the Governor, city and county agencies, and other public planning instrumentalities. Eligible activities include the preparation of development plans, policies, and strategies; implementation measures; and the coordination of related plans and activities being carried on at various levels of government. A broad range of subjects may be addressed in the course of the comprehensive planning process. They include land development patterns; physical facility needs such as housing, transportation, and recreation facilities; and the development and protection of natural resources.

Open-Space Land Program

Title VII, Housing Act of 1961 (Public Law 87-70), as amended, empowers HUD to provide grants of up to 50 percent of costs involved in acquiring land for open-space use. Further grants of up to 50 percent of improvement costs for developing the land are also made. Open-space land must be acquired and developed in accord with local and area-wide comprehensive planning. Grants to acquire developed land in built-up areas may be made only if there is no suitable undeveloped land in the same area. Applicants may be state and local public bodies with authority to acquire and preserve open-space land and to contract for federal funds.

Model Cities

This program is designed to provide grants and technical assistance for cities to carry out comprehensive programs to attack the social, economic, and physical problems in selected "blighted" areas. Cities are required to use and coordinate existing federal grant-in-aid programs and state, local, and private resources, and to involve neighborhood residents in planning and executing comprehensive five-year plans.

The City and County of Honolulu has two Model Cities programs in coastal areas -- one for Kalihi-Palama and one for the Waianae Coast. The chief responsibility of Model Cities personnel is to coordinate the actions required at the federal, state, and local levels of government in integrating the basic elements of Model Cities programs, and to provide the coordinated delivery of resources to meet the objectives of this program.

The proliferation of cost-sharing planning programs, many of which can be directly related to the management of the coastal zone environment, indicates that the exercise of authority and regulation in the coastal zone is moving progressively to higher levels of government. Such programs impose dollar pressures on states and local communities to plan, manage, and develop the coastal zone within basic federal guidelines.

While much has been said and written about the uniqueness of the coastal zone environment and the difficulties and complexities involved in its management, the Nixon Administration views the coastal zone not as an entity unto itself but as part of the national whole. This is indicated by the Administration-backed drive to enact an overall National Land Use

Policy in favor of separate coastal zone legislation. It was once theorized that the prime implementing responsibility for the National Land Use Plan (if passed) should go to the Department of Housing and Urban Development (*Coastal Zone Management: Newsletter of Coastal Resource Exploitation, Conservation and Enhancement*, December 1970, p. 2). The underlying philosophy behind such speculation is that, out of the multiplicity of federal agencies that have a stake in the coastal environment, HUD, is currently best equipped to handle the bulk of coastal zone challenges at the federal level -- the implication being that most of the pressing problems are urban in nature. This is especially true of Oahu, where the coastal zone is dominated by the urban scene, which in turn depends on the marine environment for its survival and growth.

Among land uses within Oahu's coastal zone, residential use appears to be the most significant, not only in terms of numbers but also in terms of influencing other coastal-use decisions. Whether residences are used as permanent homes, for vacations, rental income, or speculation, this use is bound to occupy an ever-increasing amount of coastal land for a long time to come, and bestow direct benefits largely upon developers and prospective occupants.

In recent months coastal planning and development news won an unusually large share of headlines. The State Legislature passed a law (Hawaii Revised Statutes, vol. 2, section 46-6, pp. 5-6) requiring counties to adopt ordinances which would require subdividers to dedicate or donate land for parks, or contribute to a fund for park acquisition, in order to get subdivision approval. One interpretation of this law is that public welfare should benefit by rules and regulations requiring substantial park and other public use donations, in cases where land values rise as a result of land subdivision. While the City and County of Honolulu is in the process of drafting such an ordinance, it has yet to be finalized and passed. In the meantime, coastal development pressures have been mounting. A case in point is the Makaha Surfside project which has become an embattled issue involving the City Council, the Mayor, representatives of Model Cities, developers, preservationists, and residents of the Waianae Coast.

In view of the potential importance of open-space and marine-based recreation to Oahu, this controversial aspect of coastal development has to be examined carefully. In May of 1971, the City Council turned down a request by the developers of the Makaha Surfside Condominium for rezoning that would permit the apartment complex to be built on more than five acres of prime Waianae Coast beach property. Newspaper coverage indicated that the Council would purchase the property and turn it into a public beach park. At that time the Council's presumed intent was to keep most remaining parcels of open space on the ocean side of Oahu's coastal highways from further development. It was soon discovered, however, that such beliefs were unfounded. As it became apparent that the majority of the Council members were about to reverse the Council's earlier position on the rezoning request, the Model Cities group, which prefers parks to condominiums, lobbied vigorously in a last-ditch effort to forestall the Council's vote.

Model Cities members had asked two city councilmen not to participate in the final vote, on the grounds that they could have a conflict of interest in the case, since in the past both councilmen had represented the

Makaha Surfside developers. Charges and counter-charges were aired in the news media. The Council itself was divided on the issue. One member asked the others to defer their decisions, since a group from HUD was scheduled to meet later in the week and possibly could make a firm commitment on a federal grant toward purchasing the property for a park. However, another Council member successfully argued against deferral: "I believe this is another delaying tactic," he said. "We heard time and time again about federal aid and haven't seen a penny" ("Council Changes Mind, OK's Makaha Condominium," 1971, p. A-14).

The Council finally acted after the City Planning Commission ruled that there had been no convincing evidence for turning the property into a public park. In a final 7-2 vote the Council approved the rezoning for the Makaha Surfside project. Mayor Frank Fasi, who earlier opposed the rezoning, later sided with the majority vote after the developers said that they would dedicate 2.8 acres between the apartment complex and the shoreline for park purposes. The Model Cities people have vowed to take legal action to prevent the Makaha Surfside development, in spite of the Council vote ("The Coast and the Condo," 1971, p. C-1).

In another similar case, the City Council overrode Mayor Fasi's veto on a North Shore resort rezoning request involving apartment and resort rezoning for 137 acres of Campbell Estate land in Kahuku. In this case, the Mayor had opposed the rezoning because the developers had not provided a written guarantee that the estate would donate 68 acres of land for park use in return for zoning changes. However, the Council did respond to the Mayor's objections by producing a letter from the Campbell Estate which pledged to abide by a parks-for-zoning agreement worked out earlier.

The controversy over construction of high-density developments along the Waianae Coast is about to erupt again. The assistant city planning director has disclosed that a plan for the construction of a 68-foot-high tower hotel was submitted to the city planning department during the Makaha Surfside controversy. The plan was withdrawn when the City Council began discussing a "lei of green" policy to restrict further beachfront development around Oahu. However, when this policy was shelved by the approval of the Makaha Surfside project, the plan for the construction of an eight-story condominium hotel on Makaha Beach was resubmitted for rezoning. The property is currently zoned for residential use, but the Oahu General Plan calls for resort development in the area.

Sources at the Waianae Model Cities Office say that public opposition to this plan is expected ("New High-Rise Fight at Makaha Looms," 1972, p. B-1). The Model Cities organization has maintained its policy of discouraging development on the ocean side of Farrington Highway along the entire Waianae Coast.

Public Costs of Private Development - Commentary

As urban, resort, and residential developments have occurred in Hawaii's coastal zone, they have brought to our society a mixture of blessings. We have an increased amount of fabricated products and a diminishing supply of certain products of the natural environment. Albeit we have more houses and fine eating establishments; we also have less unpolluted water and open spaces.

Traditionally, private land-use decisions have been and continue to be shaped by considerations of profit maximization. Public land-use decisions are also largely dictated by the principle of "highest and best use", most often based on the assumption that the market system is a tolerably good provider of information on both social benefits and costs arising from development projects. However, recent economic research has shown that the situation in the real world is often quite different. There have been several instances when decisions favoring private developers have been taken against the wishes of the local citizenry. This is certainly one area where the "invisible hand" doctrine of classical economics -- which equates private selfishness with public welfare -- needs a lot of help.

As coastal development pressures continue to mount, getting the full public benefit from land-use decisions has become an increasingly important subject of discussion. Considerable attention has been focused on public costs brought about by privately initiated development projects. The most obvious form of public cost is the loss of considerable areas of open shoreline from unimpeded public use, despite the fact that state law clearly states that Hawaii's beaches belong to the public and should be available for public use. While there may be a need for further development, the relevant question centers on the desirability of using prime shoreline areas to satisfy development demands, while alternative sites could be used.

Presently, centralized institutions for guiding and directing coastal development decisions do not exist. Instead, the coastal zone is subject to competing demands, with many of the outputs being unmarketable or not directly marketable -- for example, public coastal recreation. Thus, coastal land-use decisions are often made by extra-market bargaining, depending on value judgments and effective political power tactics.

Clearly, subdivision approval, zoning, and permits should be obtainable under well-defined rules and under clear and recognized conditions. This is especially true for the required park-dedication ordinance. Unless the rules are well defined and treated as important policy questions, it is very likely that influential individuals and groups interested in coastal development will gain disproportionate benefits. Until county lawmakers pass an acceptable park-dedication ordinance, it is highly probable that more coastal development controversies will make headlines. Moreover, whether such an ordinance will prove to be an effective tool for acquiring the highly-needed open-space coastal land to serve the interests of Hawaii residents remains to be seen.

DEPARTMENT OF THE INTERIOR

The Department of the Interior is the nation's chief conservation agency. It is responsible for water, fish, wildlife, land, park, and recreational resources -- all of which are viable resource components of the coastal zone. The Department's activities in coastal zone affairs include research, advisory services, technical assistance, funding to state and local agencies, and resource management on federally owned properties.

Geological Survey

The objectives of the Geological Survey are to perform surveys, investigations, and research covering topography, geology, and the mineral and water resources of the United States. To facilitate the accomplishment of this broad set of objectives, the work of the Survey is divided among four operating divisions:

- Topographic Division -- whose main function is to prepare and maintain a series of topographic maps covering the entire United States.
- Geologic Division -- which conducts a wide-ranging program of field and laboratory research on the geology of the national domain.
- Conservation Division -- which classifies federal lands as to their value for leasable minerals (including submerged lands of the outer continental shelves), or for reservoir and waterpower sites.
- Water Resources Division -- which determines the source, quantity, quality, distribution, movement, and availability of both surface and ground waters.

Water Resources Division

The only permanent office of the Geological Survey in Hawaii is the Water Resources Division. However, the cooperative activities of the Geological Survey in Hawaii are not confined solely to the water resources field, but extend into nearly all phases of the Geological Survey's work. The programs of the Survey involve numerous cooperating public agencies to which it provides technical assistance, largely in the form of maps, basic data, and interpretive reports. Such information provides the physical base for planning, development, and management of resources, whether in the coastal zone or elsewhere. Individual projects in the Geological Survey's cooperative program are jointly planned and financed with state agencies as full partners. This effort is aimed at providing the specific data needed by state and local agencies while simultaneously providing the broad national coverage which is the basic mission of the Survey itself. This is in no sense a grant-in-aid program and should not be confused with the many federal programs that have been established to distribute funds to the states.

As a federal agency, the Water Resources Division is unique in the extent to which it shares with state and local water agencies the responsibilities for planning and financing investigational programs. Cooperative water resources investigations in Hawaii cover a wide field of research and data collection, in accord with the national obligation of the Survey and the needs of state and other federal agencies requesting assistance. The cooperative work in Hawaii is financed with the State Department of Land and Natural Resources, and the Board of Water Supply of the City and County of Honolulu. Other water-related work in the state is financed with funds from the Corps of Engineers, the National Weather Service, and the Federal Water Pollution Control Administration.[16]

The scope of the Division's program in Hawaii consists of (1) the collection of basic data on streamflow and sediment, water quality, and groundwater levels, and (2) several special investigations to interpret the large store of accumulated data as quantitative representations of complex hydrological systems.

These special investigations enhance the usefulness of raw statistical data for public and private planners and managers. They range from reconnaissance studies to describe the hydrologic setting and the general character and availability of water in selected areas to detailed and complex studies to determine more accurately the quantities of water that can be developed. They also include studies of existing and potential hazards associated with water development -- for example, saltwater encroachment in some coastal areas, and erosion and sedimentation resulting from changes in land use.

The hydrology of basal water systems on Oahu is being studied to demonstrate the effects on the groundwater system caused by change in land and water use. A prime example of such change is the conversion of agricultural land to housing and industrial use. The pattern of pumping and irrigation recharge can be altered significantly, and the existing balance between salt water and fresh groundwater can be modified accordingly. By model studies the Water Resources Division hopes to show where new balances will develop.

In the Pearl Harbor area, where the groundwater basin is being considered as a possible source of additional water supplies, the Division is trying to define explicitly the complex relationship by which freshwater levels prevent landward movement of seawater into the groundwater reservoir. The purpose is to determine where and how much additional water might be taken without danger of destroying this valuable resource by saltwater intrusion. A related study seeks to determine how much of the floodwater that now wastes to Pearl Harbor could be recharged to the groundwater basin to increase the supply further. If the results are favorable,

[16]The Federal Water Pollution Control Administration was initially established in 1965 under the Secretary of Health, Education and Welfare to provide grants for research and development, to increase grants for construction of sewage treatment works, and to require establishment of water quality criteria. It was transferred to the Department of the Interior by Reorganization Plan 2 of 1966. Its name was changed to the Federal Water Quality Administration by Act of April 3, 1970. Its functions were transferred to the Environmental Protection Agency by Reorganization Plan 3 of 1970 (see text).

planners could use the subsurface storage capacity in the same way that surface reservoirs are used to conserve flood runoff.

Sediment investigations of selected drainage basins on the island of Oahu are aimed at determining the sediment yields, the sediment-transport characteristics of streams, and the principal factors that influence these characteristics. The data will be important in the planning of urban areas, highways, recreation sites, and for pollution studies of bays and estuaries.

A water resources reconnaissance summary for the island of Hawaii synthesizes in one package various water-related studies of the island. This compilation of hydrologic information is needed for planning purposes by the State Department of Land and Natural Resources.

On the island of Maui, similar reconnaissance studies are in progress in the Wailuku area. In addition, a study is under way on the northeastern slopes where considerable water, which theoretically could be used to irrigate the dry western slopes, is now running off into the ocean.

It is expected that flood studies throughout the state will provide information relating to the design and location of structures on or near streams, such as roads and bridges, and to the hazards of floodplain occupancy and use.

The ongoing research of the Water Resources Division enables public and private planners to consider non-hydrologic factors (economic, political, and social) in making major resource-use decisions. By providing a better understanding of what might happen to the existing water regime under alternative development schemes, a decision maker can weigh the pros and cons of each alternative, thereby minimizing the pitfall of unknowingly creating new and sometimes worse problems in the process of solving existing ones.

Office of Water Resources Research (OWRR)

The Office of Water Resources Research administers financial aid programs authorized by the Water Resources Research Act of 1964 (Public Law 88-379), as amended in 1966 (Public Law 89-404). Unlike the Water Resources Division of the U.S. Geological Survey which conducts in-house research on a cooperative basis, the OWRR does not conduct research itself. Rather, it supports research in water and water-related resources by out-of-house allotments, grants, and contracts, largely through institutes affiliated with land grant colleges. The Water Resources Research Center (WRRC) of the University of Hawaii is one such recipient of OWRR funding.

Traditionally, most of OWRR support has been in the non-coastal water resource problems. However, OWRR does support a number of projects that are clearly in the purview of the coastal zone. These include response of coastal aquifers to tidal changes, influence of watershed drainage on the quality of coastal waters, thermal properties of sea water, and others (*Annual Report*, 1970-1971).

Bureau of Land Management -- Outer Continental Shelf Office

The Submerged Lands Act of 1953 (Public Law 31, May 22, 1953 [H.R. 4198]) determined the zone in which individual states of the Union have jurisdiction over ocean resources, and the authority to lease offshore lands for extracting seabed resources. In effect, the Submerged Lands Act defined the *inner* continental shelf as being that area between the baseline (the theoretical version of the coast) and the three-mile seaward limit of the territorial sea. Outside the limit of the territorial sea, the federal government proclaimed exclusive leasing authority by the passage of the Outer Continental Shelf Lands Act of the same year (Public Law 212, August 7, 1953 [H.R. 5134]). One of the provisions of this Act was the authority granted to the Secretary of the Interior to lease such lands for certain purposes, even though the Act did not define the outer extent of the continental shelf seaward of the territorial sea. The Secretary of the Interior in turn placed the authority to administer the resources of the seabed and subsoil with the Bureau of Land Management.

The principal problem relating to extractive mining operations on or beneath the sea floor outside the limits of the territorial sea involves a precise determination of the outer limits of the continental shelf. As mentioned previously, the 1958 International Convention on the Continental Shelf[17] defines the shelf as being "adjacent to the coast" and extending seaward to a depth of at least 200 meters (656 feet) and possibly beyond, depending upon the technological exploitability of the area in question. Thus, this definition seems to be open-ended, depending on the interpretation of the words "exploitation" and "adjacent."

The Department of the Interior has published leasing maps of the ocean floor off southern California in water depths ranging up to 6000 feet. The Outer Continental Shelf Office has also granted exploitation leases to oil companies off the Oregon coast in 1800 feet of water, and exploratory leases to drill core holes off the Atlantic coast in depths of up to 5000 feet (Alexander, 1968, p. 389).

In a more recent statement of ocean policy, President Nixon suggested "that all nations adopt as soon as possible a treaty under which they would renounce all national claims over the natural resources of the seabed beyond the point where the high seas reach a depth of 200 meters and would agree to regard these resources as the common heritage of mankind" (President's Statement, 1970, p. 1). There seems to be an inconsistency in federal policy. The Department of the Interior has been known to issue leases to oil companies in offshore waters substantially deeper than 200 meters, yet the State Department, vis-a-vis the President's policy message, implies that it will not attempt to enforce the leases if disputes arise with other countries.

With respect to Hawaii's offshore waters, recent Sea Grant-sponsored research has shown that significant amounts of manganese-rich crusts and commercial quantities of precious coral lie outside the current limits of state jurisdiction and in waters substantially deeper than 200 meters. These discoveries have prompted Dr. John P. Craven, State Coordinator for

[17]The U.S. is a signatory to this Convention.

Marine Affairs, to advise the Governor that the Hawaii legislature should declare state property rights over mineral and non-pelagic biological resources within a corridor 400 miles wide, generally centered at the highest points of elevation along the Hawaiian Archipelago.

Exactly where and how the Outer Continental Shelf Office fits into this complex matrix of international, national, and state policy is unknown since large-scale extractive mining operations on submerged lands beyond the three-mile territorial limit have not yet materialized.

Bureau of Outdoor Recreation

The Bureau of Outdoor Recreation serves as an outdoor recreation planning, programming, and policy-making agency at the federal level. It is charged with formulating and maintaining a comprehensive nationwide outdoor recreation plan, and coordinating the land acquisition programs of the National Park Service, Forest Service, and Bureau of Sports Fisheries and Wildlife.

As part of its mission, the Bureau of Outdoor Recreation administers the Land and Water Conservation Fund Act.[18] This Act provides 50/50 matching grants-in-aid assistance to states and, through the states, to local jurisdictions for planning, acquisition, and development of outdoor recreation areas. To qualify for acquisition and development assistance under the program, each state must prepare a comprehensive outdoor recreation plan which delineates the outdoor recreation needs of the state and proposes a program to meet these needs. An acquisition and development schedule is also required as part of the plan. The third comprehensive assessment of statewide recreation needs in Hawaii has recently been completed, thus permitting the state to continue its participation in the Land and Water Conservation Fund Program for three more years before another updating will be required.

In 1971, Hawaii received its largest federal Land and Water Conservation allocation to date: $2,609,925 (*Hawaii Economic Review*, September-October 1971, p. 7). Of this total, nearly $2.5 million[19] (95%) has been committed to public recreation projects that are located within one mile of the coast. Previous grants have totaled $3.7 million. To date, the state and counties have had a total of 49 park projects under this federal program.

From a geographical viewpoint, the island of Oahu is receiving the largest portion of committed funds -- 45 percent of the total. Oahu is followed by the Big Island (27%) and Kauai (19%), with the remaining portion going to recreational improvements on Maui and Molokai. These Land and Water Conservation funds are being expended on construction of park pavilions, picnic units, restrooms, landscaping, shower facilities, parking areas, roadways, boat-launching facilities, utility systems, land purchase, and the like.

[18]Passed in 1965 (Public Law 88-578); amended in 1968 (Public Law 90-401).

[19]Correspondence with Frank E. Sylvester, Regional Director, Pacific Southwest Regional Office, Bureau of Outdoor Recreation, August 16, 1971.

Bureau of Sports Fisheries and Wildlife

The chief area of responsibility of the Hawaii field office of the Bureau of Sports Fisheries and Wildlife is to administer and manage the Hawaiian Islands National Wildlife Refuge System on the uninhabited string of islands between Kauai and Midway. Activities include planning and implementing management programs for migratory waterfowl and fish in these areas. The Bureau is directly involved in wildlife surveys carried out in cooperation with and under treaties with foreign governments, especially as they relate to endangered species. For example, a migratory bird treaty with Japan, which is currently pending ratification, applies to certain species of sea birds which are part of the fauna of Hawaii's coastal zone.

The Bureau is also responsible for wildlife management of federally owned lands and waters held by the military. In addition, the Bureau conducts cooperative research with the State's Division of Fish and Game, the University of Hawaii, the Oceanic Foundation, and with other organizations on fish and wildlife research. One example of such cooperative research was a recently completed study on the fauna and flora of Kealakekua Bay on the island of Hawaii (Doty, 1968) which was commissioned by the Office of the Lieutenant Governor. The Bureau is currently involved in a cooperative effort with the County of Hawaii and the University of Hawaii Sea Grant Program in a survey of shoreline ponds along the west coast of the Big Island. A scientific team from the University of Hawaii is sampling the ponds to ascertain the biological significance of fauna and flora found in association with these ponds. Scientists regard the ponds, believed to number more than 100, as ecosystems in a class apart from their marine and freshwater counterparts. Interest in the ponds was heightened in recent months by the controversy over Kaloko Pond (see following text) in North Kona. The results of the survey will be used in evaluating proposals to develop the South Kohala and Kona Coasts. It is there that the greatest number of new resorts and leisure communities are expected over the next two decades (*Hawaii Tourism Impact Plan, Volume 2: West Hawaii*, 1972). The survey will aid in selection of natural area reserves and sanctuaries.

As on the mainland, two of the most pressing problems of the coastal zone in Hawaii are loss of wildlife habitat by filling in of wet lands, and water pollution that often adversely affects fish and wildlife populations. In this connection, under the authority of the National Environmental Policy Act of 1969 (Public Law 91-190), the Bureau, along with other federal agencies, reviews permit applications issued by the Corps of Engineers. It evaluates possible detrimental effects on fish and wildlife populations caused by discharges of effluents into navigable waters and tributaries thereof, or by physical alterations of such environments.

In a timely news article ("Group Fears for Wildlife, Cites State 'Non Support'," 1972, p. C-1), it was noted that of the nation's 52 endangered bird species, more than half -- 28 species -- are Hawaiian birds. Many of these are water birds whose habitats are threatened by urban developments.

The Executive Director of the Hawaii Wildlife Federation, said that the state spends so little money on wildlife preservation that it lacks scientific data on how to preserve the endangered birds. The Wildlife

Federation feels that the only hope for saving the species will be for the federal government to step in.

The Bureau of Sports Fisheries and Wildlife has a budget of $1 million to spend in the next year to acquire wildlife refuges in Hawaii ("Group Fears for Wildlife, Cites State 'Non Support'," 1972, p. C-1). Areas of the Bureau's priority list include 300 acres at Hanalei and the Menehune Fishponds on Kauai, three lakes on Niihau, several ponds in the Kaneohe and Kahuku areas on Oahu, Kealia and Kanaha Ponds on Maui, Kahahaea Pond on Molokai, and Opaeula and Honokohau Ponds on the Big Island. The Bureau is also empowered to administer grants-in-aid to the State's Division of Fish and Game for use in its fish and game management program.

National Park Service

The National Park Service is responsible for administration of the National Park System, which includes some areas with significant marine resources. There are three units of the National Park System in Hawaii, each of which extends to the shoreline.

Haleakala National Park extends to the seas in the vicinity of the Seven Sacred Pools near Hana, Maui. The shoreline is on the windward coast and is rough and rocky, so water recreation, both present and potential, is quite limited. However, the Living History Program now being developed in that part of the park involves the use of the shore and sea by Hawaiians pursuing their cultural way of life -- fishing, opihi collecting, and other traditional activities. Park visitors use will presumably consist mainly of photography and seascape viewing.

At the Hawaii Volcanoes National Park, a long stretch of shoreline is remote and wave-beaten, devoid of freshwater sources, and consists almost entirely of low cliffs, thus preventing easy access to the water's edge. Visitor use is at present minimal, with the exception of sightseeing along the stretch of shore served by the Kalapana Road. Consumptive uses of the seashore are not expected to increase to any great extent. Moreover, consumptive uses for about one half of that part of the shoreline are further restricted by the provisions of the Kalapana Extension Act of 1938[20] which stipulates that fishing shall be permitted only by native Hawaiian residents of that area or of adjacent villages and by visitors under their guidance.

At the City of Refuge National Historical Park on the Big Island, visitors can walk out on the intertidal lava shelf to view reef fish, tide pools, and wave action. In addition, the shoreline is used by local people both for fishing and collecting limu. Once again, the relationship of Hawaiians to the resources in and at the edge of the sea is important to the interpretive story of the area. It is the aim of the National Park Service to encourage such use, but to attempt to restrict it to the kind of use that is appropriate. The National Park Service is trying to limit the purely commercial uses which could destroy the values of the seashore.

[20] An Act to add certain lands on the island of Hawaii to the Hawaii National Park, and for other purposes, approved June 20, 1938 (52 Stat. 781). This Act added approximately one half of the present shoreline to the Hawaii Volcanoes National Park.

For instance, park administrators would like to see the collection of pencil urchins and coral heads prohibited, but would endorse the continued fishing from outrigger canoes in Honaunau Bay.

In all three areas, the National Park Service has a genuine interest in what happens along the shoreline, in order that park visitors may see unspoiled stretches of coastline undisturbed by major commercial operations, and may also see a continuation of the historical relationship of Hawaiians to their natural resources. The Park Service is concerned with open space, recreation, cultural continuity, and preservation of marine and littoral flora and fauna of the coastal zone. Earlier drafts of park master plans, now obsolete, have considered requesting, by congressional action, control of the ocean waters bordering the seashore of each of the three park units. The future status of this request is unclear at present. A potential agreement with the State of Hawaii Division of Fish and Game could formalize the management of those resources to the benefit of all concerned.

The proposed Puukohala Heiau National Historic Site (for which authorization bills are now in Congress) would include an underwater heiau near Kawaihae on the Big Island. This would include federal control of a small portion of shoreline and water surface, now under state jurisdiction, bordering the proposed historic site.

In another move, the National Park Service has released a master plan for the City of Refuge that would more than double the existing size of the historical park. "Additional lands are needed not only to preserve inherent historic value but also to protect the entire complex from incompatible development," the master plan says ("City of Refuge Expansion Plan to be Aired," 1972, p. C-2).

Another coastal issue involving the National Park Service, the Army Corps of Engineers, various congressmen, a development company, conservationists, and local residents is the controversial proposal to turn a portion of the Big Island's Kaloko Fishpond into a tourist complex. The Army Corps of Engineers has been asked to approve a permit to alter an area around the historic fishpond to make a swimming beach for a proposed tourist development. Opposing the development are a group of native Hawaiians, the Kona Conservation Group, and Representative Patsy Mink ("Testimony Heard in Fishpond Dispute," 1971, p. B-1).

In its official role, the National Park Service is neither for nor against development of Kaloko Pond, but rather in the position of a friend of the court. Since Kaloko Pond is part of a National Historic Landmark, any proposed alteration of the landmark involving federal funds or licensing authority requires the National Park Service to make an evaluation of the effect of any proposed alteration on the landmark. The National Park Service evaluated the effects of the proposed development at the Honokohau Settlement and the matter was referred to the Advisory Council on Historic Preservation as required by the Historic Preservation Act of 1966. In addition, Representative Mink has recently sponsored a bill (H.R. 11774) asking for $50,000 to make a one-year study of the Kaloko Fishpond and the surrounding area with the possibility of turning the area into the Kaloko-Honokohau Living Historic Park. Neither the status of this bill nor the status of the development is clear as of this writing.

DEPARTMENT OF AGRICULTURE

In the literature dealing with public agency involvement in the coastal zone, the activities of the Department of Agriculture have received scant mention. Most authors confine themselves to a description of resources and agency activities affecting such resources, in an area limited to the narrow interface between the land and the sea, or to the offshore area. It should be recognized, however, that the soil of the hinterlands is one of the most important resources falling within the purview of coastal zone affairs. For example, the quality of the coastal environment can be detrimentally affected by surface runoff which transports silt and debris to beach areas. Although other pollutants such as oil and sewage effluent have been singled out as serious contributors to coastal pollution, sediment from surface runoff greatly exceeds the total volume of all other pollutants of coastal waters. Siltation of offshore waters by erosion runoff, some of it from agricultural lands and some from excessive grading for subdivisions and highway construction, is a serious problem. In other instances, land has been allowed to lie bare for years with heavy rains periodically washing large quantities of soil into the ocean.

Soil Conservation Service (SCS)

The Soil Conservation Service is the Department of Agriculture's technical arm of action for soil and water conservation. As such, SCS is involved in three programs which have an impact on the quality of coastal waters: (1) District Assistance Program, (2) Watershed Protection and Flood Prevention Program, and (3) Plant Materials Program.

District Assistance Program

SCS was initially created to arrest soil depletion in the United States as dramatized by the "dust bowl" conditions of the 1930's. The mode chosen by Congress to achieve soil conservation at the local level was the soil conservation districts, which were formed through democratic procedures defined by state laws. Such districts are currently in existence in all states.

In Hawaii these districts are known as soil and water conservation districts (SWCD). They are government divisions within the state. Today there are 15 such districts encompassing 96 percent of the land area of Hawaii, with the outward boundaries of each district terminating at the coastline.

Each district is directed by a board of local people, usually resident landowners or operators, elected or locally designated. This board of directors prepares a document describing the condition of the land and water resources in the district and the problems affecting them, and then decides upon a district-wide program and plan of action for implementing development goals.

To assist the districts in carrying out their functions, the State Legislature assigned to the Department of Land and Natural Resources the responsibility of overseeing the coordination of activities among the 15 districts and of keeping districts informed of each other's work.

The significance of soil conservation districts in the regulation of land-use practices has been negligible, since neither the Soil Conservation Service nor the district directors have regulatory powers over land-use practices. However, the weakness of the soil and water conservation districts with respect to regulation of practices does not imply that their influence on land use has been nil. Through the formalized organizational structure of each district, the achievements of the Soil Conservation Service have been largely in the field of conservation education and the provision of technical assistance to private land users and public development agencies.

The Soil Conservation Service is essentially an agency that offers the best technical assistance available. It may recommend that steep or otherwise highly erodable land be retired from farming, that contour cultivation be practiced, and that specific structures such as terraces and water outlets be erected. To date more than a million acres have been treated to minimize erosion, and more lands are being brought under some control. For example, some sugar companies have installed settling basins and hydro-separators that can reclaim silt for use on poorer lands. The State Highways Division has just begun to require the installation of settling ponds and plantings to curtail erosion from highway construction projects. The State Health Department has moved on the Waialae Ridgeline Estates subdivision, requiring increased grass plantings to reduce excessive erosion that has been polluting the ocean near the Kahala Hilton Hotel. So far, these achievements have been possible because of the assistance received through the Soil Conservation Service. However, soil and water conservation districts could be an even more important institutional mechanism of cooperative self-improvement and self-regulation, provided that coastal zone consciousness is infused in district planning.

Watershed Protection and Flood Prevention

The Watershed Protection and Flood Prevention Act (Public Law 83-566) stipulates that a local organization may apply through the Soil Conservation Service for technical assistance and cost sharing in constructing local flood-prevention and watershed protection projects on areas of no more than 250,000 acres. In this respect, soil and water conservation districts are necessary partners in co-sponsoring such projects since these districts are the principal means for local administration of a land-treatment program under the Act and its amendments. However, since the districts by themselves do not have power of eminent domain or taxing powers to finance the local share, co-sponsoring with the state or a local agency is the rule. Moreover, to qualify for federal assistance, local organizations must have authority under state law to carry out and maintain the needed works of improvement.

Approximately a dozen local communities have requested watershed project protection, and their applications have been recommended by the state and forwarded to the Department of Agriculture for SCS planning and financial assistance. To date, some of these projects have been completed while others are authorized for operations. Such programs may include fish and wildlife measures, structural modifications, stream-channel improvements, and other activities. All of these are measures which should be related to the management of the coastal zone.

Plant Materials Program

During the past decade, the Soil Conservation Service's plant materials program has played a significant role in providing more conservation "on the land." SCS operates the Hawaii Plant Materials Center which works closely with the University of Hawaii in collecting, screening, testing, and developing new strains of plants primarily for soil stabilization. Currently, a number of PMC-recommended plants are showing promise in reducing runoff from State Division of Highways projects. Moreover, beach and ocean pollution resulting from eroded lands is being cut down by large-scale plantings of pangola grass supplied by the Plant Materials Center.

Expanded Scope

The coastal zone is not only characterized by the physical land-sea margin, but often includes rapidly changing urbanized areas. It contains the state's major industrial centers and the preferred choice of residence for many citizens of Hawaii. With population growing every year, land is rapidly going out of agricultural use and being replaced by urbanized demands for living space and for industrial, transportation, and service facilities.

This growing acreage of highly developed land poses new conservation problems. The information and experience gained by the Soil Conservation Service in working with the rural sector is currently becoming useful to those using land for other purposes. SCS's contribution to broad resource planning, including both agricultural and urban sectors, has increased dramatically during the last decade. The Soil Conservation Service works closely with the Hawaiian Sugar Planters' Association in designing furrow-management techniques which should result in minimizing surface water runoff. In addition, soil, plant, and engineering knowledge accumulated through the years has encouraged state and county planning organizations to seek SCS assistance before making land-use decisions. More recently private developers have been requesting SCS "know-how" concerning soil and water problems of suburban areas, including advice on residential tract layout and on other matters where concentrations of people inevitably create problems of land use and protection.

Forest Service -- Institute of Pacific Islands Forestry

As with the Soil Conservation Service, its sister agency within the Department of Agriculture, the Forest Service, does not participate directly in coastal activities. However, some of its functions can be related to the total sphere of coastal zone management.

The Institute of Pacific Islands Forestry located in Honolulu is an arm of the Pacific Southwest Forest and Range Experiment Station at Berkeley, California, which is one of a network of regional research units administered by the Forest Service. The Institute was established in 1957 at the request of the Territorial Government, to take inventory of the forest land resources and to determine the quality and quantity of timber in the Islands. In this respect, coastal forests are in the Institute's realm of interest.

Since its inception, the primary program of the Institute has been research in forest and watershed resources. As watersheds are integral entities of the coastal zone, the Institute's concern with watershed management can be directly related to the quality of coastal waters. For example, preliminary studies conducted by the Institute's scientists on water transmission and water storage suggest that soils under forests are hydrologically superior to the same type of soils under sugarcane, pineapple, or pasture. This implies that increasing demands for changes in land use, particularly agriculture and urban development, can adversely affect an area's water supply or increase flood runoff or erosion, all of which have a detrimental impact on the quality of coastal waters. In the future, an economic feasibility study of obtaining potable water from planting forests as compared with other methods such as desalinization could be initiated. It is possible that water obtained from forested watersheds may be economically and socially preferable to water obtained from the sea.

Forest researchers are studying other aspects of the hydrologic cycle including "fog drip." It is known that forest vegetation intercepts minute water droplets which otherwise would be carried away by the brisk trade winds. Moisture thus pulled from the clouds serves as an additional natural bonus to people residing in the coastal zone, simply by bringing more water to underground storage reservoirs.

In addition to research, knowledge of the basic land resources is necessary to provide back-up information for making land-use decisions. Intensive management of Hawaii's diverse forest resources can lead to a broad array of benefits accruing to residents of the coastal zone -- more and cleaner water from adjacent watersheds; diminished flood runoff, erosion, and siltation, improved recreation opportunities and scenery; and improved wildlife habitats in coastal estuaries. The Forest Service also participates in the U.S. Department of Agriculture's flood control programs (Public Law 83-566) which affect waters flowing to and through coastal areas.

Unlike the mainland where the federal government owns and manages 190 million acres of national forests, in Hawaii there no national forests as such. Some forests are owned by the federal government in the form of military lands and national parks, some of which border the coastline. In these cases, management assistance is provided by the Forest Service upon request. In addition, technical assistance is given to other government agencies and private firms. Financial assistance is provided to the State Division of Forestry for forest fire prevention and control, for production of seedlings, for soil erosion control and other reforestation programs, and for assisting private landowners in developing their forests. As a reciprocal measure, the state provides some funding for the Institute's annual research budget.

DEPARTMENT OF TRANSPORTATION

The Department of Transportation has a multifold interest in the coastal zone. It is difficult to overemphasize the importance of the Department since many of its functions are obvious to the public. Most coastal zone uses require travel; for example, the tremendous rise in the use of recreational resources, whether by local residents or visitors, has been possible because of their accessibility. Conversely, there remain few areas of high recreational potential in Hawaii which are lightly used because of lack of adequate access facilities. Outside of transportation-related matters, other functions of the Department are not as recognizable to the public at large.

Coast Guard

The Coast Guard takes its present name by Act of Congress, January 28, 1915: "There shall be established. . .consisting of the Revenue Cutter Service and the Lifesaving Service. . .The Coast Guard which shall constitute a part of the military force of the United States" (14 U.S.C. 1). Formerly under the Department of the Treasury, the Coast Guard was expanded to include the Lighthouse Service and the Bureau of Marine Inspection, and was placed under the Department of Transportation when the Department was established in 1967 (Transportation Act of October 15, 1966 [80 Stat. 932]). Being a branch of the Armed Forces, the Coast Guard operates under the Navy in time of war or when the President directs. Many Coast Guard functions in what is now popularly construed to be the coastal zone were authorized by Congress in 1949 (63 Stat. 495, 14 U.S.C. 89). Other statutory responsibilities were outlined in later Congressional Acts.

Port Security

The Coast Guard provides for safe, secure port areas and facilities and protection of the national interest in internal waters. To accomplish these objectives the Coast Guard conducts waterside and dock patrols, supervises the loading and discharge of dangerous cargo within the waterfront facilities, and controls the movement and anchorage of vessels in Honolulu Harbor when warranted. It has assisted in the establishment of sea lanes to control the safe passage of vessels in and out of high-traffic-density ports of the nation. Currently the state exercises harbor-entrance control in Honolulu Harbor. As a federal agency, the Coast Guard has the statutory authority to preempt such state control.[21] However, considering the relatively low traffic density in Honolulu Harbor, the state is adequately equipped to do the job.

Aids to Navigation

The Coast Guard provides for safe passage on and over the high seas and waters, subject to the jurisdiction of the United States, through an

[21] Technically speaking, under the interstate commerce clause of the Constitution, the federal government has the authority to regulate the control of vessels in navigable waters of the United States.

intricate short- and long-range system of aids to navigation. The Fourteenth Coast Guard District in Honolulu maintains and operates a short-range system which is a visual, electronic, and audio network of lighthouses, radio beacons, channel markers and other buoys, and other miscellaneous aids to navigation. The long-range system, LORAN (Long-Range Aids to Navigation), is an electronic system incorporating scattered transmitting and monitoring stations. The most sophisticated long-range system, termed OMEGA, is a highly technical Navy-supported program which the Coast Guard will administer. It is anticipated that OMEGA will be in operation sometime this year.

Merchant Marine Safety

The Coast Guard provides for the safety of life and property on the high seas and internal waters through programs of regulation and inspection of vessels, examination and licensing of ships' officers and crewmen, engineering supervision and safety standards, marine casualty reviews, and liaison with industry representatives.

Search and Rescue

The Coast Guard provides timely assistance to persons and property in distress on or over the high seas, in waters subject to the jurisdiction of the United States, and elsewhere whenever forces are available. The search and rescue function is the largest Coast Guard program in terms of personnel, funds, requirements, and facilities operated. At the Honolulu Rescue Coordination Center continuous watch is maintained for the control and coordination of assistance to vessels and aircraft in distress. A powerful radio station (NMO) on Oahu is the major communications link between vessels at sea and the Rescue Coordination Center. Honolulu-based cutters alternate between ocean duty and standby for emergencies in their home port. Smaller patrol boats are based at Hilo, Maalea Bay, Maui, and Honolulu.

Recreational Boating

As pleasure boating continues to increase along Hawaiian coasts, a larger portion of the Coast Guard's effort is being expended in this direction. As an expanded network of aids to navigation is instigated, more effort is needed to enforce the Federal Boating Acts of 1940 (60 Stat. 238) and 1958 (72 Stat. 1754-1758), and more energy is being directed to limit pollution of the nearshore environemnt resulting from pleasure craft. Of paramount concern to the boating public are recent federal proposals to control discharge of wastes from ships and boats. The growing popularity of recreational crafts is causing this source of pollution to grow to alarming proportions. It is most severe in harbors and marinas. Under proposed regulations (Federal Register, vol. 36, no. 92 [May 12, 1971], pp. 8739-8740), the Coast Guard has been entrusted to promulgate federal standards of performance for marine sanitation devices within a certain time framework. These devices shall be designed to prevent the discharge of untreated or inadequately treated sewage into or upon the navigable waters of the United States. Compliance with these regulations, which apply only to vessels with installed toilet facilities, shall become effective for new vessels

two years after promulgation of the regulations. Existing vessels will have five years to comply. Thereafter, the federal government will preempt the control of vessel sewage from local and state governments unless, in the event it is necessary to meet water quality standards, the state applies for complete prohibition of sanitary-waste discharges from vessels.

The Coast Guard cooperates with the State's Harbors Division in the numbering of small recreation boats, as required by the 1958 Federal Boating Act. It also conducts boating accident studies and provides public training for safe boating through the Coast Guard Auxiliary, a volunteer organization which is strictly civilian in nature.

Law Enforcement

The Coast Guard is charged with the enforcement of all applicable federal laws upon waters subject to the jurisdiction of the United States, including navigation, customs, criminal, conservation, boating, and pollution laws.

The major Coast Guard law-enforcement effort in Hawaii, aside from port security and recreational boating, pertains to pollution. Federal jurisdiction to control pollution stems from constitutional responsibility that government has over the maritime jurisdiction or "navigable waters" of the United States in its broadest interpretation.

The Federal Water Pollution Control Act of 1956 (Public Law 84-660), as amended in 1961, 1965, 1966, and 1970, is the legal backbone for our national water-cleanup campaign. In essence, this series of legislative acts provides for construction and other grants, research programs and enforcement procedures. Title I of the Water Quality Improvement Act of 1970 (Public Law 91-224) is the most recent amendment to the Federal Water Pollution Control Act. Among its major provisions, Title I provides for improved control of oil pollution. The provision gives the federal government the authority to develop multi-agency contingency plans for responding to oil-spill emergencies, with the cost of the cleanup charged to the offending party, provided that the United States can prove willful negligence or misconduct on the part of that party. Other provisions of Title I call for control of hazardous polluting substances and control of sewage from vessels, as discussed previously.

By Executive Order of July 20, 1970, the Secretary of Transportation was designated as the enforcing authority of the Water Quality Improvement Act upon the navigable waters of the United States. He, in turn, delegated this duty to the Commandant of the Coast Guard.

Locally, the Coast Guard is presently working on regulations and procedures to enforce the provisions of this Act. It has instituted both aerial and surface pollution patrols and has apprehended a number of vessels discharging oil into the sea. Recently over 9000 fliers were mailed to island boaters and marinas requesting they report oil-pollution sightings. Reports are also being solicited from swimmers, surfers, and others who may observe the waters being polluted. The precise outcome of all these activities on the quality of coastal waters is impossible to predict at this time. During the last few months, the Coast Guard's first pollution cases, involving ships under the British, Finnish, and American flags (*Fourteenth Coast Guard*

District Pollution Newsletter, August 1971, p. 4), have been successfully prosecuted by the U.S. Attorney under the 1899 Refuse Act (33 U.S.C. 407). As far as can be determined, this represents the first successful prosecution of marine polluters by a federal agency in Hawaii.

As a public service, the Fourteenth Coast Guard District distributes a local pollution newsletter to approximately 100 interested parties: local-state-federal agencies, actual and potential polluters, pollution-cleanup firms, ecology groups, and others requesting copies.

Federal Aviation Administration (FAA)

How the coastal zone is affected by the activities of the Federal Aviation Administration is difficult to ascertain, since it has no statutory responsibility specifically related to the zone as such. However, by virtue of its overall responsibilities on matters largely related to the use of airspace and ground support facilities, some of the Administration's activities which have a significant impact on the coastal environment are not easily recognizable to the public.

FAA's role is twofold. It allocates the use of airspace by developing and operating a common system of air traffic control and air navigation for both civilian and military aircraft. Groundside, FAA is charged with a complementary task of promoting the development of a national system of airports.

In providing for safe and efficient utilization of the navigable airspace, the Administration prescribes flight operating rules and procedures governing the flow of air traffic to and from airports. These rules have the force and effect of law, violations of which can subject the violator to civil penalties. The Administration operates a network of traffic-control towers and air route traffic-control centers. It also regulates the installation, maintenance, and operation of visual and electronic aids to air navigation.

FAA administers the Airport Development Aid Program (ADAP) as outlined in the Airport and Airway Development Act of 1970 (Public Law 91-258). This Act authorizes grants-in-aid to public agencies in developing public airports that are essential units of the national airport system. It also provides financial assistance to qualified planning agencies for airport system planning and to public agencies for airport master planning.

Among the numerous demands placed on the nation's coastal zone, aviation requirements alone are staggering. For example, Los Angeles International Airport handled more than 21 million passengers in 1968, and something in the neighborhood of 50 million is anticipated by 1975. Chicago's O'Hare Airport accommodated 27 million passengers in 1967 and is expected to accommodate nearly twice as many in the very near future (Krueger, 1970, p. A/3). To meet these requirements, more and more cities are considering the offshore coastal zone for aviation uses and other uses with large spatial requirements. Chicago is considering a jetport to be placed in Lake Michigan. An airport to be located in Long Island Sound is being studied as a possible addition to Kennedy Airport. Similar massive land-water reconfigurations are being considered for various coastal areas throughout the country. Hawaii is no exception to this national trend, especially since the mountainous and

irregular terrain of undeveloped inland real estate is unsuitable for airport expansion.

Acting under the provisions of the Airport and Airway Development Act, Hawaii's Department of Transportation, acting as a public sponsor, came to FAA requesting transfer of certain federally owned upland and submerged lands to the state. FAA, in turn, formally petitioned the respective Secretaries of the Navy, Army, and Air Force, who approved the state's request of title transfer for the planning of the "reef runway" airport extension project. The State Department of Transportation drafted a preliminary environmental impact statement prior to public hearings which were held in the spring of 1971.

The state's airport extension plan had been challenged by several environmental groups, most notably Life of the Land. This group maintained that the environmental impact statement had failed to point out the adverse environmental effects of the project. It also had taken action to ensure a thorough review of the impact statement by the President's Council on Environmental Quality. The central issues surrounding the controversy were safety for airport area residents, noise and water pollution, impact of the runway on the biota and migratory patterns of fish, among others.

Currently (mid 1972), the State Department of Transportation "reef runway" development plans are in the final stage of preparation. When completed, the reef runway will be an offshore addition to Honolulu International Airport. Before FAA released federal monies for the construction of the proposed project, all newly raised environmental issues were resolved in the final environmental impact statement as required by the National Environmental Policy Act of 1969 (Public Law 91-190).

As a pollutant to the environment, noise is not a newcomer to the public ken. The rapid growth of aviation has created a major noise problem in areas surrounding airports, many of which are located in the nation's coastal zone. In this regard FAA assists in noise control by encouraging aircraft taking off from Honolulu International Airport to reduce power and swing seaward away from the Kalihi-Palama industrial and residential areas. Helicopters are similarly encouraged to maintain sufficient altitude to minimize noise over residential areas. FAA also requires a limitation on noise generation through its certification program on newly developed aircraft, and modifications of existing aircraft.

FAA is involved in a cooperative program with the aviation industry in developing and testing improved aircraft, engines, and other modifications intended to reduce exhaust emission, both visible and invisible. Through this program and its certification program, the Administration puts considerable pressure on the industry to reduce noise and other forms of pollution.

FAA develops specifications for aeronautical charts which the National Ocean Survey of NOAA prepares and publishes. FAA publishes current information on airways and airport services, and provides technical assistance when requested by a public sponsor for airport planning and design. In this connection it may be requested by the state to provide assistance in evaluating and partially funding various alternative over-water transportation systems connecting the airport and Waikiki.

Federal Highway Administration (FHWA)

The Federal Highway Administration has three principal functions: (1) multiple aspects of highway research, (2) road-building on federal domain, and (3) the administration of federal aid to the states for highway construction. FHWA has not been involved in road-building projects within the narrow confines of the coastal zone proper. However, it has administered federal aid for a number of inland "interstate" and defense highways, principally on Oahu.

The relationship of the third function of the Federal Highway Administration to prospective developments in Hawaii's coastal zone is more potential than actual at the moment. As pressures on shoreline space mount, partially due to the spread of suburban and resort development in coastal areas, the subject of public highway expenditure has become an issue of prime public concern.

Conceivably, the construction of highways could be used to guide the pattern of community development and growth along the coast. By deciding to build or not to build highways, social decisions can be made to expand or restrict development in certain areas. A case in point is the highly controversial H-3 interstate highway project designed to connect Windward Oahu with Honolulu.

Public hearings on the state-initiated H-3 project were held to provide input for the required environmental impact statement[22] and to gauge the project's social acceptability. In rudimentary form, the lines of debate were as follows: The advocates argued that the projected growth of coastal Windward Oahu and the limitations of existing transportation networks necessitate the construction of the highway. The opposition countered that the highway will significantly damage the natural and cultural environment and that state planners are skirting the basic issue that continued growth of automobile traffic is neither inevitable nor necessary.

In a report to the Federal Highway Administration, the Environmental Protection Agency's San Francisco regional office (see text) labeled the state's environmental impact statement on H-3 "deficient" ("EPA Recommends H-3 Halt," 1972, p. A-1) since it largely ignored the projects' vital secondary impacts. In the view of EPA, H-3 would not be just a transportation link, but would very likely also be a major catalyst in promoting more people and urban sprawl in coastal Windward Oahu, to the possible detriment of public welfare.

Work on the portion of the freeway through Moanalua and Haiku Valleys has been delayed for more than a year, to await preparation of an acceptable impact statement answering all of the criticisms to federal satisfaction. The final decision on the project's fate will be made by the Secretary of Transportation, partially based on the recommendations made by the Council on Environmental Quality and the Environmental Protection Agency.

[22] As stipulated by the National Environmental Policy Act; Public Law 91-190.

DEPARTMENT OF STATE

Unlike some departments within the executive branch of the federal government the Department of State is not authorized or empowered to intervene directly in the management of Hawaii's coastal zone. However, since the Department has primary responsibility for conducting the international relations of the United States, there is a possibility that its actions may have an effect on coastal zone matters. This is particularly true in the context of the control of activities of vessels and nationals of foreign countries. For example, the Department of State may become involved through international conventions if pollution of the adjacent high seas by foreign shipping presents danger of damage to the coastal zone. Also, the Department is directly involved in negotiations of international fishery agreements governing fishing by nationals of foreign countries in the contiguous fishery zone and the adjacent high seas around states of the Union. In this context, in the event that a viable local skipjack tuna fishery is developed in the future, the State Department may be involved in negotiating treaties to reflect the interest of Hawaii-based fleets. Moreover, fishing carried on under such agreements might indirectly affect the ecology of living resources in the coastal zone, examples being the recent discovery of modest commercial shrimp resources off the Hawaiian Islands by the Honolulu Laboratory of the National Marine Fishery Service, and the discovery of commercial quantities of precious corals which lie outside the current limits of state jurisdiction. As a further example, a migratory bird treaty with Japan, which is currently pending ratification, applies to certain species of seabirds which are part of the fauna of Hawaii's coastal zone.

The Department plays the leading role in the United States Government in interpreting and developing the international law of the sea, and most significantly this function has an effect on the very extent of Hawaii's coastal zone. For instance, if the position recently taken by the U.S. delegation at the preparatory meeting for the Law of the Sea Conference in Geneva prevails, the seaward breadth of Hawaii's coastal zone may be extended.[23] Such an international agreement on the width of the territorial sea could open up a legal Pandora's box relating to federal-state control over resources of the coastal zone and beyond -- the recent discovery of substantial manganese deposits off of the island of Kauai being a prime example.

[23] An international Law of the Sea Conference is scheduled for 1973 to resolve several major areas of non-agreement since 1958. The earlier 1958 Law of the Sea Conference failed to establish a precise outer limit for the exercise of sovereign rights by coastal nations over the exploration and exploitation of the seabeds. Another major area of non-agreement pertains to the width of the territorial sea. In the course of the last two years, the United States has consulted with a large number of nations regarding the desirability of making a fresh attempt to achieve some consensus on this issue. It now appears that there is widespread support for fixing the breadth of the territorial sea at 12 nautical miles. In addition to these two major areas of non-agreement, the 1973 Conference will attempt to resolve problems concerning fisheries conservation and management, management of non-living seabed resources, transit of international straits, marine pollution, scientific research, and related subjects.

An International Marine Exposition, scheduled for 1977-78, is planned to be housed on a floating structure just beyond the present three-mile limit, in an area where the laws of the federal government are mostly applicable. This facility will undoubtedly be linked with Oahu through various lines of communications. These points of connection should be sufficient to permit the state to regulate many of the activities on such a floating "city" to the extent consistent with federal laws. Adoption of international proposals to expand the seaward breadth of the territorial sea would very likely alter the federal-state jurisdictional regime in the offshore coastal zone. The proposed floating "city" could likewise be affected in a legal context concerning the expansion of state jurisdiction.[24] As marine technology develops, other examples could be brought forward to show how international relations of the United States, as carried on by the Department of State, may have an impact on the management of Hawaii's coastal zone.

DEPARTMENT OF DEFENSE

The federal government owns a sizeable portion of land in the coastal zone, including lands in national wildlife refuges, in national parks and monuments, and in defense establishments. In addition to land holdings, the Defense Department, through the Army Corps of Engineers, has perhaps the greatest impact on the coastal zone of any federal department.

Army Corps of Engineers

A shift in the mission of the Corps of Engineers from the early, strictly military functions to one including many-sided civil works projects began in 1824 with the passage of the first River and Harbor Act. Since then, the enactment of a multitude of laws[25] relating to the planning and execution of the Corps' civil works program has expanded its responsibility in the coastal zone to include programs for beach-erosion control, construction of breakwaters and jetties, and the effect thereof on the coastline; for the development of navigation channels and harbors along the coast; for flood control involving streams draining through the coastal zone; and for protection against hurricanes in coastal areas.

Navigation Projects

When the Corps of Engineers was first established in Hawaii nearly 70 years ago, its principal mission as a federal agency centered primarily

[24] The Admission Act of 1959 provides that boundaries of the state shall include appurtenant reefs and territorial waters. State control, therefore, extends at least as far as three miles from the shores of all islands in the state and covers all lands and waters within those limits. Title to all submerged lands of the territorial waters rests with the state government unless such title has been specifically withheld by the federal government or has been transferred to private holding by legal instruments or by prescriptive right.

[25] For a compilation of laws relating to pre-authorization planning of the Corps of Engineer's civil works program, see: Robert D. Wolff, *Laws Relating to the Corps of Engineers; Planning of Water Resource Projects*, Program in Engineering-Economic Planning, Report No. 41 (Stanford University, February 1971).

on the development of Honolulu and Pearl Harbor on Oahu. During the ensuing years, acting under the general authority of the commerce clause of the Constitution and by specific authority of River and Harbor Acts of various years, the Corps has transformed every major deep-water port and several small-boat harbors on the Islands.

Navigational projects undertaken by the Corps are limited to provision and maintenance of channels, basins, and harbor protective works, while onshore facilities (piers, berths, terminals, and other landside appendages) are generally the responsibility of state and local governments.[26] The Corps does not engage in any project planning and implementation unless specifically requested by Congress or by state and local interests. For example, in view of the rapid industrial and residential development at Barber's Point (Oahu), local interests requested a deep-water harbor to serve industries there. Congress in 1965 authorized a federal harbor at Barber's Point[27] which is now estimated to cost $21,500,000, of which $19,051,000 will be federal funds. The project is now in the final stages of design; it will provide an entrance channel 3,700 feet long, 450 feet wide, and 42 feet deep, and a harbor basin about 110 acres in area and 38 feet in depth.

Currently the Corps is planning for several other navigation projects in the Islands, including further deepening of Honolulu Harbor. Other investigations are now being finalized concerning federal participation in modifications of Kawaihae Harbor (Hawaii),[28] and the widening of the entrance channel of the enlargment of the harbor basin at Nawiliwili Harbor (Kauai). A listing of uncompleted authorized navigation projects, including project description and status, is available from the district office of the U.S. Army Corps of Engineers at Fort Armstrong, Honolulu. The University of Hawaii Office of Marine Programs is currently compiling an atlas of Hawaii's marine resources. One volume of this atlas is an inventory of bays and harbors for the entire state, including detailed geographical and navigational data in addition to a facilities inventory.

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[26] For 100 percent harbors, the federal government can provide and maintain at federal expense entrance channels, turning basins, and protective structures. The berthing areas and on-shore facilities are the responsibility of the local interest. For 100 percent recreational harbors, the federal government can provide and bear 50 percent of the cost for entrance channels, main access channels, turning basins, and protective structures. Under recent administrative policy, maintenance of these dredged areas and protective structures is assumed by the local interests. Also, all berthing areas and on-shore facilities are the responsibility of the local interests. Where both recreational and commercial benefits accrue to a harbor project, federal participation can be increased proportionately to the ratio of commercial to recreational benefits. The federal government can also share in the maintenance cost for the entrance channels, main access channels, turning basin and protective structures in direct proportion to the rates of commercial to recreational benefits.

[27] The Barber's Point Harbor project was authorized under the River and Harbor Act of 1965. The authorizing document was published as House Document No. 93, 89th Congress, First Session.

[28] Modification to Kawaihae Deep-Draft Harbor is in progress. The construction contract was awarded in June 1971.

Besides participating in the provision of commercial and recreational navigation projects, the Corps administers federal laws protecting and preserving U.S. navigable waters. This responsibility includes granting permits for structures in navigable waters;[29] the clearing and removal of accumulated snags, debris, sunken vessels, and other obstructions which can impede navigation in such navigable waters; the establishing of regulations for navigable waters; and the administering of the Rivers and Harbors Act of 1899 (33 U.S.C. 407) prohibiting the disposal of refuse in coastal and other navigable waters.

Section 13 of the Rivers and Harbors Act of 1899, commonly referred to as the Refuse Act, made it unlawful "to throw, discharge, or deposit, or cause, suffer, or procure to be thrown, discharged or deposited. . .any refuse matter of any kind or description. . .into any navigable water of the United States or into any tributary of the navigable water from which the same shall float or be washed into such navigable water. . .", subject to certain exceptions which are not important here. It further authorized the Secretary of the Army to "permit the deposit of any material above mentioned in navigable waters, within limits to be defined and under conditions to be prescribed by him, *provided application is made to him prior to depositing such material*. . ." (33 U.S.C. 407) (emphasis supplied). Parties violating this section are liable to fine and imprisonment.

It is under this title that the U.S. Justice Department has recently taken court action against nine Hawaii sugar mills for causing water pollution off the Big Island's Hamakua Coast. *The Honolulu Advertiser* recently reported: "The companies at present do not have permits from the U.S. Army Corps of Engineers for discharges. Under the Act all discharges into navigable waters or their tributaries must have such a permit" ("Sugar Mills Crackdown Asked: EPA Cites Pollution of Ocean," 1971, p. A-1). In prosecuting a suit of this nature, a high degree of specificity about the actions of the dischargers must be made available to the court. The decision to prosecute this case and potential cases lies with the Corps of Engineers, the Environmental Protection Agency, and the U.S. Attorney. The ultimate resolution of such cases and their overall impact on water quality in Hawaii's coastal zone are presently unclear.

Beach Erosion

The Corps' participation in coastal erosion projects stems from the establishment of the Beach Erosion Board in 1930 (now replaced by the Coastal Engineering Research Center) to furnish technical advice to states on methods of providing coastal protection. The first beach-erosion control projects in Hawaii were completed at Waikiki Beach in 1959 and at Haleiwa Beach in 1965 by the State of Hawaii in cooperation with the Corps of Engineers. By subsequent acts, legislation was extended to permit the Corps to conduct studies at federal expense of U.S. shoreline, estuaries, and bays directly connected therein. Only those erosion problems principally caused by waves and tidal currents are eligible for study under present law. Federal participation in coastal protective works is normally equal to the cost of protecting federally owned property plus not more than

[29]Permits for structures over navigable waters are under U.S. Coast Guard jurisdiction. Construction in navigable waters requires a permit from the Corps of Engineers.

70 percent for non-federal public parks and conservation areas. Federal participation is limited to 50 percent of the first costs of construction of works for the protection of other shores owned by non-federal public agencies.

Under these provisions the Corps has been authorized to undertake beach erosion-control projects at Hanapepe Beach and Waimea Beach on Kauai. Beach erosion-protective works for the Kihei District of Maui was completed in June 1971.

A new Waikiki Beach erosion-control project authorized by the River and Harbor Act of 1965 has resulted in controversy. Beach widening at the Fort DeRussy segment was recently completed using matching non-appropriated funds. However, the construction plan for the Kuhio segment met resistance. Local special-interest groups, Save Our Surf (SOS) and others, exerted strong opposition to the state plan of improvement. In response, the state has agreed to coordinate the plan with these groups and other interested citizens. This particular beach-widening phase -- the section of Kuhio Beach between Kapahulu and Ohua Avenues -- is part of a $4.6 million project which will widen Waikiki Beach an average of 90 feet from Diamond Head to the Ala Wai Yacht Harbor. Upon completion of the Kuhio sector, beach sandy areas will be increased about 25 percent ("'New' Kuhio Beach Grows Day by Day," 1971, p. D-16). Until plans are finalized, the increase in beach area for the entire Waikiki Beach cannot be provided. It will probably be greater than 25 percent.

In 1966, the County of Hawaii requested the Corps' assistance to curb sand erosion and to provide safe swimming at the much-photographed but little used Kalapana Black Sand Beach. In response to this request, the Corps had initially drawn up a plan for a sea-level-high breakwater. It later drew up a new $1.09 million plan calling for a breakwater 2-1/2 feet above sea level, 13 feet wide, and running the length of 1,400 feet ("New Hearing Set on Kaimu Project," 1972, p. B-5). This new plan has been under considerable attack by conservationists and surfing enthusiasts, since the proposed breakwater would eliminate three primary surfing spots in Kaimu Bay. Since the Corps had altered its original plan, a new environmental-impact study was ordered.

Other Corps of Engineers investigations, not as controversial in nature and not specifically authorized by Congress, indicate feasibility projects for a wide array of beach erosion control undertakings, principally on Oahu.

Flood Control

The Corps of Engineers and the U.S. Soil Conservation Service have both developed and assisted in creating multiple-use flood control projects which serve recreationists and other resource users of the coastal zone. Corps of Engineer projects in flood control are undertaken when the inter-relationship of flood control and navigation becomes apparent. The first such project in the Islands was completed in 1950 to provide flood protection along Kaunakakai Stream on Molokai. Since then, flood-protection projects, under the authorization of Flood Control Acts and River and Harbor Acts of various years, have been completed or are currently proceeding on

all of the islands. In the Kaneohe-Kailua area of Oahu, the Corps is investigating a project for flood control, general recreation, and fish and wildlife enhancement, with some channel improvement near the mouth of Kaneohe Stream. Additional projects in and adjacent to the coastal zone are under study for numerous aspects of development and improvement of streams and rivers throughout the state.

General Investigations and Survey Reports

In addition to specific projects that are authorized and carried out in response to local requests, the Corps undertakes investigations covering a broad array of topics in coastal zone affairs, in response to national needs. In 1968, the 90th Congress authorized an appraisal of shore erosion and shore protection needs on a regional level. In response to this mandate, the Corps has released a report (*Hawaii Regional Inventory of the National Shoreline Study*, 1971) summarizing the results of a shoreline inventory for Hawaii, including descriptions of the present conditions of the state's shoreline, the scope and magnitude of shoreline problems, and identification of areas where more research and knowledge of the coastal environment are required to assess the consequences of natural and man-caused changes to the shoreline. Other studies of a general nature, of interest to coastal zone decision makers, are *Shore Protection Guidelines* and *Shore Management Guidelines*, both of which are available from the District Office.

Expanded Scope

The Corps of Engineers is not a resource-conservation agency in the literal sense of the term. Some have tended to view the activities of the Corps as being adverse to public welfare. Life of the Land, a locally based ecological-action group, has criticized the state's plans to expand the Haleiwa (Oahu) small-boat harbor, claiming it is an example of "a gross misplacement or priorities" ("Haleiwa Small Boat Harbor Draws Life of the Land's Ire," 1972, p. B-1). The state's plan calls for Corps' assisted dredging of the outer harbor and the building of floating berths for 244 boats. Life of the Land has maintained that the project would cause degradation of the surrounding waters, have an adverse effect on marine life, and reduce the quality of open space.

In the broad realm of resource management in the coastal zone, various projects of the Corps of Engineers have often been directed primarily to a functional emphasis. This is especially true since many of the Corps' projects deal with small-boat facilities geared to active recreation pursuits of pleasure boaters. However, the potential of these projects to serve multiple needs has not always been realized in the past. The Nawiliwili Harbor on Kauai, for example, has been criticized because it disregards the needs of beach and park users in water sports activities (*State Comprehensive Outdoor Recreation Plan*, 1971, p. 19). In many cases, harbor projects can be developed to serve a number of different activities. Initial planning should insure that the demands of various user groups are considered.

In the last few years, national directives have considerably broadened the Corps' approach toward coastal engineering. Under the provisions of the National Environmental Policy Act of 1969 (Public Law 91-190) and its

amendments, the Corps must now explicitly consider the environmental effects of its actions before projects are initiated. As a result, the Corps is currently incorporating comprehensive, multi-agency, multi-disciplinary studies of the effects of construction activities upon coastal ecology. In evaluating an application or in planning for a specific project, the Corps is entrusted to consider the value and usefulness of the project and its effect upon the uses of the waters by the public, and it must employ professional biologists to provide counsel about the project's effect on coastal organisms. Particular emphasis is being placed on the environmental impact of federally funded projects, and an evaluation of multi-use potential is a key factor in considering the priority of these projects.

Military

Approximately 8.9 percent of Hawaii's tidal shoreline[30] is utilized by the three branches of the military for bases, restricted firing, or test ranges. In comparison, approximately one percent of tidal U.S. shoreline is utilized by the military (Adams, 1969, p. 94). The Navy alone accounts for 8.3 percent of tidal shoreline use in Hawaii.

The defense effort has considerable impact upon civilian uses of coastal lands and waters, since the public may be denied access to and use of these resources -- a policy which constricts the already limited supply available for recreational and other non- onsumptive use. At the same time, lands and waters reserved for defense purposes may be protected from alteration and, therefore, remain open for future options. The expansion or reduction of military holdings should be coordinated with state plans for the coastal zone in the future.

Department of the Army

The Army has nine installations/facilities which are in the purview of the coastal zone; eight of these are located on Oahu. Tables 1a and 1b are synoptic statements supplied by the Director of Engineering, Headquarters, United States Army, Hawaii, relating to these Army facilities.

Department of the Air Force

The Air Force has four facilities in the coastal zone. All major Air Force shoreline land holdings are located on the island of Oahu; minor coastal land holdings are located on the southernmost tip of the island of Hawaii.

Tables 2a and 2b are descriptive statements pertaining to coastal facilities. This information was supplied by the Commander, 6486th Air Base Wing at Hickam Air Force Base, who is responsible for all Air Force property in the Hawaii area.

[30]The tidal shoreline of Hawaii is 1,052 statute miles. Among states and territories, Hawaii ranks seventeenth in tidal shoreline mileage. The shoreline of bays, estuaries, and sounds is included in the measurement of tidal shoreline to where such waters narrow to 100 feet, and the distance across at such points is included. (Source: U.S. Coast and Geodetic Survey, Coastline of the United States, April 1, 1961.)

Table 1a. Army Installations/Facilities in the Coastal Zone

Installation or Facility	Location	Nature of Legal Right	Length of Shoreline (statute miles)	Total Acreage of Installation or Facility
Ft. DeRussey Military Reservation	Waikiki, Honolulu, Oahu	Owned in fee simple	0.31 (shoreline owned/ controlled by State)	72
Kapalama Military Reservation	Honolulu Harbor, Oahu	Fee simple/ceded	0.14	138
Ft. Shafter Military Reservation	Kalihi, Honolulu Oahu	Fee simple/ceded	0.00 (½ mile inland from Keehi Lagoon)	?
Ft. Kamehameha Military Reservation	Entrance to Pearl Harbor, Oahu	Fee simple	0.49	602
Honouliuli Military Reservation	Barbers Point, Ewa, Oahu	Fee simple	0.34	70
Waianae-Kai Military Reservation	Pokai Bay, Waianae Oahu	Ceded	0.34	16
Makua Training Area	South of Kaena Pt., Oahu	Fee simple/ceded/leased	2.00	1,515
Moluleia Army Beach	Northeast of Kaena Pt., Oahu	Fee simple/on permit from Air Force	0.47	14
Kawaihae LST Ramp	Kawaihae Bay Hawaii	Ceded	0.00 (Submerged; landing craft ramp area)	3
		TOTAL	1.78 miles of shoreline under Army control, all on Oahu	

Table 1b. Army Installations/Facilities in the Coastal Zone

Installation/Facility	Utilization/Remarks
Ft. DeRussey Military Reservation	Armed forces recreation center including U. S. Army Reserve Center. Beach frontage land is State of Hawaii owned public beach open to public use.
Kapalama Military Reservation	Army port facilities located in Honolulu Harbor complex and include cargo storage and maintenance facilities. Port facilities utilized by State.
Ft. Shafter Military Reservation	Located ½ mile inland from Keehi Lagoon. Does not abut the coast.
Ft. Kamehameha Military Reservation	Includes Army housing area, Hickam Golf Course, Honolulu International Airport runway, and Air National Guard facilities. Area along shoreline to mean high water mark is Army owned. Civilian use by permission.
Honouliuli Military Reservation	Army training site. Shoreline boundary extends approximately to mean high water mark. Civilian use by permission.
Waianae-Kai Military Reservation	Army beach recreation center operated for the benefit of all armed forces personnel and dependents. Beach area to mean high water mark is Army owned. Civilian use by permission.
Makua Training Area	Training and impact area; includes Kaena Point. Beach area from Farrington Highway to ocean is open for public use.
Mokuleia Army Beach	Army recreational beach. Civilian use by permission.
Kawaihae LST Ramp	LST landing ramp for offloading cargo to Pohakuloa Training Area. The training area is not in the coastal zone.

Table 2a. Air Force Installations/Facilities in the Coastal Zone

Installation or Facility	Location	Nature of Legal Right	Length of Shoreline (statute miles)	Total Acreage of Installation or Facility
Hickam Air Force Base	Entrance to Pearl Harbor. Bounded by Pearl Harbor Naval Station, the Honolulu International Airport, Fort Kamehameha, and the Pacific Ocean.	Fee 2,242.62 Ceded 1.21 2,243.83 acres	1.00	2,244
Dillingham Air Force Base	Northwest coast of Oahu, approximately 4 miles west of Waialua town.	Fee 637.55 Ceded 4.21 641.76 acres	1.37	642
Bellows Air Force Station	Directly north of Waimanalo town and fronts Waimanalo Bay, Oahu.	Fee 36.23 Ceded 1,456.95 1,493.18 acres	2.44	1,493
Southpoint Air Force Station	Southern most point on the island of Hawaii.	Fee 11.74 Ceded 21.30 33.04 acres	0	33

TOTAL 4.81 miles of shoreline under Air Force control, all on Oahu.

Table 2b. Air Force Installations/Facilities in the Coastal Zone

Installation/Facility	Utilization/Remarks
Hickam Air Force Base	This installation shares common runway facilities with the Honolulu International Airport through a joint-use agreement with the State of Hawaii. The mission of Hickam Air Force Base (15th Air Base Wing) is to: (1) provide maintenance for all Department of Defense and allied aircraft transiting Hawaii; (2) provide meals, quarters, and other support for transiting personnel; (3) maintain and operate all Air Force installations in Hawaii; (4) provide administrative, financial, personnel, and other support for over 100 separate operating tenants including Headquarters Pacific Air Forces; and (5) maintain liaison with federal, state, and county agencies and other military services in Hawaii.
Dillingham Air Force Base	The mission of Dillingham Air Force Base is to provide an active air base when needed in the aerial defense of the islands by the 326th Air Division and the Hawaii Air National Guard. When not being used actively for this mission, the base is open to general aviation (private flying) by the public at no cost. Public use of the beach frontage along Dillingham AFB is not restricted.
Bellows Air Force Station	The mission of Bellows Air Force Station is to: (1) provide a site for the transmitter complex of the Air Force Global Communication System; (2) provide a training area for U. S. Marine Corps personnel to practice amphibious assaults and penetration into the land beyond with helicopter support; and (3) provide recreational facilities for all ranks of all the services on Oahu. The State of Hawaii has a 5-year renewable license with the Air Force for public use of the center beach area on weekends from 100 hours Friday to 2400 hours Sunday, and all day on Federal holidays.
Southpoint Air Force Station	Celestial tracking facility.

Department of the Navy

Tables 3a and 3b provide a capsulized overview of Navy-controlled shoreline regions in the state. The effect of Navy activities on lands and waters in the coastal zone is difficult to describe. In general, the following can be noted:

- In view of the total defense effort in Hawaii, the Navy is by far the major user of coastal lands and waters. Over 18 percent of Oahu's tidal shoreline[31] is used by the Navy for logistical storage facilities, bases, and operating areas.

- Significant portions of the state's offshore waters and unpopulated islands are restricted to naval firing, submarine cables, test ranges, and other defense-related uses.

- Although the Navy's marine science program is directed primarily toward defense objectives, it provides considerable support for non-defense coastal zone activities as well.

  a. A considerable portion of basic marine research performed at the University of Hawaii is carried out through contacts from the Office of Naval Research.

  b. The Navy has recently sponsored conferences on water pollution and its effects on marine ecology, bringing together federal, state, city and county, and military representatives. Most of the emphasis has been focused on pollution of Pearl Harbor.

  c. The Navy has released a small portion of coastal lands on Oahu to the City and County of Honolulu and to the state for park development, for wildlife habitat improvement, for waste disposal facilities, and for other uses.

  d. The major effort by the Navy so far has been to clean up its shore-based facilities. The problem of the future will be converting ships to handle their own sewage and providing shore sewer connections for Navy ships in port.

[31] The tidal shoreline of Oahu is 209 statute miles. (Source: Hawaii Department of Planning and Economic Development, *Geographic Statistics of Hawaii*, Statistics Report 67, July 1, 1969.)

Table 3a. Navy Installations/Facilities in the Coastal Zone

Installation or Facility	Location	Nature of Legal Right	Length of Shoreline (statute miles)	Total Acreage of Installation or Facility
Naval Communication Station, Honolulu Radio Transmitting Station, Lualualei	Lualualei, Oahu	Ceded land	0 (Inland within one mile of coastline)	1,748 (land)
Marine Corps Air Station, Kaneohe	Kaneohe Bay, Oahu	Fee ownership and Ceded land	10.2	2,046 (land)
Kaneohe Bay Naval Defensive Sea Area	Kaneohe Bay waters in and about entrance to Kaneohe Bay	Ceded land	N/A (See other listings)	2,179 (water)
Honolulu Defensive Sea Area	Waters of Honolulu Harbor, its approaches and tributaries	Ceded land	N/A (See other listings)	208 (water)
Pearl Harbor Naval Defensive Sea Area	Pearl Harbor waters & sea in and about entrance to Pearl Harbor	Ceded land	N/A (See other listings)	5,877 (water)
Submarine Base, Naval Shipyard, Supply Center/ East Loch, Pearl Harbor	East Loch, Pearl Harbor	Fee ownership	6.9	725 (land) 4,776 (water)
Naval Supply Center, Ewa Drum Storage Area	Adjacent to Middle Loch, Pearl Harbor	Fee ownership	0 (Inland within one mile of coastline)	61 (land)
Public Works Center, Manana Capehart Housing Area	Pearl City, Oahu	Fee ownership	0 (Inland within one mile of coastline)	98 (land)

Table 3a. (continued)

Installation or Facility	Location	Nature of Legal Right	Length of Shoreline (statute miles)	Total Acreage of Installation or Facility
Naval Supply Center Manana Storage Area	Pearl City, Oahu	Fee ownership	0 (Inland within one mile of coastline)	134 (land)
Naval Supply Center, McGrew Point Housing	East Loch, Pearl Harbor	Fee ownership	0.7	49 (land)
Naval Supply Center, Pearl City Storage & Housing Area	Middle Loch, Pearl Harbor	Fee ownership	3.9	589 (land)
Naval Ammunition Depot, Oahu Waipio Peninsula Safety Zone	Separates Middle Loch & West Loch, Pearl Harbor	Fee ownership	8.8	1,372 (land)
Naval Ammunition Depot, Oahu West Loch Branch	West Loch, Pearl Harbor	Fee ownership	6.8	2,537 (land)
Naval Air Station, Barbers Point	Barbers Point, Oahu, Adjacent to entrance to Pearl Harbor	Fee ownership	2.7	3,679 (land)
Naval Air Station Barbers Point, Keehi Lagoon Area	Area adjacent to Honolulu International Airport	Fee ownership	0.8	524 (land)
Naval Air Station, Barbers Point, Ford Island	Pearl Harbor	Ceded land	3.6	330 (land)
Naval Air Station, Barbers Point, Kahoolawe Island	Kahoolawe, Hawaii, lee side of island of Maui	Fee ownership	34.2	28,776 (land)

Table 3a. (continued)

Installation or Facility	Location	Nature of Legal Right	Length of Shoreline (statute miles)	Total Acreage of Installation or Facility
Naval Air Station, Barbers Point, Kaula Island	20 miles southwest of Niihau Island	Ceded land	2.2	108 (land)
Pacific Missile Range Facility, Barking Sands, Kauai	Barking Sands Kauai	Ceded land	6.7	1,885 (land)
Pacific Missile Range Facility, offshore area	Waters off Barking Sands, Kauai	Leasehold from State of Hawaii	N/A (See other listings)	7,680 (water)
		TOTAL	87.5 miles of tidal shoreline controlled by the Navy, <u>including</u>: 34.2 miles on Kahoolawe Is., 2.2 miles on Kaula Is., and 30.7 miles within Pearl Harbor.	

Table 3b. Navy Installations/Facilities in the Coastal Zone

Installation/Facility	Utilization/Remarks
Naval Communication Station, Honolulu Radio Transmitting Station, Lualualei	Transmitting facility; portion outleased for forage cultivation restricted from public use.
Marine Corps Air Station, Kaneohe	Navy administrative area and operation of Marine Corps Air Station; troop training; wildlife conservation; marine related research; recreation area; fishing areas open to all civilians.
Kaneohe Bay Naval Defensive Sea Area	Defensive Sea Area for purpose of national defense. Use by non-government vessels permitted.
Honolulu Defensive Sea Area	Defensive Sea Area for purpose of national defense. Use by non-government vessels permitted.
Pearl Harbor Naval Defensive Sea Area	Defensive Sea Area for purpose of national defense. Use by non-government vessels permitted.
Submarine Base, Naval Shipyard, Supply Center/ East Loch, Pearl Harbor	Various uses to carry out mission of cognizant commands, including operation of supply center, berthing of vessels, shipyard. Restricted from public use.
Naval Supply Center, Ewa Drum Storage Area	Fuel storage site. Restricted from public use.
Public Works Center, Manana Capehart Housing Area	Housing area. Portion used by State of Hawaii to operate low income housing site. It is proposed that area will be transferred to State of Hawaii.
Naval Supply Center, Manana Storage Area	Storage facilities. Restricted from public use.
Naval Supply Center, McGrew Point Housing	Housing area. Restricted to military tenants and guests.
Naval Supply Center, Pearl City Storage and Housing Area	Storage facilities, housing area, & wildlife sanctuary. Restricted from public use.
Naval Ammunition Depot, Oahu Waipio Peninsula Safety Zone	Storage facilities; sugarcane cultivation under outlease, City & County incinerator site, and wildlife sanctuary. Open to public; however, permanent occupancy restricted due to inclusion in safety blast zone.

Table 3b. (continued)

Installation/Facility	Utilization/Remarks
Naval Ammunition Depot, Oahu West Loch Branch	Ammunition storage, housing area, & wildlife sanctuary. No permanent occupancy due to inclusion in explosive safety zone.
Naval Air Station, Barbers Point	Support operations of naval aviation activities, recreation area, sewage treatment plant, & explosive safety zone. Restricted from public use. Portions of coastal region used for aircraft approach & subject to aircraft noise.
Naval Air Station, Barbers Point, Keehi Lagoon Area	No present utilization. Limited use by public, i.e., use of buildings for aviation purposes. Being processed for transfer to State of Hawaii for airport expansion.
Naval Air Station, Barbers Point, Ford Island	Aviation facility. Used as public aviation facility under provisions of license to State. Public access to island restricted.
Naval Air Station, Barbers Point, Kahoolawe Island	Live ordinance impact area. Use by public limited to offshore fishing during authorized periods.
Naval Air Station, Barbers Point, Kaula Island	Target area for aviation training. Use by public restricted. Areas surrounding island restricted to boat and air traffic.
Pacific Missile Range Facility, Barking Sands, Kauai	Operation of landing field; missile operations. Public access to beach area except during operations.
Pacific Missile Range Facility, offshore area	Pacific Tactical Range-Tactical Cables. Restricted from public use during operations.

The Department of Defense is undertaking a detailed study of military land use in Hawaii. The study is dubbed FRESH (Facilities Requirements Evaluation, State of Hawaii). The defense study team from Washington, D.C., which is currently in Hawaii, has been criticized for failure to make provisions for public hearings, although written testimony from groups and individuals has been welcome. Even the City Council has not had full opportunity to make its views heard. Information of prospective changes in military coastal zone lands is needed because the City may save millions of dollars for future parks if a significant amount of military land reverts to public use.[32]

Speculation has been mounting that the Defense Department will release some of its coastal zone land holdings. The City and County of Honolulu Parks Department director has recently endorsed a proposal put forth by the Board of Parks and Recreation that the military turn over Bellows Air Field to the state, with an eye to subsequent inclusion of the land in the city park system ("Parks Department Backs Plan for Bellows", 1971, p. A-5). Currently under negotiation is the turnover of Navy land at Barber's Point Naval Air Station. The land will be used as a site location for a new City and County sewage treatment plant ("Navy Has Solid Impact on Isles," 1972, p. 2). Expectations are high that the Army will likewise release some coastal land at its Kapalama reservation next to Honolulu Harbor. The state has sought release of the Kapalama land for use by the University of Hawaii for marine research. To date, there has been no formal commitment by the Department of Defense with respect to military coastal lands, since the planning survey of military facilities in Hawaii has not been completed. The FRESH team will make its final report to Washington in October, 1972.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW)

One of the main missions of HEW is to protect and improve the health of the nation's people. In this respect, the two representative offices of HEW for health-related matters are the U.S. Quarantine Service and the Division of Federal Health Programs Service (P.H.S. Outpatient Clinic) which is responsible for giving direct medical care to beneficiaries of the Public Health Service.

Executive Reorganization Plan No. 3 of 1970 transferred most of the functions of the Department in the area of environmental protection to the Environmental Protection Agency (see following text). However, HEW has retained some indirect involvement in activities relating to environmental protection and improvement, primarily through research, investigations, demonstrations, and technical assistance. These programs are administered by the Bureau of Community Environmental Management in the Health Services and Mental Health Administration through HEW's San Francisco Regional Office. To date, their impact on Hawaii's coastal zone environment has been negligible.

[32]The military owns outright or leases about 28 percent of all the land on Oahu. A sizeable portion of military holdings on Oahu abut the shoreline.

INDEPENDENT AGENCIES

ENVIRONMENTAL PROTECTION AGENCY (EPA)

Just as a Presidential reorganization plan brought together major federal programs dealing with the atmosphere and the oceans into a monolithic body (NOAA), a companion reorganization plan created the Environmental Protection Agency to restrain environmental pollution on an integrated basis. EPA came into being on December 2, 1970. In essence, Presidential Reorganization Plan No. 3 of 1970 called for the consolidation of numerous scattered federal antipollution operations into one agency within the executive branch, but independent of traditional executive departments. Figure 4 shows the programs transferred from old "line agencies" within traditional executive departments to the new EPA, along with their functions. Figure 5 shows the organizational structure of EPA and its major programs -- water quality, air pollution control, pesticides, radiation, and solid-waste management -- each of which has significant impact on coastal zone matters.

EPA's principal mission is to implement the objectives defined in a host of legislative acts (e.g., Environmental Policy Act of 1969, Water Quality Improvement Act of 1970, and Clean Air Act Amendments of 1970) (Beard, 1971). Functions of this agency include: setting and enforcing environmental standards; conducting research on the causes, effects, and control of environmental problems; assisting state and local governments in planning environmental protection programs; and granting financial assistance in the form of matching grants for municipal waste-treatment facilities and other pollution control programs.

To insure that its efforts are more responsive to local needs and to better effect coordination with other federal agencies on pollution abatement matters, ten administrative regions were established within EPA along existing political (state) boundaries. Hawaii belongs to region IX which is headquartered in San Francisco.[33]

Under the Federal Water Pollution Control Administration, a predecessor agency of EPA, a field office was established in Honolulu to facilitate the carrying out of FWPCA programs.[34] FWPCA was incorporated into EPA which has a much larger area of environmental responsibility. The functions of the Hawaii office were then reevaluated in light of broader goals and new responsibilities, particularly in the realm of enforcement and regulation of adopted standards for air and water quality. From the standpoints of overall efficiency and economy, it was decided that a small EPA office should be retained in Hawaii with strong staff support from its San Francisco headquarters. The present functions of the Honolulu office are to provide liaison, coordination, and public information in all areas of EPA responsibility, rather than in the limited area of water quality only. Specialists from the regional headquarters are available to provide input on a need basis.

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[33]Region IX also includes California, Nevada, Arizona, the Territories of Guam and American Samoa, and the Trust Territory Islands.

[34]See footnote #16.

ENVIRONMENTAL PROTECTION AGENCY

Program	Transferred from	Functions
Federal Water Quality Administration.	Interior	Charged with the control of pollutants which impair water quality, it is broadly concerned with the impact of degraded water quality. It performs a wide variety of functions, including research, standard-setting and enforcement, and provides construction grants and technical assistance.
National Air Pollution Control Administration.	Health, Education and Welfare	As the principal Federal agency concerned with air pollution, it conducts research on the effects of air-pollution, operates a monitoring network, and prormulgates criteria which serve as the basis for setting air quality standards. Its regulatory functions are similar to those of the Federal Water Quality Administration. NAPCA is responsible for administering the Clean Air Act, which involves designating air quality regions, approving State standards, and providing financial and technical assistance to State control agencies to enable them to comply with the act's provisions. Also sets and enforces Federal automotive emission standards.
Bureau of Water Hygiene	Health, Education, and Welfare (Environmental Control Administration).	The Environmental Control Administration is the local point within HEW for evaluation and control of a broad range of environmental health problems, including water quality, solid wastes, and radiation. Programs in the ECA involve research, development of criteria and standards, and the administration of planning and demonstration grants. From the ECA, the activities of the Bureaus of Water Hygiene, Solid Waste Management, and portions of the activities of the Bureau of Radiological Health are transferred. Other functions of the ECA, including those related to the regulation of radiation from consumer products and occupational safety and health remain in HEW.
Bureau of Solid Waste Management.	Health, Education, and Welfare (Environmental Control Administration).	
Bureau of Radiological Health.	Health, Education, and Welfare (Environmental Control Administration).	
Pesticide Standards and Research.	Health, Education, and Welfare and Interior.	The Food and Drug Administration's pesticides program consists of setting and enforcing standards which limit pesticide residues in food. EPA will have authority to set pesticide standards to monitor compliance with them, and to conduct related research. FDA retains authority to remove from the market food with excess pesticide residue. Authority for research on effects of pesticides on fish and wildlife is transferred from Interior. This is specialized research authority under the 1958 Pesticides Act. Interior retains research on all factors affecting fish and wildlife. The transfer involves only one laboratory - Gulf Breeze of the Bureau of Commercial Fisheries. EPA will work closely with Bureau of Sport Fisheries and Wildlife laboratories.
Pesticides registration	Agriculture (Agricultural Research Service).	Agriculture's pesticides registration and monitoring function is transferred to EPA, to be merged with posticides programs from HEW and Interior. Agriculture will continue research on effectiveness of pesticides, furnishing this information to EPA. EPA will handle pesticides' licensing after consideration of environmental and health effects. EPA will use Agriculture's expertise, as in evaluating efficacy of various pesticides as related to other pest control methods and effects of pesticides on nontarget plants, livestock, and poultry. Agriculture's educational program on pesticide use will continue to be carried out through its extension service.
Federal Radiation Council environmental radiation standards.	Executive Office of the President, Atomic Energy Commission, and Federal Radiation Council.	The Atomic Energy Commission is responsible for establishing environmental radiation and emission limits. These standards have been based largely on broad guidelines recommended by the Federal Radiation Council. AEC's standard-setting authority and FRC's functions are transferred to EPA. AEC retains responsibility for implementation and enforcement of radiation standards through its licensing authority.
Studies of ecological systems.	Council on Environmental Quality, Executive Office of the President.	Authority of the Council on Environmental Quality to perform studies and research relating to ecological systems is transferred to EPA. It will help EPA to measure the impact of pollutants. The CEQ retains authority to conduct studies and research relating to environmental quality.

Figure 4. Programs Transferred into the Environmental Protection Agency

(Source: U.S. Library of Congress, Environmental Policy Division, Congressional Research Service, *Congress and the Nation's Environment: Environmental Affairs of the 91st Congress* [Washington, D.C.: U.S. Government Printing Office, February 10, 1971] p. 16.)

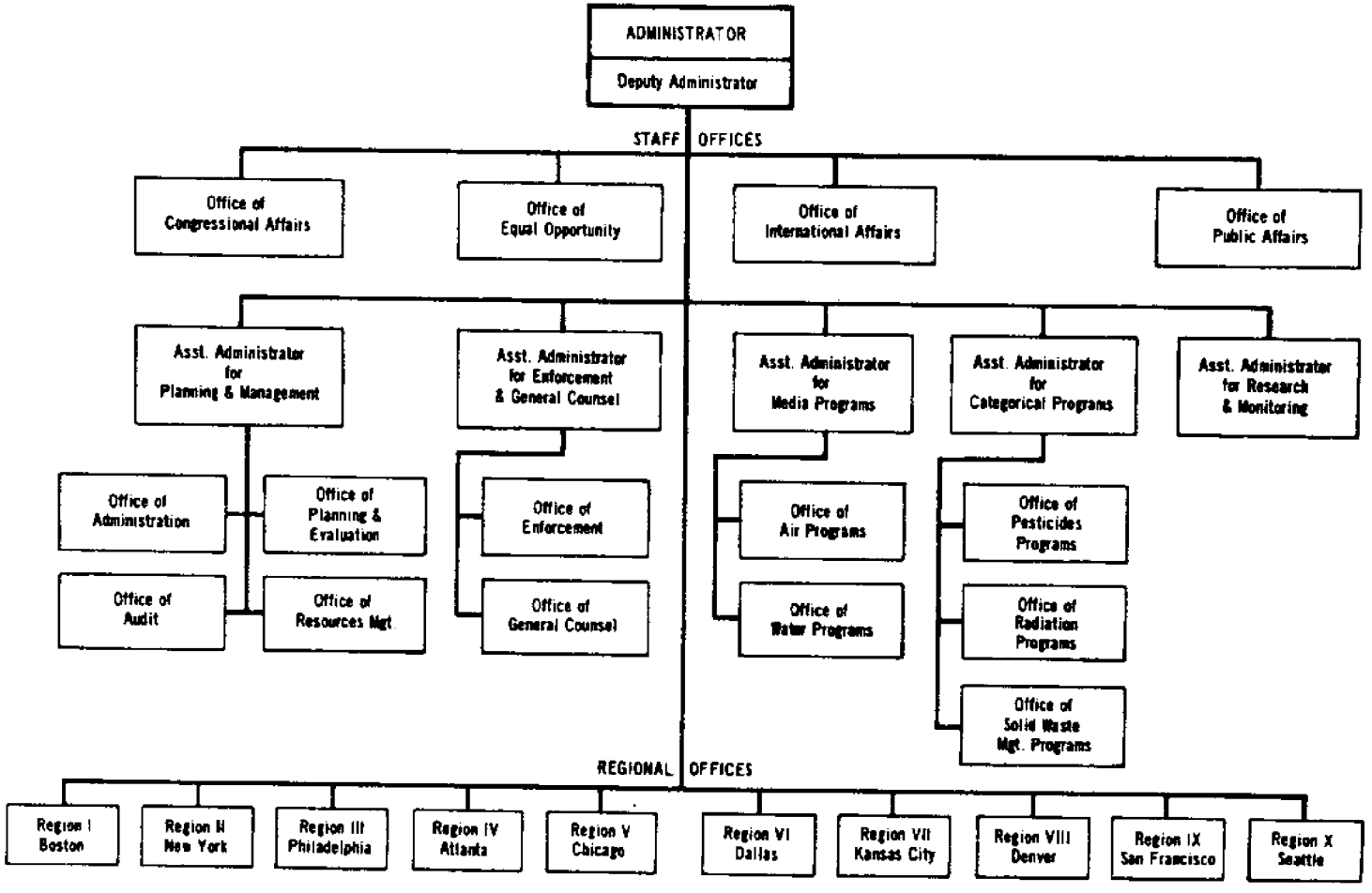

Figure 5. Environmental Protection Agency

(Source: Office of the Federal Register, *United States Government Organizational Manual 1971/72* [Washington, D.C.: U.S. Government Printing Office, July 1, 1971] p. 632.)

In recent years, various congressional acts have established national policy to protect existing levels of environmental quality and to upgrade the quality of the environment where it appears possible to do so. Whereas the federal government establishes policy, it lays responsibility on the states to adopt necessary procedures to implement such policy within a certain time framework. This kind of an approach is backed up by a program of federal grants giving states wide discretion in implementing the federal guidelines. A primary responsibility of EPA is to insure that federal monies are effectively used in meeting national environmental policy objectives.

Because of the complexity of many coastal zone environmental problems, several components within EPA may become involved in their solution. Pollution problems in the coastal zone frequently appear in all media -- air, land, and water. The same pollution source may contribute to several different kinds of pollution. For example, nationally as well as in Hawaii, the proper disposal of used motor oil can present something of a dilemma. Used motor oil is seldom acceptable for use in a sanitary landfill; air quality standards may be violated if disposal is by means of open fires or ordinary incineration; and state and federal requirements prohibit the dumping of oil in areas protected by water quality standards. Ideally, recycling is the most desirable, but facilities may not be available to do so. Specifically designed high-temperature incinerators offer some promise of relief, but some difficulties remain. EPA has sponsored research on this and on similar problems to assist state and local governments to find socially acceptable solutions.

Obviously, the mere creation of EPA has not guaranteed solutions to such problems as the disposal of used motor oil. However, it has provided for a direct attack on a set of environmental degredation problems. Coordinated efforts are under way by federal, state, and local agencies to achieve a better environment. Through the adoption of federal standards for environmental protection, backed by legislation for their enforcement, often with federal participation in funding, progress is being made on many fronts. The Navy with the cooperation of state and local agencies is in the process of cleaning up Pearl Harbor. A strong grading ordinance is pending adoption by the City and County of Honolulu to reduce excessive erosion and siltation of coastal waters. The construction of municipal waste-water treatment plants will eliminate present discharges of raw sewage. State agreements with the sugar industry should eventually remove fibrous waste materials from ocean discharges along the Hamakua coast on the island of Hawaii. In an effort to further abate the remaining chronic pollution problems arising from sugar mills along the coastline, EPA has requested the Justice Department to take necessary action.

With its broad responsibility for environmental protection, EPA is emerging as the key federal enforcement agency or the "watchdog" of environmental quality regulations.

NATIONAL SCIENCE FOUNDATION (NSF)

Prior to Reorganization Plan No. 4 of 1970 which created NOAA out of its major line components, the National Science Foundation administered the Sea Grant College and Program Act of 1966 (Public Law 89-688) which brought the National Sea Grant Program into existence. The creation of the NOAA infrastructure transferred both the administration and institutional funding support of the Sea Grant Office from NSF to the Department of Commerce.

The National Science Foundation has no special legal or statutory mission in the coastal zone of the United States. Created by the National Science Foundation Act of 1950 (64 Stat. 149; 42 U.S.C. 1861-1875) and given additional authority by the National Defense Education Act of 1958 (72 Stat. 1601; 42 U.S.C. 1876-1879), as amended, the main function of NSF is to support research and education in the sciences. While it is true that most federal appropriations for marine research directly applicable to practical coastal zone science are now channeled through other federal agencies, NSF still sponsors a good share of such programs. The research is conducted by universities and other institutions. The University of Hawaii is one such institution in the state that has recently received many research and education grants from the Foundation. A few examples of NSF-sponsored projects that could result in long-run payoffs by providing information for the rational management of Hawaii's coastal zone regime are: Computer Simulation Studies of "Littorina" (seashore) Populations; Nutrient Limited Growth and Population Dynamics of Marine Phytoplankton; Chronology and Extent of Subsidence of the Hawaii Ridge; Dynamic Response of Free-Standing Structures to Wind Forces; and Operation Support of Research Vessels Operating in the Nearshore and Offshore Environment (*National Science Foundation Grants and Awards for the Fiscal Year Ended June 30, 1970*, 1971).

SMITHSONIAN INSTITUTION

The Smithsonian Institution administers a number of government programs placed under its control by Congress and is funded mainly by federal appropriations. It is a federally chartered, nonprofit corporation which performs fundamental research primarily in the fields of systematics and ecology. Projects sponsored and conducted by the Institution can contribute to resource management in the coastal zone by providing new information for the solution of major problems of conservation and pollution.

The developing coral reef ecosystem dilemmas in Hawaii (Banner and Bailey, 1970; "K-Bay: World's Worst Coral Pollution," 1971, p. A-15; and Branham, et al., 1971) demonstrate that such back-up information is essential for making resource-management and land-use decisions. Evidence of significant detrimental changes in coral reefs in Kaneohe Bay has been presented, as a direct result of urbanization of the Kaneohe Bay watershed. Extensive portions of the reefs have been damaged, primarily due to increased freshwater runoff and siltation and increased volumes of sewage entering the bay.

These findings suggest that proper management of the coastal zone requires a continuing program of monitoring and research. To meet such challenges, the Smithsonian Institution plans and undertakes national and international programs in predictive ecology and environmental management, and provides contract services to those engaged in environmental studies. In addition to sponsoring studies that contribute to coastal zone science, the Institution maintains the National Museum of Natural History whose collections include specimens from the Hawaii coastal region.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

Superficially, NASA's involvement in Hawaii's coastal zone seems remote. However, an inspection of its overall program reveals that some of its space efforts are resulting in practical benefits.

NASA-launched weather satellites are providing a variety of direct, continuing benefits. Major applications are in weather analysis and forecasting services, based mostly on large-scale cloud patterns displayed in satellite pictures. These show the location of major atmospheric systems and provide insights into their structure and motion. Satellite data are being routinely used in weather and surf forecasts for aviation and shipping interests throughout the Pacific, as well as in minimizing the risk of sea-state hazards, particularly to the many small boatsmen and fishermen active in the Islands (*First Five Years of the Environmental Satellite Program - An Assessment,* 1971).

Another important part of NASA's satellite program is directed toward resource monitoring. NASA has recently launched a satellite as part of a long-range program dubbed EROS for Environmental Resources Orbiting Satellite ("NASA Will Keep an Eye [ERTS-A] on all Hawaii," 1972, p. A-14). It is expected that the satellite will be capable of revealing changes in beaches and be able to detect pollutants or changes in pollutant levels in Pearl Harbor and Kaneohe Bay. It should be able to locate heat sources beneath the islands for geothermal power applications and spot offshore oil spills that could threaten Hawaii's beaches. A more futuristic application could make possible the monitoring of primary productivity of reef areas in the Hawaiian Archipelago, as well as provide a base for an inventory of major land resources in the coastal zone.

APPENDIX

RESPONDENTS IN SURVEY OF FEDERAL ORGANIZATIONS

BY AGENCY AFFILIATION

OVERVIEW AGENCIES

John P. Craven, Member of the National Advisory Committee on Oceans and Atmosphere

W. Don Maughan, Director, and *Ernestine Gibson*, Executive Assistant, United States Water Resources Council

EXECUTIVE DEPARTMENTS IN THE CABINET

DEPARTMENT OF COMMERCE

T.J. Patterson, Jr., Western Region Director, Maritime Administration

C. Mark Smith, Regional Director, Economic Development Administration

National Oceanic and Atmospheric Administration

Captain John B. Watkins, Jr.,* Area Director, National Ocean Survey

F.D. Moran, Chief, Pacific Tide Party, National Ocean Survey

P.H. Kutschenreuter,* Director, National Weather Service, Pacific Region

Saul Price,* Regional Climatologist, Environmental Data Service, Pacific Region

Frank J. Hester,* Area Director, National Marine Fisheries Service, Honolulu Laboratory

Wilmot N. Hess, Director, Environmental Research Laboratories

Gordon W. Dean, Research Supervisor, Marine Mainerals Technology Center

Gaylord R. Miller, Director, Joint Tsunami Research Effort

Jack R. Davidson, Director, University of Hawaii Sea Grant Program

DEPARTMENT OF THE INTERIOR

W.L. Burnham,* District Chief, Water Resources Division, Geological Survey

Frank E. Sylvester, Regional Director, Bureau of Outdoor Recreation, Pacific Southwest Regional Office

Robert L. Barrel,* General Superintendent, National Park Service, Hawaii Group

DEPARTMENT OF AGRICULTURE

Fred Haughton, State Conservationist, Soil Conservation Service

Robert E. Nelson, Director, Institute of Pacific Islands Forestry, Forest Service

* interviewed.

DEPARTMENT OF TRANSPORTATION

*Captain Jefferies** and *Commander H.F. Olson*, U.S. Coast Guard, 14th Coast Guard District
Charles W. Carmody,* Chief, Planning/Appraisal Staff, Federal Aviation Administration, Pacific Region
John B. Dalhouse, Division Engineer and *Ralph T. Segawa*, Division Engineer, Federal Highway Administration, Region Nine

DEPARTMENT OF STATE

Stuart Blow, Acting Coordinator of Ocean Affairs and Special Assistant to the Secretary
Vilvan G. Van Campen, Foreign Affairs Officer and Officer of the Coordinator of Ocean Affairs

DEPARTMENT OF DEFENSE

Army Corps of Engineers

Karl V. Keller and *Clarence Fujii*,* Planning Branch, Honolulu District

Military

Army

Colonel Donald D. Gabe, Director of Engineering, Hawaii

Air Force

Colonel Ernest W. Pate, Commander
Colonel Charles W. Lamb, Deputy Commander for Civil Engineering

Navy

Rear Admiral H.S. Morgan, Jr., Deputy Chief of Staff for Logistics, Personnel and Administration, Pacific Fleet
D.E. Gately, Assistant Chief of Staff for Logistics, Pacific Fleet

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

E. Bartlett Kerr, Acting Regional Director, San Francisco
Fernando E.C. DeBaca, Regional Director, San Francisco

INDEPENDENT AGENCIES

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Charles M. Seeley, Acting Director, Pacific Islands Office, Environmental Protection Agency
T.O. Jones, Deputy Assistant Director, National and International Programs, National Science Foundation
Robert P. Higgins, Director, Oceanography and Limnology Program, Smithsonian Institution

REFERENCES CITED

PART I. INTRODUCTION

Adams, David A., "Federal Activities in the Coastal Zone," in *Transactions of the Thirty-Fourth North American Wildlife and Natural Resources Conference*, ed. James B. Trefethen (Washington, D.C.: Wildlife Management Institute, 1969), p. 87.

Clingan, Thomas A., "Institutional Barriers and the Coastal Zone," in *Proceedings: The New England Coastal Zone Management Conference*, ed. Robert H. Forste (Durham, New Hampshire: The New England Center for Continuing Education, December 1970), pp. 1-9.

Coastal Zone Management: Newsletter of Coastal Resource Exploitation, Conservation and Enhancement, "States Air Coastal Endeavors at Lennon Hearings," vol. 2, no. 6 (Washington, D.C.: Nautilus Press, June 1971), p. 2.

Coastal Zone Management: Newsletter of Coastal Resource Exploitation, Conservation and Enhancement, "Where Man and the Land Meet the Sea," vol. 1, no. 1 (Washington, D.C.: Nautilus Press, November 1970), p. 1.

Fisher, David W., "Development in the Coastal Zone: Economics and Policies," in *6th Annual Conference and Exposition of the Marine Technology Society*, vol. 1 (1970), p. 403.

"Geneva Convention on Fishing and Conservation of the Living Resources of the High Seas," in *United Nations Conference on the Law of the Sea*, U.N. DOC A/CONF 13/L.54 (1958).

"Geneva Convention on the Continental Shelf," in *United Nations Conference on the Law of the Sea*, U.N. DOC A/CONF 13/L.55 (1958).

"Geneva Convention on the High Seas," in *United Nations Conference on the Law of the Sea*, U.N. DOC A/CONF 13/L.53 (1958).

"Geneva Convention on the Territorial Sea and the Contiguous Zone," in *United Nations Conference on the Law of the Sea*, U.N. DOC A/CONF 13/L.52 (1958).

Hawaii and the Sea, Hawaii Department of Planning and Economic Development, Report to the Governor's Task Force on Oceanography (September 1969), 112 pp.

Knight, H. Gary, "The Role of the Outer Continental Shelf in Systems of Coastal Zone Management," Paper presented to the Conference on Management Systems for the Resources of the Coastal Zone, June 8, 1970, at Charleston, South Carolina, 11 pp.

Krueger, Robert B., "Development of the Coastal Zone and Beyond-" in *Undersea Technology Handbook/Directory* (1970), pp. A/3-A/9.

McBroom, James T., "Multiple Use of the Coastal Zone," in *Transactions of the Thrity-Fourth North American Wildlife and Natural Resources Conference*, ed. James B. Trefethen (Washington, D.C.: Wildlife Management Institute, 1969), pp. 80-81.

The National Estuarine Pollution Study, Federal Water Pollution Control Administration, vols. I, II, and III (November 3, 1969). (Especially see vol. III, ch. 6, "Estuary Study Recommendations as Compared with Other Proposals for Managing the Coastal Zone.")

Ocean Soundings: Newsletter of Marine Technology Society, "Coastal Zone Bill a Surprise Winner," vol. 9, no. 11 (Washington, D.C.: American Society for Oceanography, May 1972), pp. 1-2.

Our Nation and the Sea, "Management of the Coastal Zone," Commission on Marine Science, Engineering and Resources (Washington, D.C.: U.S. Government Printing Office, January 1969), pp. 49-81.

Science and Environment, Vol. 1, "Report on the Panel on Management and Development of the Coastal Zone," Commission on Marine Science, Engineering and Resources (Washington, D.C.: U.S. Government Printing Office, February 1969), pp. III-1 to III-187.

U.S. Senate, *Coastal Zone Management: Hearings Before the Subcommittee on Oceans and Atmosphere of the Committee on Commerce, United States Senate, 92nd Congress, First Session, on S. 582, S. 632, S. 638, and S. 992*, May 5, 6, and 11, 1971, Serial No. 92-15 (Washington, D.C.: U.S. Government Printing Office, 1971), p. 138.

U.S. Senate, *Hearings Before the Subcommittee on Oceanography of the Committee on Commerce, United States Senate, 91st Congress, First and Second Sessions, on S. 2802, S. 2393, S. 3118, S. 3183, and S. 3460*, Parts 1 and 2, Serial No. 91-59 (Washington, D.C.: U.S. Government Printing Office, 1970). (Especially see Part 2, pp. 1199-1213, for statements relating to Hawaii's coastal zone.)

PART II. FEDERAL ORGANIZATIONS

Adams, David A., "Federal Activities in the Coastal Zone," in *Transactions of the Thirty-Fourth North American Wildlife and Natural Resources Conference*, ed. James B. Trefethen (Washington, D.C.: Wildlife Management Institute, 1969), p. 94.

Alexander, Lewis M., "National Jurisdiction and the Use of the Sea," in *Natural Resources Journal*, vol. 8, no. 3 (The University of New Mexico School of Law, July 1968), p. 389.

Annual Report 1970-1971, Water Resources Research Center (Honolulu: University of Hawaii).

Banner, A.H. and J.H. Bailey, *The Effects of Urban Pollution Upon a Coral Reef System*, Technical Report 25 (Hawaii Institute of Marine Biology, December 1970).

Beard, Daniel P. (ed.), *Environmental Pollution: Legislation and Programs of the Environmental Protection Agency* (Library of Congress, Congressional Research Service, March 26, 1971).

"Big Island Code Revision for Flood Areas Opposed," *The Honolulu Advertiser* (December 1, 1971), p. D-20.

Branham, J.M., S.A. Reed, and J.H. Bailey, "Coral-Eating Sea Stars *Acanthaster planci* in Hawaii," in *Science*, vol. 172, no. 3988 (June 11, 1971), pp. 1155-1157.

Catalog of HUD Programs, Department of Housing and Urban Development (Washington, D.C.: U.S. Government Printing Office, June 1969).

"City of Refuge Expansion to be Aired," *The Honolulu Advertiser* (March 23, 1972), p. C-2.

"The Coast and the Condo," *The Honolulu Advertiser* (December 13, 1971), p. C-1.

Coastal Zone Management: Newsletter of Coastal Resource Exploitation, Conservation and Enhancement, "Land Use Policy: Key to Nizon CZ Approach," vol. 1, no. 2 (Washington, D.C.: Nautilus Press, December 1970), p. 2.

Congress and the Nation's Environment: Environmental Affairs of the 91st Congress, Library of Congress, Environmental Policy Division, Congressional Research Service (Washington, D.C.: U.S. Government Printing Office, February 10, 1971), p. 19.

"Council Changes Mind, OK's Makaha Condominium," *The Honolulu Advertiser* (December 8, 1971), p. A-14.

Doty, Maxwell S. (coordinator), *Biological and Physical Features of Kealakekua Bay, Hawaii*, Hawaii Botanical Science Paper No. 8 (Honolulu: University of Hawaii, December 1968).

"EPA Recommends H-3 Halt," *The Honolulu Advertiser* (March 7, 1972), p. A-1.

First Five Years of the Environmental Satellite Program - An Assessment, National Oceanic and Atmospheric Administration (Washington, D.C., February 1971).

Fourteenth Coast Guard District Pollution Newsletter, Coast Guard, vol. 2, no. 5 (August 10, 1971), p. 4.

"Group Fears for Wildlife, Cites State 'Nonsupport'," *The Honolulu Advertiser* (March 23, 1972), p. C-1.

"Haleiwa Small Boat Harbor Draws Life of the Land's Ire," *The Honolulu Advertiser* (May 2, 1972), p. B-1.

Hawaii Economic Review, Hawaii Department of Planning and Economic Development, (September-October 1971), p. 7.

Hawaii Regional Inventory of the National Shoreline Study, Army Engineer Division, Corps of Engineers (Honolulu, Hawaii, August 1971).

Hawaii Tourism Impact Plan, Volume 2: West Hawaii, Hawaii Department of Planning and Economic Development (1972), 114 pp.

"K-Bay: World's Worst Coral Pollution," *Honolulu Star-Bulletin* (December 29, 1971), p. A-15.

Krueger, Robert B., "Development of the Coastal Zone and Beyond," in *Undersea Technology Handbook/Directory* (1970), p. A/3.

"Last Marine Council Report," in *Oceanology International* (May 1971), p. 20.

Marine Science Affairs, Annual Reports of the National Council on Marine Resources and Engineering Development (Washington, D.C.: U.S. Government Printing Office, 1967-1971).

"NASA Will Keep an Eye (ERTS-A) on all Hawaii," *The Honolulu Advertiser* (January 6, 1972), p. A-14.

The Nation's Water Resources, The First National Assessment of the Water Resources Council (Washington, D.C.: U.S. Government Printing Office, November 1968).

National Science Foundation Grants and Awards for the Fiscal Year Ended June 30, 1970 (Washington, D.C.: U.S. Government Printing Office, 1971).

"Navy has Solid Impact on Isles," Special Advertising Supplement to the *Sunday Honolulu Star-Bulletin & Advertiser* (May, 14, 1972), p. 2.

"New Hearing Set on Kaimu Project," *The Honolulu Advertiser* (February 18, 1972), p. B-5.

"New High-Rise Fight at Makaha Looms," *The Honolulu Advertiser* (July 18, 1972), p. B-1.

"New Kuhio Beach Grows Day by Day," *The Honolulu Advertiser* (December 6, 1971), p. D-16.

NMFS (National Marine Fisheries Service), "National Marine Fisheries Service, Southwest Fisheries Center, Honolulu, Hawaii" (unpaged brochure, no date).

"NOAA Administrator's Letter No. 4," National Oceanic and Atmospheric Administration (July 30, 1971), p. 9.

"Parks Department Backs Plan for Bellows," *The Honolulu Advertiser* (December 25, 1971), p. A-5.

President's Statement of May 23, 1970, on U.S. Oceans Policy, Office of the White House Press Secretary, p. 1.

A Report on the Seminar on Multiple Use of the Coastal Zone, Sponsored by the Federal Interagency Committee on Multiple Use of the Coastal Zone, National Council on Marine Resources and Engineering Development, November 13 through 15, 1968 (1968).

Science and Environment, Vol. 1, "Report on the Panel on Management and Development of the Coastal Zone," Commission on Marine Science, Engineering and Resources (Washington, D.C.: U.S. Government Printing Office, February 1969), pp. III-1 to III-187.

Sea Grant Newsletter, vol. 1, no. 5, (Honolulu: University of Hawaii, November 1, 1971), p. 4.

State Comprehensive Outdoor Recreation Plan, Hawaii Department of Planning and Economic Development (Honolulu, Hawaii, December 1971), p. 19.

"Sugar Mills Crackdown Asked: EPA Cites Pollution of Ocean," *The Honolulu Advertiser* (September 13, 1971), p. A-1.

"Testimony Heard in Fishpond Dispute," *The Honolulu Advertiser* (November 5, 1971), p. B-1.