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A Report to: [redacted]

GC1.V384 1973 Pt. 1

The President and The Congress

by the

National Advisory Committee on Oceans and Atmosphere

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1973

Annual Report June 30, 1972

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A Report to:

The President and The Congress

by the

National Advisory Committee on Oceans and Atmosphere

COASTAL ZONE
INFORMATION CENTER

First Annual Report

Washington, D.C.
June 30, 1972

NACOA

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Price 40 cents.

NATIONAL ADVISORY COMMITTEE
ON
OCEANS AND ATMOSPHERE
Washington, D.C. 20230

To the President and the Congress:

Sirs:

I have the honor to submit to you the first Annual Report of the National Advisory Committee on Oceans and Atmosphere.

The Committee was established by P.L. 92-125, approved on August 16, 1971, and was directed to submit a comprehensive annual report to the President and to the Congress setting forth an overall assessment of the status of the Nation's marine and atmospheric activities.

This report is submitted to the Secretary of Commerce for transmittal as provided by the statute.

Respectfully,

William A. Nierenberg

William A. Nierenberg
Chairman

June 30, 1972

FOREWORD

The newly formed National Advisory Committee on Oceans and Atmosphere (NACOA) has been charged by P.L. 92–125 to have direct concern with both the oceans and the atmosphere. NACOA is advisory to both the President and the Congress on the Nation's marine and atmospheric affairs—and to the Secretary of Commerce with respect to the National Oceanic and Atmospheric Administration.

To review and evaluate every program and issue over the vast domain of NACOA responsibility is to treat none of them well and would mean attempting, in some instances, to do what others are capable of doing better.* But to be able to

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* In this, NACOA's first year, we have naturally drawn heavily on a long series of reports by which the field, particularly of oceanography, has been enriched. Specifically we wish to acknowledge our indebtedness to: "Oceanography 1960-1970," National Academy of Sciences, Committee on Oceanography, 1959. "Oceanography, the Ten Years Ahead, a Long-Range Oceanographic Plan 1963-1972," Interagency Committee on Oceanography of the FCST, ICO Pamphlet No. 10, June 1963. "Effective Use of the Sea," Report of the Panel on Oceanography, President's Scientific Advisory Committee, June 1966. "Our Nation and the Sea, A Plan for National Action," Report of the Commission on Marine Science, Engineering and Resources (Stratton Commission), January 1969. The five Annual Reports on Marine Science Affairs by the National Council on Marine Sciences and Engineering Development, 1967 through 1971, inclusive.

select for priority attention those maritime and atmospheric issues that have become urgent, whether for economic, social, or technological reasons, is an opportunity afforded no existing committee in this area. This opportunity NACOA has been given by its charter and by its statutory permanence. We find it a sobering charge.

In NACOA's First Annual Report to the President and to the Congress, we have chosen four topics: Law of the Sea, Fisheries, Weather Modification, and Coastal Zone Management. These issues meet two criteria: each is of current importance and each, despite the short half-year of our existence, we feel we can treat with balance. This means that some issues we did not treat may be more important than some we did, but we did not feel we can be helpful in these particular areas with so short a time to prepare. However, what we lay aside this year we may be in position to consider next. It also means that we judge some areas neglected in this Report to be well in hand. This is particularly true of the national program in basic marine and atmospheric research despite certain weaknesses in ocean engineering.

Of all the fundamental and pressing issues which NACOA wanted to include in this Report, but did not, Marine Transportation stands out. We did agree that recent governmental actions have been important in slowing the decline in our merchant marine. However, we also found that

it was next to impossible to examine the issues and choices from an adequate perspective in the absence of a detailed analysis of the maritime transportation system as it inter-relates with problems of economic growth, social costs and benefits, and environmental goals. *We recommend that the Secretary of Commerce be asked to undertake such a study in consultation with NACOA.* Such a study would be a major undertaking that could reveal a much greater possible contribution to our Nation's overall well being than even the present ardent supporters of a merchant marine consider to be the case.

It is NACOA's intent to learn how best to be of service to those we advise. It is our hope to place major isues in the context of national interest to reflect our understanding of the interplay between science, technology, and social and economic factors in national policy decisions in the light of limitations of manpower, budgetary, and physical resources. It is NACOA's goal to help clarify what is good husbandry of the resources of the sea and air and what this can mean to the United States of America.

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Introduction

A similarity which runs through most of the issues in NACOA's First Annual Report is the underlying need for specific international understandings as a requisite for solution. This requirement stems less from the international nature of the oceans and the atmosphere than it does from the need for wise management of what have lately become recognized as limited resources.

Effective resource management requires agreement among the parties whose interests are involved; interdependence amongst nations therefore clearly complicates matters. While coincidence between national and international interests plainly exists, it has nevertheless grown more difficult in recent years to keep questions of international politics from taking over where technological interchange would better serve all concerned. The hope is that where there is growing international awareness of a common problem, there can be found the mechanisms for providing the technological inputs for working things out.

Common interest issues are prominent in three of the four sections of this Report. In "Some International Issues Related to Law of the Sea" they are central. Here NACOA reviews the developing controversies over freedom of passage, freedom for research, and the jurisdiction of fisheries, and proposes means for fostering their resolution while protecting U.S. interests. In a second section, NACOA notes the growing international awareness that fish can be harvested to extinction if not biologically managed and suggests how this awareness provides the opportunity to work at rehabilitating the U.S. fisheries.

Thirdly, recognizing advances in the ability of some developed nations, including our own, to modify the weather both intentionally and inadvertently, NACOA advocates intensified national and international discussion and development of appropriate regulation.

The fourth section of the Report, on coastal zone management, though specific to the United States, describes a situation demanding virtually

unprecedented management efforts to weave together and rationalize the conflicting and at times incompatible needs of the many different users of this resource. The coastal zone is not only complex naturally, it is also the focus for an unusual confluence of national, regional, state, and local interests. Which is David and which Goliath when it comes to the oil terminal or the bathing beach? the oyster or the dredge? Here again NACOA finds that the nation's science and technology can be more effectively used in support of management. It is on the means for promoting a more effective interaction between management and science that the discussion of the coastal zone centers.

Finally, in a brief section titled "Moving Ahead" NACOA emphasizes the urgent need for action and for facing up to the pervasive impact on our society that appropriate action will have. The alternative, doing nothing, is in our view unthinkable. The days of the open ocean and limitless air are gone. The oceans and the atmosphere belong to all rather than to none, and it is in our common interest to enhance the use and decrease the abuse to which they are made subject.

Some International Issues Related to Law of the Sea

The rules governing the use of the seas by the nations of the world are today in a transition comparable to that which took place in our own country when the frontier and the open range disappeared. While NACOA finds the emerging U.S. positions at the level of the Working Group on Law of the Sea soundly in the national interest and consistent with international needs, it also finds that the actual situation, and the U.S. current tactics in negotiation, give less cause for optimism. These matters are discussed with respect to freedom of passage, fisheries, and freedom of research. NACOA then suggests the kind of effort and program adjustment which should result in a more positive approach and improved prospects for international agreement.

It will be impossible to come anywhere near the oceanic goals set by the Congress or proposed by earlier commissions and councils until an updated and accepted set of international rules is developed for international oceanic operations. The international negotiations on the Law of the Sea have a status comparable to those on disarmament, and may very well take longer to resolve. We should take care not to view this matter with undue optimism in view of the complexity and wide range of issues to be resolved.

The basic issues before us are in several broad categories which have to do with:

- the extent of territorial waters and the resultant effect on freedom of navigation and overflight and freedom for research;
- fisheries; and
- the appropriate regime for the management of the ocean basins.

The complexity of the issues derives from the many different interests, national and international, and has diplomatic aspects that are normally not discussed in official reports. NACOA nevertheless feels that the importance of a full and frank discussion of this multifaceted problem is essential if procedures and programs are to be adopted that can move matters forward. We conclude that the present situation is unsatisfactory

internationally and that the current U.S. procedures will not suffice to achieve the U.S. policy goals. This is a pessimistic statement more with respect to the direction matters have taken internationally than to specific criticism of past approaches. Nevertheless, NACOA feels that these difficulties could have been sooner anticipated and a more imaginative and coordinated program could have been developed.

NACOA has been critical of the activities of the Working Group on the Law of the Sea because of an apparent diffusion of objectives and a lack of sharply developed policies or positions. The situation has recently improved considerably, undoubtedly through the effect of increasing the delegation by five nongovernmental experts, and the formation of a broadly based advisory committee. One of the results of this interaction is, as is noted later, an agreed industrywide position for the fisheries industries. There is, however, the ever-present danger of weakening of objectives under the grind and tedium of a one-hundred nation debate.

The entire position of the United States in international oceanic affairs should be thoroughly reviewed and clarified without neglecting the possible contribution of any department or agency. The position must include a strong policy for keeping the oceans and the classical straits open for free navigation and the oceans free for commerce and for responsible scientific research. The oceans are a common heritage. This heritage carries with it the necessity for freedom to explore, freedom for navigation, and freedom for simple human enjoyment.

ACHIEVEMENT AT GENEVA (1958)

With these goals in mind, and before setting down specific programmatic recommendations, we present our analysis of the current situation and the history of how we arrived at what appears to NACOA to be a difficult impasse. Perhaps the most useful and illuminating starting point is the Geneva Conventions of 1958. These Conventions were the result of intensive and arduous preparatory conferences. They were momentous achievements, made possible largely by intensive and lengthy preparations involving considerable technical consultation. The signatories assigned the bottom resources out to the 200-meter depth to the adjacent state and made easy allowance for general research outside of territorial waters in this zone by agreeing that permission to carry on research in this region would "not normally be withheld." Freedom for research in the ocean basins outside these limits was unrestricted. Considerable detail went along with these conventions—specifying, for example, that lobster and shrimp were not to be classified as belonging to the bottom but rather to the water mass, and so on.

One provision was accepted that may soon be a thorny issue; it provided that the bottom resources of the region beyond the 200-meter depth be assigned to the adjacent state to the extent that they are economically

exploitable. Until recently it was expected that this controversial clause would be a dominant issue in the current discussions. Then a host of other difficulties arose which seemed for a while to overshadow it: concern about the depletion and management of the living resources of the world ocean, proposals for ultimate arrangements for the exploitation of the ocean basins, a number of unilateral extensions of territorial limits, a deepening universal concern about the environmental degradation of the oceans, and concerns dealing with the destruction of species, such as the whale. However, growing oil consumption may again force to the fore problems having to do with resources beneath the ocean floor.*

APPROACH TO GENEVA (1973)

Against this background we wish to make four observations. The first is that treaties in matters of this kind where a common heritage is involved must allow for change. In the course of increasing knowledge of the oceans and their resources, and increasing threats to the oceans, it is clearly necessary to review the arrangements periodically and adjust them equitably to new needs based on new knowledge. This point applies principally to our present emergent fisheries position.

The second observation is that these conventions have the force of international law and should be observed as such. Unfortunately U.S. experience with the 1958 Geneva Conventions has been largely the opposite. This experience raises grave questions as to the usefulness of attempts to improve the situation by treaty revision alone, unless a better basis is laid. For example, in waters off Chile, Peru, Ecuador, and Brazil, the United States or its fishermen have had to pay fines or seek permits in areas in which there should be unrestricted fishing access under generally accepted provisions and conditions at the time of the 1958 Conventions. Another example is in the area of scientific research. Various countries have affected the freedom to conduct scientific research in that they have not routinely granted permission to perform research in waters over their shelves, or they have instituted permission-granting procedures sufficiently cumbersome in many instances as to effectively exclude certain areas from planning for scientific research cruises. Their reasons often seem obscure, but it appears that they may be interpreted as possible efforts to force the reopening of previously settled matters for the impending Law of the Sea negotiations. It is all the more discouraging to observe that, for other reasons, several of the developed nations have also denied permission for

* It is possible that there will be a considerable lapse of time before international agreement on Law of the Sea is attained. NACOA recognizes that economic and other pressures may develop to such an extent that individual nations including the United States will take unilateral actions, especially with respect to resource exploitation. NACOA therefore urges consideration by the U.S. Government of suitable interim arrangements that will allow development of these resources to proceed, but at the same time will offer reasonable probability of meshing with eventual international agreements.

research on their shelves. The reasons may well have involved serious national questions, but they have also had chauvinistic overtones.

This leads to a third observation, our pessimism as to the chaotic state and the ultimate benefit of the preparatory sessions leading to the 1973 Law of the Sea Conference. The difference between the 1958 Conference, with its mark of success, and the current negotiations is that the former was preceded by quiet and hard work on the part of technical experts. The 1958 results were based on the best oceanic expertise available at the time and were limited to a small number of priority issues. Despite the best efforts of the United States and other major powers to limit the forthcoming Conference to a few issues—particularly the question of territorial limits—the member nations, led by the lesser developed countries, overwhelmingly voted to include all issues on the agenda. Most of the countries will not have the time to become adequately informed technically on a broad array of complex issues. Thus the Conference may degenerate into a series of position-taking statements on very narrow local issues rather than a striving for an optimum regime for the benefit of all and for a situation that could enhance conflict-free prospects around the world.

Our fourth observation is that a legalistic approach will not serve and an alternative must be sought. A legalistic approach will only work to maintain the present fractionated situation. A strongly pragmatic approach based on the realities of what the oceans can offer mankind and what is needed to deliver on this offer allows more hope for success. It appears that the true requirement is a framework which permits all nations to jointly participate in a mutual educational effort centered on the world's oceans, the current and future resources, and the factors to be balanced if mankind's long-term needs are to be most appropriately met by oceanic means.

Today's strong movement in the direction of further nationalism carries with it serious threats to classical free movement on the oceans. This is contradictory to the lofty phrase, the "common heritage of mankind," which opened the present debates on the uses of the resources of the midocean.

The current position of the United States with respect to three important issues treated in this chapter (freedom of passage, fisheries, and freedom of research) as it has slowly evolved in the ferment of the last years, seems to us now eminently sound. It satisfies U.S. national interests, it is based on good conservation principles, and it seems the best arrangement leading to an amicable international situation and the common good.

The Issue of Free Passage

The U.S. policy for free passage in waters outside the 12-mile territorial limit and in classical straits must remain unmodified. It is required in the

interests of world trade and communication, and is necessary to prevent cumbersome restrictions or procedures being placed in the way of open research. It is also necessary with respect to national defense. In this regard, the Committee has in mind not only the classical requirement for defense systems but also the historical fact that restrictions imposed on classical straits passage have almost always converted them to foci of military confrontation and sources of conflict.

The Issues of Fisheries

The U.S. position with respect to the fisheries question has been slow in formulation because of the lack of an agreed industrywide position. Now, however, the industry as a whole has agreed to support the position prepared by the U.S. Working Group. The coalition of interest has been largely induced by the realization that the current worldwide fishing capability can grossly reduce the catch of currently marketable fish and alter the relative species balance in a major way if uncontrolled and unregulated. The position proposed is to assign each coastal fishery to the adjacent state for management and licensing; to assign responsibility for anadromous fish to the country in whose waters the fish spawn; and to rely on multilateral arrangements for the pelagic fisheries. *The basic approach is to place priority on conservation of the resource.* This approach, in the case of the coastal fishery, has the important corollary that the fixed territorial concept is removed from the important fisheries domain, and should help relieve the pressures which appear to be driving territorial limits outward.

The Issue of Open Research

Our position with regard to the use of the ocean basins is largely in agreement with the positions of most other states. The principle of community ownership and international management has been accepted, but the question of the relation between a producing corporation and the international management is yet to be settled—and there is great resistance to such management conducting its own research while restricting research of member nations.

Except possibly for manganese nodule and phosphate mining, the deep-sea resources will remain inaccessible for many years. Therefore these questions are less immediate than the fishing and territorial waters questions, and even in the case of the nodules and phosphate beds the pressure for development may be resolved by the hidden question of the effect on individual states' economies by the introduction of new sources of specific minerals. Nevertheless, discussions relating to the use of the seabed have raised the specter of restrictions on freedom of research on the open sea. *It is and should remain firm U.S. policy that this freedom of research on the open sea continue.*

In a purely practical way, we as a world can never hope to realize any of the postulated benefits from the oceans if research is hampered. Even now it is proceeding at altogether too slow a pace to match the oft-stated expectations. International interference with research is far more serious than that on the national level. It has happened that scientific inquiry has been blocked in various disciplines in one nation or another at one time or another usually for ideological reasons. Fortunately for mankind, if not for that nation in particular, scientific inquiry advanced elsewhere. At a later date, the laggard nation was able to catch up, if not to repair the damage completely. This corrective is not available if the inhibition to science is on a global scale. More fundamentally, any further limitations on freedom of inquiry that are not for basic safety or the general welfare (such as those to control pollution) are a dangerous addition to a list of limitations that is already too large.

It is possible to understand and sympathize with the position taken by the developing nations. Mostly former colonies, they are sensitive to any possibility, however remote, that their share of the oceanic resources may be usurped by the more advanced nations who have the technology to exploit these resources. They transfer this concern to research as well, believing that their poor or nonexistent research capabilities put them at a gross disadvantage in obtaining their share of the resources. This could bring major oceanic development to a halt if such fears are translated into conventions restricting research on the open seas, because research and education do go together, and are not developed serially. Thus, halting exploration or research until the developing nations reduce the research gap would lead to a total slowdown, further frustrating hopes for fulfillment of the postulated benefits available to mankind from development of oceanic resources. It would also greatly impede applied research in nonextractive uses of the oceans such as meteorological research, which, for the immediate future, may be the most beneficial of all efforts.

RECOMMENDED COURSES OF ACTION

NACOA recommends means by which the United States may exert leadership based on its acknowledged advanced capabilities in oceanic technology. The 1958 Conference was successful largely because of the United States and the technical support that could be brought to bear on the deliberations. The generally formal, legalistic approach that has been followed in the last several years seems to be moving too slowly. If progress is to be made, we must change our approach by recognizing the obstacles to progress in negotiations and by altering our procedures accordingly. *Our principal recommendation is to engage other countries, particularly the developing nations, in as many joint projects with the United States as possible and in as great a variety as reasonable.* This en-

gagement should be primarily at the technical level with the full cooperation of the involved government. Some of the harsher realities of oceanic research and development will be more widely understood and there will be improved ability to interpret the findings of others. This should go far toward allaying suspicions of unilateral exploitation. Or, from a different point of view, this should give the developing nations a better technical base to protect themselves in economic negotiations.

It happens that numerous U.S. programs exist at various levels of activity which could be employed toward this end. Aside from the necessary strengthening of the individual programs, the programs should operate in a coordinated way with the ultimate purpose of developing a better worldwide understanding of ocean technology and the value of a management approach to oceanic resources.

1. A first and important step would be greatly strengthening the office, in the Department of State, of the Coordinator of Ocean Affairs and Special Assistant for Fisheries and Wildlife. This Office has been very effective with its limited means in handling many fisheries problems, and has been supportive of U.S. research programs around the world and in species protection, particularly mammals. The success of this Office is based on its expertise and the relationships it has established with its constituent community in the United States. The problems, however, are too varied and too numerous for the Office to handle within its present means. It is this Office that has demonstrated the usefulness of joint research in the international realm by arranging for cooperative fisheries research.

2. Other governmental agencies have not been as effectively or imaginatively used. For example, the Agency for International Development has almost entirely dropped its programs in the oceans due to budget pressures. This lack of coordination seems difficult to understand at a time when Law of the Sea problems involve so much intradepartmental effort up to the Under Secretary's level at the Department of State. We recommend a vigorous AID program in ocean science and technology. There are a number of such efforts by the Department of Agriculture, with one example being the USDA's Economic Research Service, set up to work with AID for the purpose of enhancing international development in areas related to agricultural matters. By analogy, a similar decision could be reached to focus certain developmental activities in areas related to marine matters by a cooperative Department of Commerce/AID program. NACOA suggests this might be most logically assigned to the Sea Grant Program within Commerce's NOAA.

Thus, a new candidate for international programs is the United States Sea Grant Program. By analogy with our Land Grant Program it offers great promise. One of the great contributions of the Land Grant Program to the common welfare has been that of American agricultural technology, and the key element has been the educational contribution of our great

agricultural colleges and universities. Their dedicated students are to be found in the most remote corners of the world. They have been instrumental in helping feed the world's billions by introducing new agricultural and land management practices. We cannot properly compare the fledgling Sea Grant Program of the Department of Commerce with the Land Grant Program activity developed over the past century, but the potential is there. One possibility has already been noted. The Sea Grant Program could be made even more valuable than at present by introducing an exchange program for foreign students, particularly from the developing countries.

3. It was hoped that the International Oceanographic Commission (IOC) could serve as an important exchange mechanism between governments and during the period between important diplomatic conferences. It has been a major disappointment. For many nations it has become rather a political forum. A re-examination of the role of the IOC would be very much in order, looking to the possibility of having experts named as representatives rather than political delegates. If a major reconstruction takes place as a result of this review, it would be desirable to consider consolidating the oceanic and atmospheric interests.

4. Among the various U.S. programs the most useful could be the International Decade for Ocean Exploration (IDOE) of the National Science Foundation. It was originally intended to be a major international effort but has fallen far short of the intent. Its various current activities, such as GEOSECS (Geochemical Ocean Sections), the ocean buoy efforts, the midocean ridge studies, and the upwelling studies are very suitable candidates for massive international cooperation. Greater international participation at a higher level in these programs should be developed by more vigorous diplomatic activity, accelerated support to allow for more and a greater variety of projects, with funds specifically allocated for the support of cooperating developing countries. We note the important contributions of the IDOE to the oceanic pollution problem.

5. The National Marine Fisheries Service (NMFS) can play a vital role in exchanges with foreign governments—indeed they already do to a considerable degree—but this activity could be greatly enhancd, again with the motive of a mutual learning effort among nations. The NMFS is the basic support instrument for all of our activities related to biological resources. The NMFS should be strengthened to enable it to meet the increased demand for its services to related Law of the Sea activities, sea mammal protection, and additional fisheries conservation activities. The best support for a rational international program is a well-promulgated and sound scientific position—which is not presently available for many important issues.

6. There are military-related aspects apart from those of straight national defense requirements, and those warrant the most careful considera-

tion. Within the United States, in addition to various academic institutions and civilian branches of the Federal Government, the military branches—most notably the U.S. Navy—conduct considerable amounts of scientific research. Such research is intended to contribute to better understanding of natural phenomena. This is largely open research, it is not classified in nature. Outside the United States, particularly in a number of Latin American nations, much if not all of the oceanographic research is conducted by the navies, even research that would in the United States be conducted by civilian organizations. This suggests an important role for the U.S. Navy in extending its current relationships with these navies to include the exchange of research programs and techniques.

7. The National Oceanic and Atmospheric Administration's National Data Buoy Program and all the programs in general involving air-sea interaction, such as NORPAX and GATE, are extremely appropriate for intense international cooperation. There are immediate possible benefits for the participating countries regardless of a country's current level of research effort or sophistication, since many measurements of widely varying complexity are required. There are also appreciable cost savings for the individual countries. These programs can all use more support, particularly for those aspects which are directly related to international cooperation. Particular support is required to enable close contact between technical people at the working level.

8. Beyond these there are individual programs of sufficient magnitude and worldwide scope that they could carry important international involvements. The Deep Sea Drilling Project is a good example. It is also the unique tool now available for divining the potential resources beneath the deep ocean floor. The results of the research are now widely and voluminously disseminated. Greater international participation would help dispel the sense of inadequate knowledge that motivates the developing countries and builds pressures for increasing restrictions or widened territorial waters.

In summation, we do not underestimate the difficulties facing the negotiators who have to operate in a forum of representatives with widely varying backgrounds in technical development and varying nationalistic attitudes. It is as a result of our experience with these difficulties that we make our recommendations to engage other countries in suitable mutual efforts in the hope that a different and more positive approach may result which is aimed specifically at the sources of the difficulties.

Rehabilitating United States Fisheries

Fishermen have long contended with one another. Competition for a common resource has set commercial fishermen against the sportsman, one segment of the industry against another, one locality in the Nation against another, one nation against another. But now, as a consequence of technological improvement and overcapitalization, there exists the capability to fish to extinction. Awareness of this dreadful possibility is becoming universal and, NACOA feels, has produced the opportunity to achieve agreements by which to manage the ocean's living resources and conserve the ability to harvest them. This in turn would make it possible to create in the United States an environment which attracts private enterprise and thus leads to rehabilitation of a declining fishing industry. This section discusses the new awareness and the means by which a coherent program may be developed.

A COMMON THREAT

A gap exists between the declared national policy to rehabilitate the fisheries of the United States and the specifics of how to do it. One reason is that agreement on which of many problems is most important is no easier to come by than agreement on what to do if certain ones were picked. We are thus twice removed from coming to grips with the issues.

NACOA believes this situation is changing in the face of a common threat. We believe there is a general awareness—quite recent in origin—of what had previously been shrugged off as local by all except those affected. This threat, which now touches all coasts and all segments of the fishing industry and of sports fishing, is the threat to fish as a resource itself.

While there are underutilized fisheries, the potential for over-fishing exists by the international and interstate nature of much of the industry and the technology which underlies it. This potential for overfishing is stimulated by improving technology and by an economics which offers incentive to overfish to the fishermen who have little responsibility for management. It is not the husbandman who would kill the goose that lays the golden egg, but the hunter.

There has been a tendency to regard the decline of the world position of commercial fishing in the United States as a problem of international competition in which an unsubsidized, artisan-like, entrepreneurial, labor-intensive American industry has suffered the effects of competition with technologically-advanced, government-supported foreign fishing fleets. And in fact, the proportion of fish products imported into this country hit a peak, in 1968, of over 70 percent of the fish products used, though the average, 55 to 60 percent, is somewhat less.*

But these facts, serious as they are, divert attention from the more basic condition, masked by the rise in the total world catch, that fish resources are limited, that the potential exists in the world to destroy these resources, and that if our fisheries are not in fatal trouble now, they are going to be unless something is done about conserving the resource. The shrinking share by U.S. commercial fishermen of the growing catch has elicited suggestions for Government support to meet foreign competition, but this is a digression from the more fundamental problem, the threat to the resource itself. What purpose would any plan for rehabilitating the U.S. fishing industry serve if the fish themselves were gone?

ENVIRONMENT FOR REDEVELOPMENT

Adjusting to an approach which is resource-oriented rather than economics-oriented was the nub of many of the Stratton Commission recommendations; and it is the basis for existing fisheries policies which center on:

- obtaining the information on which proper resource management depends,
- minimizing institutional constraints such as Federal/State coastal jurisdiction problems, and
- adjusting conflicts in interest between sports and commercial fishermen, etc.

The Stratton Commission recommendations also touched on legislative, economic, and international issues, such as:

- the desirability of rescinding the requirement that a fishing vessel be American-made,
- the desirability of removing those types of control which impose inefficiency as an inhibitor to over-fishing, and
- the desirability of limiting entry to counter the inherent tendency of producers to overcapitalize when the price of entry is low.

Some of these recommendations have been translated into policy, others into official recognition as worthy bases for action. All remain valid today

* The U.S. catch, about two and a half million tons per year, has been relatively constant for 25 years, while the world catch has more than doubled in each of the last three decades. About half the U.S. catch is edible fish.

and some, such as limited entry, coastal jurisdiction problems, and sufficiency of biological information for resource management, remain crucial. But they have been upstaged by this new need of the hour—assurance there will be fish to catch in the future.

It is NACOA's opinion that assuring the resource, and the program for proper fisheries management which that goal implies, will provide the basic inducements for investment and venture. Limiting entry, modifying antiquated State regulations, developing new Federal/State guidelines, and improving the resource will also be necessary, but there need be no requirement for the kind of direct financial subsidy that can be both expensive and self-defeating.

We know this means borrowing trouble. In addition to adjusting and negotiating the conflicting fisheries interests within our own Nation (problems of resource management in the midst of jurisdictional confusion exist in inshore fisheries), we will have to assure our fishermen their fair share on the international stage.* It is our opinion that biologically determined regulations to assure a maximum sustainable yield could make worth to all the nations involved the cost of current restraint for future benefit. We believe the argument for rationalization of international agreements on conservation and allocation of catch can be made persuasive and the value of a share of the proceeds can be weighed by each nation as inducement to an agreement.

None of this is new. Resource management and bilateral or multinational agreements have arisen in response to specific fishery problems over the years and Fishery Conferences have proved their value. But they have in general been defensive efforts, evolutionary in nature, and often too local and slow moving. Furthermore we have, as a nation, shied away from approaching the problem of total conservation of fisheries partly because a course of action which depends on international agreement is not lightly undertaken, and partly because other elements of national policy were believed to have been involved whose importance, fate, and treatment can be quite separate.**

What is paramount from our point of view is the need to establish proper resource management as a matter of first priority. We must, however, be convinced that the price we pay for the potential benefit is justified. The Committee is aware that one reason for the decline of the fishing industry in the United States is that for the last 20 or 30 years commercial fishing has become less and less a factor in the life of the Nation. Unfortunately, fisheries are not regarded as part of the national wealth

* The preceding section on Law of the Sea discusses this in greater detail.

** In arriving at some agreement on the rights and responsibilities of coastal nations to the fish off their shores, the lumping of fisheries problems with those of offshore mineral resource exploitation occurs in the politics of international negotiations if not in the actual agendas. Fishing and mining are totally different activities, but political combinations for one regard can carry over to the other.

as are submerged attached resources; the national efforts and energies devoted to fishing have thus declined, or at least not expanded in the face of growing foreign effort.

Thus, to raise the level of national effort in the fishing area by heroic means such as by a series of financial shots-in-the-arm, tariffs, quotas, and exclusions cannot automatically be assumed to be in the public interest. Any increase in effort, even control of the resource on a sound financial basis, must first respond to the questions: to what purpose? how? and how much will it cost?

IS IT WORTH THE EFFORT?

To what *purpose* do we wish to rehabilitate the domestic fishing industries? NACOA believes a rehabilitation effort is justified because the program necessary to do so can be expected to:

- advance established national policy,
- invigorate maritime activity,
- help reduce the present adverse balance of payments,
- increase domestic employment,
- contribute to the conservation and wise use of living marine resources,
- provide for expanded recreational fishing,
- arrest the trend toward total dependence on foreign fisheries, and
- provide an additional source of high-quality protein to the national food supply.

How do we propose to do it? NACOA believes the decline in the fishing industry should and could be corrected by providing a more attractive economic environment for individual venture and that at the same time the United States can contribute to the rational control of a global food resource. The time is now ripe, because of the threat to the resource itself, to find common ground in an industry which historically is beset with conflicting and fragmented interests. Before going into more detail as to how we suggest fisheries rehabilitation be undertaken, can we gage the required effort?

How much will it cost, and is it worth it? These are tangled questions. It is easier to ask for an assessment of costs and of benefits than it is to provide the answers and then be persuaded by them. One reason we think this has been especially difficult in the fishing area is because the traditional approach has taken the point of view of one segment of the industry at a time—the problem of the pelagic fishermen and the 200-mile limit, of the coastal fishermen and Russian and Japanese competition, of the sports fisherman and the disappearing sardine. Or the approach has been ambiguous because only a part of the problem has been attacked—such as limiting entry (but how do you get the States to agree and how long will it take?); reserve an increased share of the catch for

coastal nations (but what do we do while we wait for agreement?); provide loans (but do those who least need it benefit the most?); discourage the marginal operators who reduce the catch per unit effort for everybody without helping themselves very much (but what do you tell them to do instead?).

NACOA suggests that a way to override the difficulties of industry segmentation and of diverse local goals is to approach the question of a national fisheries goal directly and derive from it a comprehensive, consistent national planning basis for fisheries operations.

AN APPROACH TO NATIONAL FISHERY PLANNING

NACOA proposes a target for an increase in the share of fish supplied to the domestic market by domestic fishermen. U.S. food fish consumption is now 6 billion pounds a year of which the domestic catch supplies about 40 percent. Per capita consumption of this edible fish has remained constant for at least 30 years. (Consumption of fish for industrial use varies because it competes in the animal-feed market with other sources of protein.) Confining ourselves to edible fish and assuming per capita consumption will not change by 1980, we will then consume about 7 billion pounds of fish. A target of 3.5 billion pounds for domestic producers (increasing from 2.5 billion pounds in 1970) would increase our catch volume by 40 percent and reduce our dependence on imports for edible fish from 60 percent to 50 percent. This amplification would occur because the market is growing. What we propose is to supply the market increase and simultaneously move up to a larger share for domestic producers. A similar goal could be set for industrial fishery products.

We believe the implementing plan to achieve this goal can be developed in the following manner.

1. Determine present productivity of fishing areas of interest to the United States (including all inland fisheries). This assumes continued improvement in catch or production statistics.
2. Determine what the productivity of these areas, populations, or species could be in 10 years if a program of ideal conservation were adopted.
3. Determine which of the above programs should be adopted and implemented and to what degree.
4. Enumerate the steps that would be required and identify the agencies that would be concerned, e.g., Department of State on the matter of preferential access to coastal fish populations; Department of Commerce on internal maricultural efforts, etc.
5. Estimate how much additional fish and related products would be available to the consuming public as a result of this effort.
6. Relate this to domestic market requirements in 10 years and set feasible goals, programs, and time schedules to supply this need.

THE SECRETARY OF COMMERCE
Washington, D.C. 20230

September 27, 1972

The President
President of the Senate
Speaker of the House of Representatives

Sirs:

I have the honor to submit, in accordance with Public Law 92-125, August 16, 1971, the First Annual Report of the National Advisory Committee on Oceans and Atmosphere (NACOA).

Enclosed also are my comments and recommendations which are required by the Act.

Respectfully,

Peter G. Peterson
Secretary of Commerce

Enclosures

COMMENTS AND RECOMMENDATIONS OF THE SECRETARY OF COMMERCE ON THE FIRST ANNUAL REPORT OF THE NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE

PREFACE

Public Law 92-125, which established the National Advisory Committee on Oceans and Atmosphere requires that the annual report of the Committee "shall be submitted to the Secretary of Commerce who shall within 90 days after receipt thereof transmit copies to the President and to the Congress with his comments and recommendations." Accordingly, the following comments are submitted. The comments have been organized to parallel the presentation in the Committee report and under the same chapter headings.

INTRODUCTION

The First Annual Report of the National Advisory Committee on Oceans and Atmosphere (NACOA) has focused on four critical oceanic and atmospheric issues confronting our Nation—the Law of the Sea, the Rehabilitation of our Fisheries, Weather Modification, and Coastal Zone Management. The findings and recommendations of the Committee warrant thoughtful consideration as new policies and programs are formulated and implemented. They provide a basis for further discussion on some of the key economic and environmental issues facing the Nation and a basis for immediate action on others.

The issues are complex. The way in which they are resolved will have an impact on the future economic and social welfare of the United States. The outcome of present international deliberations within the United Nations on the Law of the Sea

will determine the extent and character of the rights and obligations of our Nation and its citizens in the sea and its resources. The effectiveness of our plans to revitalize our national fisheries will determine whether our fishing industry can survive economically. What is perhaps more significant, it will determine whether the fishery resources off our coasts can be maintained in a healthy biological condition so that they may be harvested in perpetuity for the benefit of our and future generations. How we choose to manage our coastal zones will determine whether we can, in the long run, provide for protection of this environment while using it wisely to sustain the Nation's continued economic and industrial growth. The issues of weather modification go directly to the question of whether and to what extent we will develop and use new technology to manipulate environmental processes in the public interest. More importantly, it raises the question of the nature of the public interest. All of these issues raise basic philosophical as well as practical questions.

I am pleased that the Committee has recognized the important contribution that a strong United States merchant marine can make to our Nation's overall well-being and the impact of President Nixon's actions to revitalize our merchant fleet. Instrumental in this regard was the passage of the President's Merchant Marine Act of 1970 and the efforts of the Maritime Administration in the Department of Commerce to rebuild our maritime transportation system. I have requested the Assistant Secretary of Commerce for Maritime Affairs to consult with NACOA with respect to its comments and suggestions supporting a strong U. S. Merchant Marine.

For many of the findings and recommendations of NACOA, policies and programs are presently under study and the views of NACOA are welcomed as valuable contributions in their formulation. For others, planning is underway or action is being taken to implement committee recommendations. For a few, the views of the Administration are at variance with those of NACOA.

I believe that my comments on the NACOA report can best serve the intent of Public Law 92-125 by addressing only key policy issues to indicate where the Administration is moving to carry out the recommendations of NACOA and to present the rationale of the Administration where its plans, programs, and policies differ from those recommended by NACOA.

SOME INTERNATIONAL ISSUES RELATED TO THE LAW OF THE SEA

I concur with recommendations of NACOA for actions which can strengthen the United States position in international ocean affairs by joining with other countries, particularly developing countries, in joint projects. Many Federal Agencies including the National Science Foundation and the National Oceanic and Atmospheric Administration (NOAA) are engaged in a wide spectrum of joint efforts, both with developing and developed nations. A number of countries now participate actively with the United States in ocean projects. Some of the innovative suggestions for additional cooperative ventures will be explored. At the same time, I must note that the NACOA report does not fully reflect either the carefully defined policy which the United States has followed in the current Law of the Sea negotiations, based on the President's statement on United States oceans policy of May 23, 1970, or the institutional arrangements created to implement that policy.

In 1970 an Interagency Law of the Sea Task Force was established under the chairmanship of the legal adviser of the Department of State. From its inception, the Task Force has been composed of representatives of all agencies within the Executive Branch concerned with the proposed 1973 Law of the Sea Conference. The primary responsibility of the Task Force is to elaborate on United States oceans policy within the guidelines established by the President. Its recommendations are reviewed by the Departments concerned and, where appropriate, in the Executive Office.

Since early 1972, the Task Force has been assisted by an Advisory Committee on the Law of the Sea, composed of about sixty representatives of the business, professional, academic and scientific communities. The Advisory Committee has already made a valuable contribution to the formulation and negotiation of United States oceans policy, and its advice will become even more important as the Law of the Sea Conference approaches.

The fundamental problems facing the United States in the Law of the Sea forum concern the respective rights of nations to use the seas and their resources. The issue, as the President stated, concerns whether the oceans will be used rationally and equitably for the benefit of mankind or whether they will become an arena of unrestrained exploitation and conflicting jurisdictional claims.

The present state of the Law of the Sea is inadequate to meet the needs of modern technology and the concerns of the international community. If not modernized multilaterally, unilateral action and international conflict are inevitable. At stake are the maintenance of order in the oceans, protection of national security and economic interests in free navigation and overflight, assurance of supplies of energy and minerals from the seabeds and fisheries from the sea, maintenance of maximum freedom of scientific research, and protection of the marine environment.

The President's statement on United States oceans policy of May 23, 1970, sets out certain objectives which the United States Delegation of the United Nations Seabed Committee has been seeking to achieve for over two years, primarily through a number of specific proposals submitted to that Committee. They include:

- A draft convention on the resources of the seabed which provided a 200-meter depth limit of national jurisdiction over the seabed, an intermediate zone of mixed coastal state and international jurisdiction embracing the continental margin, international machinery to administer exploitation of seabed resources in the area beyond national jurisdiction, and sharing of benefits with developing countries.
- Draft treaty articles which would fix the breadth of the territorial sea at 12 miles and guarantee a right of free transit through and over international straits.
- Draft treaty articles providing for a system of preferential rights of coastal states in high seas fisheries adjacent to their coasts.

The United States is also taking an active role in the Law of the Sea negotiations on the subjects of marine pollution and marine scientific research and has proposed draft treaty articles drawing on the relevant conclusions of the Stockholm Conference on Human Environment.

REHABILITATION OF UNITED STATES FISHERIES

I share with the NACOA the sense of concern in rehabilitating United States fisheries. It is United States policy to bring this traditional American industry back to economic health. The Committee's views are helpful in outlining the basic problems which must be overcome to achieve this goal.

I find it reassuring that many of the Committee's recommendations support fisheries policies which we have instituted since the creation of NOAA. The Committee rightly points out that a new situation now confronts the world's fisheries . . . that there is a basic threat to the world's fishery resources from growing fishing pressure by all nations.

NACOA calls for a basic approach to fisheries management which is resource-oriented. With this view we concur wholeheartedly, and we are moving both domestically and internationally to invoke such an approach.

This Administration is pressing internationally, within the context of the Law of the Sea, to establish standards of fisheries management which are directed at the worldwide conservation of fisheries resources so they may be harvested at a sustained yield that will preserve all stocks as a perpetual source of food and recreational enjoyment. We have strongly advanced as a management concept the assignment to coastal nations of the management responsibility for coastal species and anadromous stocks and to international bodies for highly migratory species.

In the interim, to the extent that international realities permit, we are seeking to increase the management effectiveness of the many international Fisheries Commissions. Already, our policies are having some effect. In the International Commission for the North Atlantic Fisheries, we have urged, and the Commission has adopted, "country" quotas for some ten different stocks of fish.

Although not of the same commercial importance, we have been moving vigorously as a matter of national policy to protect marine mammals and restore them to ecological health, through the International Whaling Commission and the North Pacific Fur Seal Commission.

While there has been some progress, we cannot be satisfied with the present status. We will continue to press for better management and better conservation in all international forums until our national objectives are achieved.

Domestically, we have introduced new programs within the last two years to attack other key problems identified by the Committee. The Department of Commerce has taken the initiative to launch its Marine Resources Assessment and Prediction Program. This effort is aimed at achieving one of the Committee's key recommended actions . . . to provide for systematic knowledge of all the fishery resources of importance to the United States. Secondly,

the Department of Commerce is moving ahead to engage the several coastal states in a resource-oriented cooperative State/ Federal fisheries management program.

It is steps such as these that NACOA says will provide the proper environment for basic inducements for investment and venture, and we agree.

The Committee suggests that national planning for rehabilitation of our fisheries should be based on a set of specific goals. They feel that only then can programs for achieving such goals be instituted. They do not minimize the difficulties of either setting such national goals or developing the plans for achieving them. We agree the matter is not simple. NACOA suggests that the basic national fisheries goal be set in terms of a specific percentage of the share of the domestic market to be supplied by our domestic fisheries. They recommend, as a goal, increasing the present share of the Nation's fisheries needs supplied by domestic industry from 30% to 40% . . . an increase in the domestic catch from 2.5 billion to 3.5 billion pounds of fish annually.

Such a goal would reduce our dependence on foreign sources, reduce significantly our present billion-dollar trade deficit in fisheries products, and increase employment in a rejuvenated industry. Such an increase in our domestic industry is to take place against a backdrop of a rational fisheries management system.

I believe that the implications and consequences of such a fisheries goal should be explored fully before it is set as a national target, so that we can understand the costs involved and other policy implications, such as effects on domestic fish prices to the consumer and effects on tariff and trade policy.

WEATHER MODIFICATION

I believe that NACOA has correctly assessed the exciting outlook in the field of weather modification. There is no question that developments of the last decade have put us on the threshold of weather control. To realize the potential of this new technology, the Committee urges action in the field of legislation, research and technology, hurricane control, public policy and international relations.

I welcome both the Committee's analysis of the present status of weather modification technology and its many recommendations for action. The present national plans for development of this

field closely follow many of the suggestions of the Committee. The public policy positions, especially as they relate to the international aspects of weather modification and our posture in this field, are being studied by the Administration. The Committee's views on these matters will be considered in the course of these studies.

The need for Federal legislation to define the rights and responsibilities of citizens, States, and the Federal Government; to establish regulatory mechanisms and liability provisions; and to protect the public is strongly supported by NACOA. Along these lines this Administration recommended legislation that has been enacted requiring the reporting of all weather modification activity to the Secretary of Commerce. I welcome the views of the Committee concerning the need for further legislation.

The analysis of national needs for research and technology in weather modification is a balanced and comprehensive treatment. The findings and recommendations offer a sound basis for further development of the national effort.

The review of the technical obstacles to progress in this field provides a framework for organizing our scientific effort, directed at understanding critical physical processes, and for our technological development effort in instrumentation and facilities. The call of the Committee for an expanded field effort in the Great Plains region of the United States is welcomed, and initial plans for such an effort are being prepared.

Some concern has been expressed by NACOA about the fragmentation of effort among the many agencies of the Federal Government, and NACOA recommends that a single Federal Agency take the lead in the development of the technology of weather modification. I agree with this recommendation for establishment of a central focus within the United States Government for carrying out research and development in all phases of weather modification. However, I believe that weather modification technology should remain available for use by all agencies of the Federal Government in the discharge of their mission responsibilities. It would also be unwise to divorce the necessary supporting research that would be required for the application of weather modification techniques from the agency with responsibility for such application.

The Committee has given special attention to the national effort in hurricane modification. I agree that this effort represents one

that must be fostered at an accelerated pace. I welcome the views of NACOA on this issue, as we develop our plans for this effort.

The Committee's concern for the public policy issues is deeply appreciated. Weather modification carries with it the potential for social gain, but not without the threat of concommitant social losses. It is clear that careful technological assessments of the consequences of the application of weather modification are required before decisions for widespread use are made. There is no question that we do not know enough at the present about many of the public policy issues involved, and they require continuing study. Studies are already being sponsored by the National Science Foundation and NOAA.

The realization that weather modification has critical international implications is strongly emphasized by NACOA. The Administration is conscious of these implications and welcomes NACOA's views on these matters. It is the policy of this Administration to foster international collaboration in this field to the maximum extent possible. We are moving to follow up the recommendations of the United Nations Conference on the Human Environment held in Stockholm this year for the monitoring and study of inadvertent weather modification in cooperation with other nations. We are working closely with all nations of the world on the World Weather Program and its research phase, the Global Atmospheric Research Program. We are continuing our exchanges of scientists with the Soviet Union and other countries in many phases of weather modification, and are extending assistance to developing countries in those instances where weather modification appears to be a useful tool in ameliorating weather-related problems.

COASTAL ZONE MANAGEMENT

The issue of coastal zone management arises from the rapidly increasing demands for use of the coastal zone, many of which are highly conflicting. For example, industrial and commercial usage of shorelands may be incompatible with recreational demands or the demands of fishery and wildlife conservation. This kind of incompatibility and the need to provide for all of our national needs generate the pressing need for management decision at all levels of government on the uses of our shorelands.

NACOA points out that the problems are complex, and there exists a need for a National Coastal Zone Program which will address both the management and scientific and technical problems upon whose solution rational management decisions depend. I join with the Committee in recognizing the urgency of our coastal zone problems. In the Department of Commerce, we have initiated programs to illuminate the scientific and technical problems which the Committee has assigned such high priority. Our program in marine ecosystems analysis is undertaking comprehensive scientific and technical studies of key regions of our coastal waters to provide necessary scientific and technical data for coastal zone planning. Similarly, we have joined with Canada in the International Field Year of the Great Lakes in the most comprehensive study of lake conditions, and we have not neglected the more difficult economic, social and legal problems of coastal zone management. The Department's Sea Grant Program has been focusing increasing attention on these problems.

I therefore welcome the substantive recommendations of NACOA and agree that action on them requires serious consideration. I also agree with the Committee that early passage of necessary legislation to provide for a coastal zone management system is necessary. The recognition of the national need for a coastal zone program has been widespread. The action of the Senate in the unanimous passage of the Coastal Zone Management Bill signals its great concern for action in this area. The action of the House in the passage of a parallel bill indicates a similar view.

The Administration has moved to take action with respect to coastal zone problems. It has given it a high priority as part of its Land-Use Policy proposals. There has, however, been a difference of opinion regarding the proper administering agency for the coastal zone management program. NACOA recommends the passage and enactment of a bill which would put the responsibility for coastal zone management in the Department of Commerce. The Committee feels that there should be a strong coupling between the technical expertise which resides in the Department of Commerce, National Oceanic and Atmospheric Administration, and the management function. The Administration believes that coastal zone management cannot be separated functionally or as a matter of program management from overall land-use management. However, recognizing the importance of the marine ecosystem and the competence of NOAA in this field, the Administration believes

that all decisions affecting such marine matters should require the concurrence of the Department of Commerce.

Certainly, there is room for debate in such problems of assigning jurisdiction. However, the Administration believes that its solution will protect and enhance the vital marine considerations.

MOVING AHEAD

I was much interested in the assessment by NACOA of the machinery for making oceanic and atmospheric policy. It is a problem that has deeply concerned the President, not only in the field of oceanic and atmospheric affairs, but in all governmental affairs. It was the President's concern for such matters that led him to take vigorous action in environmental matters in establishing the Council on Environmental Quality, the Environmental Protection Agency, and the National Oceanic and Atmospheric Administration. It was this same concern that led to the President's sweeping proposals for reorganizing the Executive Branch of Government, which would establish the Department of Natural Resources. The Administration welcomes the suggestions of NACOA on ways of improving the national policy-making machinery. It feels that many of the weaknesses inherent in the present organizational arrangements would be remedied by the President's reorganization proposals.

However, at many points in the Committee report, attention has been called to the need for effective mechanisms for coordination between the activities of the many Federal Agencies to insure a coherent national program in both oceanic and atmospheric affairs. The impression is conveyed that no such mechanisms exist. I feel that it should be noted that many mechanisms do exist, although they do suffer from imperfections. Under the Federal Council for Science and Technology, chaired by the President's Science Adviser, and its subsidiary committees, there has been established a Government-wide mechanism for coordination of scientific and technological matters. In particular, in the fields addressed by the Committee, there exist an Interagency Committee for Atmospheric Science and an Interagency Committee for Marine Science and Engineering, which undertake annual reviews of the total Federal effort in these fields, address policy questions, and coordinate agency programs.

We have not carried out such a planning effort, nor do we underestimate its difficulty. We believe, however, that most of the capacity to do so resides collectively in the numerous agencies of government, and that the National Marine Fisheries Service (NMFS), Conferences and Commissions such as the international Convention for the Northwest Atlantic Fisheries (ICNAF), and the Food and Agriculture Organization (FAO) have much of the needed statistical information by which fish populations can be estimated by species and by area. We would be surprised, however, if even collectively they have it all in a form which would permit working backwards from a postulated national market to requirements of a resource without gaps in the analysis. It is not our intention to lay out a detailed plan to mobilize specific agency programs for this effort, but to offer a target by which such programs could be rationalized as a national planning effort under an appropriate lead agency—NOAA, for example—to strengthen the fishing industry. The experts can identify the programs, the budgetary requirements, and test our hypothesis that the benefit would be worth the cost.

Underlying these six steps to rehabilitate the fishing industry is the strategy that we must:

- assure the resource,
- assure the U.S. share of the resource by establishing the principle of preferential access, and
- accommodate the needs of both recreational and commercial fisheries.

Since no nation is in a position to take such action unilaterally, implicit in this proposition is the recognition that, at the Law of the Sea Conference to be held in 1973, stricter control of fisheries by the coastal nations and procedures for their enforcement must be established to make possible both allocation agreements and biological control of the resources. This will necessitate some readjustment in our understandings with some distant-water fishing nations. The issue is not a trivial one, and we address it also in our discussion on Law of the Sea.

RECAPITULATION

Let us review the reasoning of our proposed approach.

- The fishing resources of the sea are limited and subject to extinction unless managed so as to permit a sustainable yield.
- Present fishing technology, especially as developed by protein-deficient nations who themselves do not have sufficient fishing resources, threatens the existence of the species they catch. The economics of the situation drive each nation (indeed each fisherman) to catch specific fisheries even to depletion, because if they do not, they fear some other nation (or fisherman) might do so.
- International fishing arrangements which are species-specific have been

worked out between the interested parties so as to protect and preserve the resource. Because these agreements are usually in response to a downturn in catch, that segment of the industry is victimized before it can begin to recover.

- Many developing nations are anxious to reserve any resource to which they can now lay claim for development at their own pace. They should be willing to agree to aspects of control and management which respect their future.
- The time is ripe for reaching agreement among nations for control of fishing.
- In order to elicit agreements among many nations, the basis of resource management control would have to be biologically rather than politically determined.
- With the fishing resource assured over a period of time sufficient to attract investment, and our national share of the catch reasonably predictable, U.S. private enterprise should be depended upon to harvest it profitably.

The six steps by which a plan for an increased share of U.S. market may be developed are to determine (1) the present productivity of the fishing areas of interest to the United States, (2) their potential under ideal conservation conditions, (3) the necessary critical conservation methods, (4) the agencies which should bear the responsibility, (5) the increased supply of fish which would be available to the domestic market, and (6) a market penetration schedule.

We recommend that NOAA be assigned the lead agency role for developing such a plan, verifying its economic and operational feasibility, and—with Department of State collaboration—for proceeding with its implementation.

The time for us to act is now because foreign competition and the threat to fish resources are now recognized as a national problem rather than a local one. Like the land when the frontier began to disappear, the oceans too now need management in the common interest of those who would harvest its bounty today and be custodian for generations to come.

Weather Modification

Both deliberate and inadvertent weather modifications are possible today. Potential benefits and potential risks are great and raise grave social, legal, economic, and jusisdictional issues. In this section NACOA discusses the effort it believes desirable in: legislation to define rights, responsibilities, and a sense of purpose; research to hasten and extend our abilities to reduce risks; and international agreement to promote peaceful uses of weather modification and to eschew its hostile uses.

ON THE THRESHOLD OF ENVIRONMENTAL CONTROL

NACOA is persuaded that we stand on the threshold of a new era of environmental control. The scientific literature indicates today, that under certain limited conditions, man can increase or decrease rainfall, increase or decrease snowpack in the mountains, and clear fogs over runways and highways. Claims of suppressing hail in the Soviet Union are impressive. A large-scale effort is now being mounted to develop better methods of hail suppression in the United States. The capability to diminish the force of a hurricane (though not the ability to steer it) seems to be near at hand. Further research and development make it likely that some of today's limitations will soon be removed and man may before long deliberately exert an even greater influence on the weather. These developments require our serious attention now.

Our ability to treat these problems has been increased by advances in mathematical modeling of atmospheric processes, increases in the speed and capacity of computers on which these models are run, and new forms of instrumentation. Delivery systems for cloud seeding (rockets, land-based and airborne nuclei generators) and predictive methods for local meteorological conditions are being rapidly developed. These advances make possible methods of measurement and diminish the reliance on a long expensive series of statistical observations which seek to filter a faint signal from a large background "noise." The result is an acceleration of the entire field.

While our capabilities and understanding are growing, so are the dangers. In some parts of the United States operational weather modification has been carried out for nearly twenty years and operations are also being carried out in many foreign lands. The results are often unrecorded or unpublished. There is also increasing concern that man's activities inadvertently affect the weather and thereby modify the climate. The more we have learned about deliberate weather modification, the more reason we have to be concerned over the inadvertent effects of various substances now being released into the atmosphere. These effects can extend to the global scale as well as being local in nature.

The potential benefits from weather control and conscious climate modification are very large. So are the potential risks—particularly from inadvertent climate modification. Furthermore, any technique enabling man to control large-scale phenomena necessarily raises grave social, legal, and economic issues where effects extend across state and national boundaries. There is still time to address these issues rationally before operational weather modification grows at a pace which forces hasty moves. This opportunity should not be wasted, and NACOA believes that the time has come to take action along several broad fronts.

RECOMMENDATIONS FOR ACTION

NACOA sees five areas in which action is required.

- *Legislation:* Legislation to define rights and responsibilities of citizens, the States, and the Federal Government is needed promptly. So is legislation to define means for regulating and licensing private operators, organizational responsibility in the Federal Government, and above all, a sense of national purpose. More specifically, legislation is needed to designate responsibility in ameliorating those weather disturbances that produce public states of emergency, to establish the procedures under which the Federal Government and its employees may legitimately modify the weather, to define the rights and responsibilities of commercial weather modifiers, and to designate responsibility (probably Federal) for monitoring inadvertent weather modification. Regulation is also badly needed, but the issue of separating the responsibility for regulation from promotion of operations, always delicate, deserves more study.
- *Research and Technology:* Development of the technology by which precipitation can be increased, decreased, and redistributed should be hastened through increased funding for basic research in cloud physics and the optical properties of particulates, for computer modeling, experiment design and field work, and the development of remote-sensing devices (e.g., satellites and Doppler radar).
- *Hurricanes:* Research and development of the technology to mitigate the effects of hurricanes should be accelerated. This may involve mov-

ing Project Stormfury from the Atlantic to the Pacific, where the greater incidence of this type of storm makes the cost-effectiveness much higher.

- *Public Policy:* A detailed public examination of the policy issues inherent in weather modification should be undertaken. It seems clear that operational weather modification will open the way to substantial social benefits, but the matter of potential social losses cannot be dismissed out of hand. Increasingly the question will be asked *"Who* benefits from weather modification?" All major consequences of large-scale operational programs should be assessed in advance of their implementation. NACOA believes both national and international reporting systems should be developed. Rarely—if ever before—has there been a more attractive opportunity for creative thinking and planning regarding the impact of a potential technological development upon international relations. This opportunity should not be lost.
- *International:* International agreement should be arrived at and the necessary institutional arrangements developed to eschew the hostile uses of weather modification and to investigate inadvertent changes in the global climate. The Global Atmospheric Research experiment now planned for 1977 can, with some other activities during that period, provide a superb tool for analyzing the vital interaction between long-term oceanic changes and natural or man-made climatic changes. It may be desirable to have an international conference, say in 1974, to discuss issues such as promoting the peaceful use of weather modification and possible collaborative efforts in inadvertent weather modification. The national laboratory dedicated to weather modification, proposed by a National Academy of Sciences study, should be internationalized.
- NACOA wishes to associate itself with the position taken by the National Academy of Sciences that in order to safeguard the life-sustaining properties of the atmosphere for the common benefit of mankind, *the U.S. Government is urged to present for adoption by the United Nations General Assembly a resolution dedicating all weather-modification efforts to peaceful purposes and establishing, preferably within the framework of international nongovernmental scientific organization, an advisory mechanism for consideration of weather-modification problems of potential international concern before they reach critical levels.*

HISTORICAL BACKGROUND

Before discussing existing efforts and suggested changes in more detail, it is useful to review briefly the history of weather modification and how we got to the present state. The era of scientific weather modification began

in 1946 when Vincent Schaefer and Irving Langmuir demonstrated that it was possible to initiate precipitation by dropping pellets of carbon dioxide from an airplane into a cloud composed of water droplets at below-freezing temperatures. This dramatic development led to Project Cirrus, a broad theoretical and field program intended to establish a strong scientific basis for cloud modification. Perhaps the most important scientific finding was that silver iodide crystals were as effective as dry ice in transforming supercooled clouds into ice-crystal clouds, and thence to rain. More spectacular—and more controversial—were (1) an experiment with seeding a hurricane off the east coast, with inconclusive results and (2) experiments by Langmuir that convinced him (but very few others) that periodic seeding of the atmosphere with silver iodide in the southwestern United States produced corresponding periodicities in the rainfall 2,000 miles to the east.

Enough interest was stimulated by Project Cirrus to set in motion two other agency projects. The first was the Cloud Physics Project under the auspices of the U.S. Weather Bureau, the Air Force, and the National Advisory Committee for Aeronautics, conducted from 1948 to 1951. The second was a 5-year Department of Defense project which began in 1952. These serious efforts yielded inconclusive results because of their brevity, the primitive state of the art of instrumentation, and partly because the design of the experiments was not sufficiently sophisticated to filter out the natural variability of the atmosphere.

Meanwhile, a determined band of meteorological entrepreneurs moved in and succeeded in placing nearly ten percent of the land area of the country under commercial seeding, from strategically located silver iodide generators, at an annual cost of between 3 and 5 million dollars. The movement spread to 30 other countries.

Sufficient interest and controversy were generated by these results that Congress established in 1953 an Advisory Committee on Weather Control to study and evaluate the results of private and public experiments. Its report issued in 1958 was cautiously optimistic, concluding that increases of 10 to 15 percent in rainfall were induced by seeding spring and winter storms in the mountainous areas of the western United States. More long-term research was recommended with special responsibilities being assigned to the National Science Foundation. The Advisory Committee report was subjected to considerable attack, primarily on statistical grounds. However, the NSF did mount a modest but sound program of fundamental research and field experimentation, which laid an important basis for the next decade. As a result of extravagant claims and questionable practices by a few commercial cloud seeders, and controversy on statistical interpretation of experimental results, the field did not flourish during the early 1960's.

A two-pronged study was initiated in 1963 and 1964, by the National

Academy of Sciences and a Special Commission of the National Science Board. Their reports, issued early in 1966, were moderately optimistic. The conclusions of the 1953 Advisory Committee that the order of a 10-percent increase in precipitation can be expected from seeding orographic storms in western United States were substantiated. Subsequent studies by the Academy and the Interdepartmental Committee for Atmospheric Sciences have reinforced early findings.

PRESENT STATE OF THE ART

- For certain meteorological conditions the evidence is persuasive that it is possible to increase precipitation by substantial amounts and on other occasions to decrease precipitation by substantial amounts.
- There is ambiguous evidence that the effects of seeding may influence precipitation at points 100 to 200 kilometers from the site of the seeding. This matter must be clarified.
- It now appears possible to acquire the additional knowledge necessary to predict the effects of seeding on a wide variety of cloud types and systems (convective, orographic, stratiform, migratory storm systems, etc.) in different geographic areas from reasonably realistic computerized cloud models.
- Supercooled fog can be dissipated on an operational basis.
- There is encouraging evidence that hail can be suppressed.
- There is encouraging evidence that the intensity of winds in a hurricane can be reduced.
- There is evidence that further development will lead to operational techniques for decreasing the frequency and duration of cloud-to-ground lightning discharges, with a subsequent reduction in forest fires.
- Advances in remote-sensing techniques are the first steps toward methods to modify tornadoes.
- No completely accepted technique yet exists for dissipating warm fog, but the potential economic benefits and the encouraging prospects of such a capability warrant further research.
- The prospects of inadvertent modification of weather and climate by changing the chemical composition of the atmosphere, the particle concentration, or by the discharge of heat are so real, and so likely to be realized within a matter of decades, that a major program of research appears to be warranted.
- Weather modification issues now reach to the stratosphere. It has been suggested that exhaust emissions from SST's may decrease the ozone concentration at high altitude and lead to an increase in ultraviolet radiation at the Earth's surface. Fortunately, the way appears clear to resolve this question before SST's are operational.

Ongoing National Projects

The Federal programs in weather modification are coordinated under the Interdepartmental Committee for Atmospheric Science (ICAS) of the Federal Committee for Science and Technology. A number of the research projects representing voluntary combinations of resources of several of the interested Federal agencies are National Projects. They include snowpack augmentation, surface-wind reduction in hurricanes, increase of natural rainfall in areas where needed, reduction of damaging hailfall, spreading heavy Great Lakes snowfall over a wider area, and improving visibility in warm and cold fogs. Though agency funding for weather modification has lately been increased—in the last 2 years from $16 million (FY '71) to $20 million (FY '72 Estimate) to $25 million (FY '73 Budget)—the projects have characteristically been inadequately coordinated, underfunded through fragmentation, often not backed up by basic research, and undertaken with obsolete equipment. This is not a criticism of any specific project, but of the lack of central planning and execution.

SOME POTENTIAL BENEFITS

Although too much reliance should not be placed on benefit-to-cost analysis, attractive ratios are already being achieved in some areas of weather modification. The Southern California Edison Project in the upper San Joaquin River Basin in the Sierra Nevada range has been operated continuously every winter since the 1950-51 season. Although the exact figures are proprietary, the meteorologist in charge reports that annual runoff has been increased 8 percent over the lifetime of the project.* Bureau of Reclamation studies indicate something like a 10 to 1 ratio of benefit-to-cost for orographic precipitation enhancement of this sort.** However, these operational programs are limited in number and have remained relatively constant through many years. Many programs having large potential benefits at attractive operational costs are not operational today due to limitations in the present technology. This translates to limitations on the resources (laboratory facilities, scientific manpower, instrumented aircraft, computer time, etc.) necessary to improve the technology.

Hail suppression has been operational in the USSR for many years with reported benefit-to-cost ratios of as high as 17 to 1. Lightning-caused forest fires produce losses in excess of $100 million annually and destroy valuable forests. An operational technique for lightning suppression is expected to yield a benefit-to-cost ratio of at least 5 to 1. A semioperational program in Alaska now beginning its fourth season reflected this ratio in the 1971 summer season. Cold fog dispersal over airport runways is now op-

* Private communication from Robert D. Elliott, North American Weather Consultants, Santa Barbara, Calif.

** "Some Considerations of Benefit-to-Cost Relationships Regarding Use of Weather Modification," by Loren W. Crow, April 7, 1972, Contract to NOAA, LWC #99.

erational, where this type of fog is prevalent, with a return in benefits six times the cost of the program. Warm fog is even more prevalent, and it seems likely that a similar benfit-to-cost ratio will be attained when the operational techniques for its dispersal are perfected.

It is estimated that the hurricane modification program alone, when operational, would cost about $5 million annually and could reduce property damage and related costs by $100 million annually, a benefit-to-cost ratio of 20 to 1.

There is another vast area which suffers a shortage of annual precipitation, reaching drought proportions in far too many years. This is the northern Great Plains area of the country. In this region, where summer rainfall is both scanty and sporadic, crop-production technique is based on trapping a portion of 1 year's rainfall to help support grain production in the subsequent year, and one crop is produced each 2 years per unit of land area. On the basis of soil quality, the potential exists for annual crops given a modest increase in rainfall. This area, which has been largely ignored by the Federal Government in its weather modification program, should be explored.

TECHNICAL OBSTACLES TO PROGRESS

Progress in any technical endeavor depends upon our theoretical understanding, our ability to measure, our facilities for experimentation, and our ability to mount and manage large-scale field experiments. We have made significant progress in all four areas in the last decade.

Understanding

In order to make progress in the National Projects and other applications of weather modification, a great deal more must be learned about the natural weather processes and how these processes can be modified to bring about the desired effect. Some of these areas where measurements are essential include:

- origin, detection, and counting of natural ice nuclei;
- modes of nucleation, optimum particle size and numbers, and inadvertent sources of artificial ice nuclei;
- detection, counting, and variability of natural cloud condensation nuclei;
- inadvertent sources of artificial cloud condensation nuclei;
- water vapor, liquid water, rate of riming, cloud drop size, etc.;
- ice crystal type and size; and
- temperature in cloud, vertical and horizontal flow, electrical field, etc.

Instrumentation

The key to increasing our knowledge of the processes involved is accurate measurements of all of the needed information. This requires de-

velopment of improved instruments and the means to test and calibrate these instruments under actual or simulated conditions. The priority areas requiring attention are: (1) airborne instrumentation that can rapidly and accurately provide measurement of the type discussed in the preceding paragraph; and (2) more effective nucleating agents and more efficient methods of getting the nucleating agents into the target area.

Significant progress has been made in recent years in satellite technology and in remote sensing from aircraft and from the ground. NOAA's coming high resolution geostationary satellite and its developments in Doppler and optical radars and other remote-sensing techniques will make significant contributions to the advancement of the technology of weather modification. Satellites and remote sensing should be able to tell us something of the physical changes taking place within the seeded cloud and thus aid in the evaluation of field experiments.

In the final analysis, however, it is the precipitation on the ground and the runoff into the rivers and reservoirs that count where precipitation enhancement is the goal. Measuring the true difference in precipitation and runoff between seeded and unseeded areas continues to be the best hope for assessing results, but a vast improvement in this area is needed. Here radar, in combination with recording rain gages, represents the primary hope.

Facilities

A significant one-time investment in facilities will be required in order to support the developmental programs. The more important of these include:

- cloud chambers to stimulate the natural environment to enable the study of the natural processes involved and how they are affected by artificial stimulation.
- a test and calibration facility. NOAA has in operation the analog to what is needed here, i.e., National Oceanographic Instrumentation Center. Here new instrumentation developed by both public and private organizations are tested in modern facilities, and reports are issued as to their accuracy, reliability, maintainability, etc. The Center also provides a calibration service to both public and private organizations. Such a facility is urgently needed in the weather modification field.
- modern well-instrumented aircraft. A majority of the needed aircraft already exist in the private sector. The Federal Government need only be concerned with providing the minimum number of heavy aircraft equipped with sensing and recording systems, radars, and seeding capabilities required of the program. NACOA notes with concern the need to cancel NOAA's planned move of its hurricane modification project (Project Stormfury) to the Pacific for lack of such aircraft

Field Experimentation

As discussed previously, the Federal agencies are currently engaged in a variety of field programs. In almost every case the field programs are restricted by limited resources of one kind or another to the point where the programs are suboptimal and progress has been at a snail's pace. One would hope that the primary objectives of Federal programs to enhance rainfall, eliminate fog, and suppress hail and lightning would be the transfer of this technology to the private sector where it could produce an expansion of existing industries and create new ones.

What is badly needed is a field experiment which brings to bear all of the resources that can contribute to the success of the experiment. The experimental area might be somewhere in the Great Plains and should operate on a year-around basis. Experiments should be carried out with summer cumulus, winter upslope stratus, and winter migratory storms. The program should employ the latest in meteorological satellite and remote-sensing technologies, well-instrumented aircraft, and an increased density of surface, upper air, and radar observations of the National Weather Service. The emphasis should be on providing the tools necessary to fully measure and observe the physical and dynamic changes taking place both naturally and under the influence of seeding. Maximum effort should be made to determine results through direct observation of the changes in the cloud. In addition, the experiment should be designed in such a way as to provide optimum conditions for a statistical evaluation (e.g., random crossover design). The technologies developed by NOAA in Florida with dynamic seeding of tropical cumulus, by NOAA with seeding of low stratiform clouds over the Great Lakes, and by Bureau of Reclamation supported programs in the Dakotas and Texas provide the initial groundwork for this effort. The field experiment should be concentrated in an area less than the size of a State. From this experiment should come the basic knowledge which is needed for most phases of weather modification.

INSTITUTIONAL FACTORS AND REGULATION

Weather modification today within the Federal Government is carried out by seven agencies to meet their individual mission needs. The Department of Transportation is concerned with the effect of fog on airport operations, the Department of Agriculture is concerned with the reduction of lightning-caused forest fires, the Department of the Interior is interested in increasing the water supplies in the West, and the Department of Commerce is interested in abating hurricanes and other severe storms and in reducing or increasing precipitation for a wide variety of purposes. What is lacking is a central focus for the overall effort. Some progress has been made in this direction with NOAA having been assigned responsibility for monitoring the weather modification activities

within the country, both Federal and non-Federal. More importantly, though, is the need to have a single Federal agency responsible for taking the lead in development of the technology of the overall program. The present fragmented approach is moving the country ahead in weather modification in an erratic fashion.

Certain basic facilities and services which represent common needs of most Federal programs do not exist. Instrument development programs are critical to progress in weather modification, yet no focused program in this area is in evidence. There is a strong need for a central Federal facility to test, evaluate, and calibrate instrumentation and equipment used in field experiments. Again, no such facility exists. The lead agency should be responsible for doing the type of field experiment recommended for the Great Plains area. It should focus on drawing on the research results of the NSF and other Federal agencies and testing these in an operational environment. The end objective would be a feedback to the mission-oriented programs of the other Federal agencies, and a technology transfer to the private weather modification sector.

There is an immediate need for some form of regulation. As the Federal Government invests increasing resources in major field projects such as the National Hail Research Experiment and the Great Plains project, it becomes imperative that these experiments not be compromisd by other seeding activities on their peripheries. To illustrate the problem, there recently was a test carried out to determine whether a seeding program upstream of a field project could be affecting the project. The results showed that 20 to 30 percent of the seeding agent introduced 100 miles upstream was actually contaminating the field project. In addition, the National Science Foundation has reported that two major weather modification projects supported by the NSF in the western United States were seriously compromised by unregulated cloud seeding in the vicinity of the projects. In one of the cases, the Foundation investment of over a quarter of a million dollars was negated by the lack of regulation.

Regulation at this time should be the minimum necessary to ensure that critical Federal experiments are not vitiated as a result of contamination by a nearby seeding activity and to ensure that all commercial operators are licensed and meet certain specified standards to protect the populace from unsafe seeding procedures.

EVALUATION

Experimental weather modification is an activity that does not lend itself to demonstrating a precise connection between actions and outcomes. The accuracy of assessment after the fact can be increased by better use of advanced instrumentation such as geostationary satellites, modern radars, computer models, aircraft probes, nuclei counters, etc. However, even with the best of instrumentation it is impossible to measure all variables over

a region of several hundreds of square miles. Even with unlimited funding, exact evaluation of an experiment is not possible. In the case of operational weather modifications, there are economic limits to the instrumentation that can be afforded. Therefore, decisions regarding operation must be made with only part of the data at hand. Whether the missing data are of serious consequences depend upon the specific circumstances. If operational weather modification is to be more generally applied, the decision making apparatus for determining when and how to permit operations needs to be improved.

Therefore, NACOA wishes to emphasize need to integrate statistical and other analytical approaches (mostly computer modeling) to reduce the uncertainty in evaluating the efficacy of weather modification. NACOA urges all agencies that sponsor research and development in weather modification, and all those who conduct operations, to explore and utilize both statistical and nonstatistical techniques and to conduct studies designed to bring these approaches together.

The Coastal Zone

An increasing population and increasing economic activities, poured into the attractive but confined space of the coastal zone, give rise to a host of conflicts and problems because of the incompatibilities of unrationalized multiple uses. The coastal zone is exceedingly complex naturally, socially, and economically, and every aspect of planning, negotiation, understanding, agreement, and implementation seems to involve many levels of government. As a result the management aspects of the coastal zone take on greater significance than is usual where an intimate mix of institutional and scientific activity is required. NACOA finds that prompt action on coastal zone management problems is urgently needed. These needs have already been pointed out in many reports including the milestone Stratton Commission Report issued three and a half years ago. NACOA is disturbed at the lack of definitive progress by the Federal Government on this matter, and the findings strongly underscore the need for action. State governments are already moving in this area, and the public is calling for action. NACOA recommends prompt enactment of coastal zone legislation.

THE NEED FOR LEGISLATION

Pressure is building in the coastal areas of the United States. Increasing population and increasing economic activity, crammed into a confined space, mean myriad conflicts which result from incompatabilities of unwise and unconstrained multiple uses.

The coastal zone is a pressure cooker precisely because its bounds are limited. Yet because it is the interface between land and sea it is a zone which is more complex naturally, socially, and economically than the continental interior. In addition, it is a zone in which every aspect of planning, negotiation, understanding, agreement, and implementation seems to involve more levels of government than any other zone.

There is ample evidence that the public is impatient with the lack of meaningful progress in this area and is demanding much more than a token commitment on the part of its government. The problems of the coastal zone now have too direct an impact on too many people for its

issues to be conveniently swept under the rug. An impressive manifestation of these concerns was evident at the recent Stockholm conference on the environment where important American citizens, acting as representatives of several hundred nongovernmental organizations, came to be heard on these and related matters. The fact that they felt impelled to act on their own, outside the normal channels of government, testifies not only to their great concern for the subject but also their lack of confidence that the established system would produce an adequate response.

The problems of the coastal zone have an extraordinary range: Usage problems include deep-draft oil terminals to alleviate the growing energy crisis vs. conservation of shore areas for recreation and protection of living marine resources; commercial vs. sports fishing; condominium development within jumping distance of the breakers vs. preservation of the dunes for their inherent physical and aesthetic value; marinas, housing developments, and industrial sites vs. wetlands; roads vs. hiking trails. Technical and scientific problems include the need for understanding the processes of circulation, stability, waste-receiving capacity, marine productivity, and habitat to mention only a few. Then there are the problems of man's impact on the ecosystem from dredging and filling, engineering and construction, contamination of water, water diversion, and many others. The list is almost endless.

Several features are worthy of special mention. Since it is the tidal tributaries and the nearshore waters of the coast that receive outfall effluents and surface and subsurface drainage and are immediate to atmospheric injection sources, pollution of the oceans is determined largely by what happens in the coastal zone. Most of the species on which commercial or recreational fishing industries depend are dependent on the waters, wetlands, and bottoms of the coastal margin. Finally, the coastal zones of the world are gateways to the oceans through which must pass most commerce serving man's marine-related needs. The regulation of man's activities in the coastal zone involves balancing social, economic, political, and national security trade-offs of great complexity with local, state, regional, national, and international consequences.

This situation has been recognized for some time and this recognition has during the last 5 or 6 years led through a lengthy series of studies, commissions, and policy resolutions to a gathering momentum for comprehensive legislative action, presently represented by two well-conceived coastal zone management bills under active consideration by the Congress. NACOA feels that the passage of suitable legislation has been delayed much too long and urges prompt enactment of one of these. At this time, we strongly favor legislation devoted exclusively to the management of the coastal zone unencumbered by the larger issue involved in land-use management legislation applicable to the entire nation. We feel it is vital that this legislation also provide for the establishment of research and

technical advisory sources closely coupled to each level in the management hierarchy including local, State, and Federal echelons. The basis for these recommendations follows.

THE PROBLEM

It is widely recognized that the coastal zone problem is first and foremost a management problem, and that the crux of the management problem is jurisdictional.

This is not to say that the other elements typifying a management problem are all in hand. The Stratton Commission, for example, mentioned several, including the neglect accorded marine affairs by State governments at that time and their failure to develop and implement long-range plans. Furthermore, there is a continuing and undesirable gap between those responsible for coastal zone decisions and the technical and scientific expertise needed to help them assess the consequences of their decisions before they are made.

But the last few years have seen a growing awareness of the importance of the problem and a broad consensus regarding the major goals. These were described by Lawrence, the Executive Director of the Stratton Commission, during the 1969 Hearings on the Coastal Zone, as including:

> ". . . the urgent need to halt the deterioration of the Great Lakes and estuaries, provide more adequate seaside recreational opportunities, improve our ports, accommodate expanding industries seeking shoreline space, capitalize on opportunities to make more effective use of the waterfronts of coastal cities, and protect our coastlines from accidental oil spills and other forms of pollution." *

It is our conviction that all these goals can be met. The plans to do so must be drawn up in such a way as to take advantage of the full range of possibilities represented by the coastal zone as a whole, adjusting local plans to keep within the guidelines derived from the larger context. For this, resolving the jurisdictional problem is mandatory.

To see why this is so, consider the ownership of the coastline for example. Excluding Alaska** about 70 percent (26,000 miles) of the 37,000 miles of U.S. shoreline is in private hands, 12 percent (5,000 miles) is

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* "Coastal Zone Management Conference," Hearings before the Subcommittee on Oceanography of the Committee on Merchant Marine and Fisheries, House of Representatives, 91st Congress, October 28-29, 1969.

** Prior to the recently approved Alaska Native Lands Claims Settlement Act, the extent of whose impact on land ownership in the coastal zone is not yet known, only 1 percent of Alaska's 47,000 miles of shoreline was privately owned. Most of it (88 percent or 41,000 miles) is owned by the Federal Government, and the rest (11 percent or 10,000 miles) by State and local governments. Less than one-fifth is in any way developed, and more than half of that is used for recreation. In "the lower 48" plus Hawaii, more than 40 percent is developed, two-thirds of which is used for recreation. "Report on the National Shoreline Study," Department of Army, Corps of Engineers, August 1971.

owned by State or local governments, and 11 percent (4,000 miles) by the Federal Government. The ownership of nearly 3,000 miles or 7 percent is uncertain. Seaward below mean high water, the State generally has jurisdiction, in most cases out 3 miles.

Although Alaska's coastal zone has important management problems, those with difficult jurisdictional properties lie elsewhere, and this discussion will focus on these. The greatly complicating factor in the non-Alaskan coastal zone is of course the problem of how to deal both equitably and wisely with the private interests involved when they begin to conflict with each other or the public interest. One illustrative statistic —two-thirds of the 2,700 miles of critically eroding shoreline is privately owned, virtually all of it under extensive development. And "significant" erosion affects over 40 percent of the shoreline, again much of it traceable to man-made developments.*

Accordingly, when NACOA undertook to review the present status of the coastal zone management problem, it arranged for briefings from representatives of local governments, State governments, intrastate and interstate regional commissions, as well as from the major Federal agencies involved, the Department of Interior, the Department of Commerce, EPA, the Department of Defense (including both the Corps of Engineers and the Navy) and the Department of Transportation (the USCG). In addition, points of view representative of other Federal agencies, industry, and of the conservation community were also sought. Using the judgment of knowledgeable Committee members to supplement these briefings, we feel the following factors are of special significance.

- Though what is done on land does affect the coastal zone, the major indicators of impact are marine. Hence, the coastal zone poses unique problems for management, many differing in kind as well as degree from those facing inland land-use management.
- The coastal zone—and its problems—differs from one place to another in fragility and the need for protection, as well as in biological productivity, and the presence of mineral resources. Management approaches and priorities for early attention should differ for estuaries, wetlands, exposed beaches, and unique areas such as the Everglades from those applied to more stable systems such as the coast of Maine, areas already heavily developed such as New York Harbor, or where extensive oil or mineral deposits underlie the region such as along the Gulf Coast of Louisiana.
- Priority attention and management decisions should also be determined by the relative severity of the environmental impact of the various types of activity proposed. Activities producing permanent or

* "Critical" erosion is that where action to stop it is felt justified in the light of economic, safety, demographic, or ecological factors. "Significant" erosion is undesirable but efforts to arrest it may not be justified in these terms. *Ibid.*

preemptive changes demand that a wider context and broader set of considerations be applied to regulatory decisions than do activities whose impact can be controlled or rectified.

- It should be recognized that the cumulative effects of multiple similar activities are far different from those of a single case. The effect of one offshore oil well or of one retirement village is not the same as that of 25,000.
- The scientific knowledge needed as a basis for sound management decisions is spotty and generally inadequate. Institutions for bridging the gap between existing knowledge and contemplated action are relatively few and weak.

COASTAL ZONE NEEDS FROM SEVERAL VANTAGE POINTS

Since local, regional, State, and Federal interests and jurisdictions may all impinge at once on various coastal zone issues, and the management problem has a large jurisdictional element, NACOA found it instructive to hear representative views from each level. We will typify them in what follows by quotation and by paraphrase. While they differ in a number of respects, there are two related jurisdictional principles which all these views tend to support:

- Regulatory authority must be associated with existing political entities or combinations of such entities even when the phsysiography or other features of the coastal zone region to be managed are not completely coincident.
- The State and its constitutional powers make it the key political entity in coastal zone management in that localities and intrastate and interstate regional authorities derive their powers from the State or States involved.

Local Government

We note that local government, be it in the city in highly populated areas, or the county in areas of low population density, is closest to the people, and its elected officials must raise much of the money to carry out decisions made regarding their communities. The system is likely to work best if they have some latitude in land-use decisions, subject to conformity with reasonable environmental standards and carefully conceived regional or state guidelines. The greatest current handicap is the unavailability of the right kinds of expertise. To use the words of a discussant,

> "We are in an era when politicans, managers, and scientists of many disciplines must get together in a systematic approach using all our resources . . . There is a need for adoption of standards, criteria and priorities at the Federal and State level within which local agencies can operate . . . There is a need for the Federal Government to identify nationally significant areas and to identify uses in those areas, to include Federal procurement of land if necessary. The States should follow suit within their jurisdictions.

"In the remaining areas, local government should be permitted to act within criteria established. Should the criteria work hardship on local agencies, there must be subvention . . . Local government must have more ready access to either direct interdisciplinary advice or funds with which to obtain such advice . . . Private property owners must receive some protection against costs disproportionate to benefits they may receive." *

State

It is at the State and local levels that most of the pressures have been felt and most of the attempts at solution have been made. Though helpful legislation has been passed, the result is what one would expect from catch-as-catch-can solutions—the problems simply get bigger and move up in priority. Although several States have moved toward comprehensive coastal zone management arrangements, this has not been, in general, true in the past. State experience can be most instructive for action at the Federal level. As one State official put it, the problems characterizing State efforts at coastal zone management during the last 20 years have arisen from "expedience, inexperience, and lack of political interest." Programs have often grown without sufficient statutory authority, guidelines, or priorities, resulting in a tendency to make ad hoc decisions on each issue as it arose. Continuing demands for more and more mineral production, flood control, hurricane protection, navigation channels, and the reclamation of wetlands for human habitation and agriculture, he informed NACOA, have produced tremendous pressures on an ill-defined set of environmental priorities.

"Such an approach to environmental management, at best, is partially effective and only prolongs the agony of environmental degradation by partial control and regulation of specific destructive activities and projects but which fails to accomplish very much control over the accumulative and quantitative effects of multiple actions. At worst, (there) are cases of overzealous environmental agencies and individuals which take a completely negative position on all environmental manipulation and which would bring progress to a halt. Such an inflexible position is self-defeating since neither the executive and legislative branches of government nor are industry and the public prepared for such drastic change. The probable result will be rebellion against environmentalists and the environmental position unless all branches of government and a majority of the public is fully aware of the need for and the ramifications of such regulatory severity . . .

". . . many of the same errors are being repeated on a national level as the Federal Government wrestles with problems of coastal and environmental management. From the state's position, the Executive Branch of Government has not spelled out the national environmental policy in sufficient detail and clarity, particularly in the area of setting priorities, and there is much evidence that the Legislative Branch is still proposing vast public works projects and industrial development that are environmentally disruptive while expecting and promising environmental protection and management in the same locality. Legislative demands for incompatible activities create an almost impossible position for state

* "Statement for Presentation to NACOA," 27 April 1972, George Dawes, Harbor and Tidelands Administration, City of Newport Beach, Calif.

and Federal administration to resolve and guarantee environmental stability . . .

"Much more research specifically aimed at gathering data to make environmental management determinations is needed:

- The research should be associated with and geared to furnish data to specific planning bodies or agencies.
- Research may be carried out by Federal agencies, state agencies, and universities but it should be specifically oriented to produce needed answers in the shortest possible time. Vague, undirected or uncontrolled research programs, particularly in universities, will be inefficient and costly. . . ."

In conclusion, NACOA was told,

"It should be obvious that the technical personnel of the states is more familiar with and in a better position (than the Federal Government) to make local judgments concerning environmental impacts. Local political pressure and public demand, however, may negate efficient local management unless specific national and state environmental priorities and policies are developed.

"Once a clear and well-defined national policy is established and accepted by the public and local governing bodies, then workable guidelines and planning can follow, and the states could be expected to do most of the planning and decision making." *

Regional

There are two sorts of regional organizations, one intrastate and the other interstate. Each has its problems and unique applications, the former being built usually about a unique feature or situation (for example, San Francisco Bay), the latter about regional needs that transcend State boundaries (for example, the New England River Basins Commission). In both cases, however, multiple jurisdictions must be welded into a single ad hoc jurisdiction or district for some specified purpose. And in both cases active citizen initiative and broad public interest are probably crucial, since State action is required if the regional body is to have regulatory authority.

Referring to the San Francisco Bay Project, "The experience," says a recent Conservation Foundation Publication **

"provided many lessons to those who seek to protect other estuaries and other national resources, even if there is no patterened, ideal way to achieve environmental protection that will work everywhere. 'Much more important are the personalities and the quality of local politics.' . . . In other areas, other political arrangements may be needed. Several states might be involved in a resource. A compact, or a full regional government might be desirable. But it is worth reviewing the major ingredients of the San Francisco Bay story—because each of them *may* have been indispensible there and could be crucial elsewhere: A resource that was highly valued . . . rising environmental concern . . . factual basis . . . nucleus of concerned, hard-working citizens . . . legislators to take up the cause . . . campaign for legislation . . . coverage, from the press . . . an agency

* "Coastal Zone Management Problems—The State's Position," prepared for presentation to NACOA by Lyle S. St Amant, Louisiana Wildlife and Fisheries Commission, New Orleans, La.

**"The Saving of San Francisco Bay," Conservation Foundation, Washington, D.C., 1972.

which provides a forum for all the interested governmental jurisdictions and other parties to work out their problems together . . . non-nonsense staff and a respected, diplomatic chairman . . . public hearings and public debate . . . power to control uses of the resource it seeks to protect . . . Finally, of course, a plan and a law . . .that is enforceable . . . respected, and that draws wide support from the community."

The bite in the San Francisco Bay Group could very well have been its regulatory power. This is somewhat unusual at either intrastate or interstate levels such as, for example, the New England River Basins Commission. Although the NERBC has been influential and effective in a number of specific instances, it has authority only for planning. Formal interstate compacts may be increasingly desirable as management needs, which cross State boundaries, multiply in number and severity.

IMPLICATIONS AT THE FEDERAL LEVEL

We wish to emphasize that the *management* aspects of the coastal zone take on greater significance than is usual where an intimate mix of technical and scientific work is required.

NACOA believes that only by proper management can one get a handhold for progress in the coastal zone, that the powers vested in the States make their role pivotal, that the lead-agency concept for Federal involvement must be used, and that scientific and technical support must be made available and responsive to all levels of authority.

- Proper management is the key to progress in meeting and overcoming difficult problems in the coastal zone and in learning to anticipate them.
- Technical and scientific knowledge, without which proper management would be impossible, can be encouraged to serve the needs of that management.
- Management is in turn subordinate and in service to the local region—the coastal State—and derives a large part of its technical problems, goals, and force of implementation from the locality.

NACOA therefore advocates a National Coastal Zone Program whose two principal elements are Management (planning, legislation, development of regulations and standards, monitoring, and enforcement) and Research and Development (basic and applied research, engineering development, technical assistance, and advisory service). In order to make certain that the necessary collaboration between these two major elements is ingrained in the structure of the national program on the coastal zone, NACOA further urges that the research and development, as well as the management elements, be tied closely to existing geographic and political jurisdictions.

The summary of views held by various levels in the jurisdictional hierarchy indicates that they are looking for Federal action to provide

a number of vital elements now missing in a satisfactory coastal zone management system. Among the more important of these are:

- the articulation of national policy regarding the management of the coastal zone, and an effective means of governmentwide coordination in its implementation;
- the identification of nationally significant coastal zone areas, the specification of uses suitable for these areas, and initiative, including purchase, to assure appropriate development;
- for the remaining areas, the establishment of standards, criteria, and priorities of use within which lower levels of government can act on their own initiative;
- protection or compensation for private property owners against costs disproportionate to benefits;
- regulatory procedures, including procedures for appeal, that are uniform, reasonable, direct, and centralized;
- the provision, through support of appropriate research and services programs and institutions, of accessible, responsible, and competent technical expertise available to all levels of decision makers.

Since 1965, the major studies on ocean affairs, particularly the Stratton Commission Report, emphasized the importance of a prompt attack on coastal zone problems. Many of these recommendations are apparent in the U.S. oceanographic program today. A particular example is the Sea Grant Program supporting several institutions which are developing a capability to assist State and local governments in technical aspects of coastal problems. Basic legislation in coastal zone management is overdue both at the State and national levels. Some forward-looking states have made considerable progress in the areas, but the Federal Government is lagging badly.

RECOMMENDATIONS

In this chapter NACOA has discussed the basic elements that national coastal zone legislation should encompass and encourage.

The Senate has unanimously passed the Magnuson Coastal Zone Management Act—S. 3507, introduced by Senator Hollings—which largely satisfied the requirements we have put forward. A similar bill—H.R. 14146—has been introduced by Representative Lennon in the House. NACOA strongly recommends the passage and enactment of one of these bills.

There are competing legislative proposals which would have the effect of absorbing coastal zone management into a much larger national land use program (H.R. 7211 and S. 992). We do not support this approach for a number of important reasons: (1) The problems of the coastal zone have been very well defined by the work of earlier national and

State commissions. In the much larger land-use bill, the urgency would be diffused in the enormous variety and complexity of both physical and social problems that the larger act involves. (2) The technical problems, including the biological aspects, are sufficiently distinct that there could be no net gain, and almost certainly a loss, by mingling marine-oriented technology with land-use technologies. (3) The logical place in the Federal Government for a land-use program is the Department of the Interior. By contrast the governmental reorganizations of the last 7 years have placed most of the expertise in coastal zone affairs in Department of Commerce, in the National Oceanic and Atmospheric Administration. Further, other agencies that have expertise in this area, such as the Corps of Engineers, have strong links to NOAA.

We consider S. 3507 and H.R. 14146 progressive in the sense that they match very closely the developments of many of the coastal states, who are moving toward separate coastal zone programs of their own. H.R. 7211 is regressive in this respect. The movement towards separate management of the coastal zone is clearly supported by the National Governors' Conference, which for 3 successive years has strongly endorsed national coastal zone legislation. The same movement has been supported on the parliamentary level: *viz,* in the National Legislative Conference.

The Committee feels very strongly that there should be strong coupling between the information-gathering and the management functions. The legislation that we support does not do so explicitly; however, the fact that the Department of Commerce, with NOAA, would have the primary Federal responsibility for implementation of this program (under S. 3507 and H.R. 14146) assures the opportunity of this coupling. H.R. 7211 creating a land-use program centered in the Department of the Interior would impede achievement of this desirable goal. The legislation we favor does provide that the Secretary of Commerce will prepare rules and regulations which State coastal zone management plans must meet. NACOA observes that the Secretary, with the expertise available to him through NOAA, is in a position to recognize the necessity for close coupling of the information-gathering and the management functions in formulating these rules and regulations and to monitor state activities to see that this coupling actually occurs. Indeed NACOA is specifically charged with oversight of these issues and intends to make further recommendations in the future.

Moving Ahead

This first NACOA report is a beginning. It begins to examine the spectrum of critical national needs and priorities in the light of our Nation's role in man's stewardship of the oceans and atmosphere.

These are not abstract, remote problems for a few experts to worry about. They are basic to this country's well-being and perhaps even to its survival. It is already very late. In some places the oceans, coastal waters, and atmosphere have been degraded and their resources despoiled. In a few areas, we are close to the peril point and little time is left to turn matters around.

The preceding chapters provide NACOA's assessment of how things now stand with respect to our interface with other members of the world family, our fisheries resources, weather modification, and the condition of our coastal zones. We are not in good shape in many of these areas, and we are not moving rapidly enough or confidently enough to put our affairs in order. Each of the preceding chapters sets out the condition in which NACOA finds us, and the priorities as NACOA perceives them.

How did we get in this shape? What failings allowed us to arrive at situations tending toward irreversibility? What should we do to correct the failings?

National policy is the sum of governmental and private decisions and actions. Neither government nor private parties have been sufficiently alert to the emerging problems, nor prepared to make the adjustments and sacrifices necessary to deal with them.

The machinery for national policy making for marine and atmospheric affairs has been, and remains, weak and disunited. Responsibility and accountability are divided. Coordination is inadequate. Priorities are slow to emerge, decisions even slower, and resources to implement these priorities are too little and too late.

The problems addressed in this first NACOA report all show a common pattern: they arise from the behavior of a system that takes action

only in a crisis. Man's increased power to exploit the environment, and to destroy it, has brought an end to the era in which societal decisions could be based on a frontier philosophy. We no longer deal with unlimited resources of energy and materials. The shoreline is not unlimited. Species can be made extinct by over-zealous exploitation. Once we could fire a pistol that sent the settlers rushing to fill the vacant lands. Today, the ocean frontage is overcrowded, the pioneers have no new lands to conquer, but we still make decisions as though they did.

The established procedures for determining social actions do not reflect the new realities; and the deficiencies can often be traced to a failure to use available knowledge. The system should therefore address the need to keep information about the *realities* of our environment ever before the decision makers, be they legislators, city managers, governmental executives and, ultimately, our citizens. The system should also guarantee that those who gather data about the environment do so to support the informational needs of decision makers. The results of decision making should square with the realities; data gathering should be responsive to needs.

Each system for decision making should incorporate a system of checks and balances, permitting decision makers the opportunity to influence those who develop the information, and to give those who develop the information an opportunity to review and influence the decision making. Any system which does not display the characteristics of candor and consistency necessary to popular support will not be effective.

The pattern that should be adopted is clear. Its absence can be discerned as a reason for failure of existing attempts to reconcile competitive uses of common resources. This pattern emerges from the common sense observation that you cannot manage something you do not comprehend and you do not appreciate what you need to know until you try to manage something.

Some of the decision problems are highly decentralized, such as shoreline protection and development or estuarine development and conservation. Others are highly centralized, as is the case with Law of the Sea negotiations or severe storm modifications. But each resource problem, at whatever level, requires the close integration of fact finding and evaluation of alternatives.

To guarantee that these processes are carried out with integrity, it is necessary to provide for the generation of national policies. These policies should define the national interests and should provide guidelines for the resolution of conflicts which arise in pursuit of these policies. To make these points explicit, NACOA strongly urges that:

- legislation establish, in every case, both a focus of policy responsibility and a center for assembling the information upon which decisions can be made—and explicit provisions to see to it that these interact with each other;

- a strong policy-level office be maintained, reporting to the President and with outreach to state governments and private interests to focus and coordinate national policies, priorities, and implementation;
- the Administration and the Congress reopen the unfinished business of the Stratton Commission with respect to the structure, organization, roles, and missions of NOAA and other primary agencies charged with responsibilities for the oceans and atmosphere. The present arrangements, while a distinct improvement over the conditions which preceded the Stratton Report, still fall short of providing the fully integrated and accountable management system that is required. Scattered and divided responsibility is unlikely to produce the perspectives and decisions needed for arriving at goals and priorities for the oceans, the atmosphere, and the coastal zone. NACOA itself intends to address these issues in the coming months.
- an integrated annual budget and legislative program related to priority objectives of national oceanographic and atmospheric policy should be formulated and adopted by the President and the Congress at levels of effort commensurate with the critical problems confronting the Nation.

Absent these measures, serious discontinuities in policy planning, resource allocation, and policy execution will continue to bog us down in half measures and compromises. We can do better than that.

Appendix I

Public Law 92-125
92nd Congress, H. R. 2587
August 16, 1971

An Act

85 STAT. 344

To establish the National Advisory Committee on the Oceans and Atmosphere.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, There is hereby established a committee of twenty-five members to be known as the National Advisory Committee on Oceans and Atmosphere (hereafter referred to in this Act as the "Advisory Committee"). National Advisory Committee on Oceans and Atmosphere, Establishment.

SEC. 2. (a) The members of the Advisory Committee, who may not be full-time officers or employees of the United States, shall be appointed by the President and shall be drawn from State and local government, industry, science, and other appropriate areas.

(b) Except as provided in subsections (c) and (d), members shall be appointed for terms of three years.

(c) Of the members first appointed, as designated by the President at the time of appointment—

(1) nine shall be appointed for a term of one year,
(2) eight shall be appointed for a term of two years, and
(3) eight shall be appointed for a term of three years.

(d) Any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed only for the remainder of such term. A member may serve after the expiration of his term until his successor has taken office.

(e) The President shall designate one of the members of the Advisory Committee as the Chairman and one of the members as the Vice Chairman. The Vice Chairman shall act as Chairman in the absence or incapacity of, or in the event of a vacancy in the office of, the Chairman. Chairman and Vice Chairman

SEC. 3. Each department and agency of the Federal Government concerned with marine and atmospheric matters shall designate a senior policy official to participate as observer in the work of the Advisory Committee and to offer necessary assistance. Senior policy official.

SEC. 4. The Advisory Committee shall (1) undertake a continuing review of the progress of the marine and atmospheric science and service programs of the United States, and (2) advise the Secretary of Commerce with respect to the carrying out of the purposes of the National Oceanic and Atmospheric Administration. The Advisory Committee shall submit a comprehensive annual report to the President and to the Congress setting forth an overall assessment of the status of the Nation's marine and atmospheric activities and shall submit such other reports as may from time to time be requested by the President. Each such report shall be submitted to the Secretary of Commerce who shall, within 90 days after receipt thereof, transmit copies to the President and to the Congress, with his comments and recommendations. The comprehensive annual report required herein shall be submitted on or before June 30 of each year, beginning June 30, 1972. Duties. Reports to President and Congress.

SEC. 5. Members of the Advisory Committee shall, while serving on business of the Committee, be entitled to receive compensation at rates not to exceed $100 per diem, including traveltime, and while so serving away from their homes or regular places of business they may be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as the expenses authorized by section 5703(b) of title 5, United States Code, for persons in Government service employed intermittently. Pay. 80 Stat. 499.

SEC. 6. The Secretary of Commerce shall make available to the Advisory Committee such staff, information, personnel and administrative services and assistance as it may reasonably require to carry out its activities. 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 under this Act; and each such department, agency, and instrumentality is authorized to cooperate with the Advisory Committee and, to the extent permitted by law, to furnish such information and assistance to the Advisory Committee upon request made by its Chairman, without reimbursement for such services and assistance. Department of Commerce and other agencies, assistance.

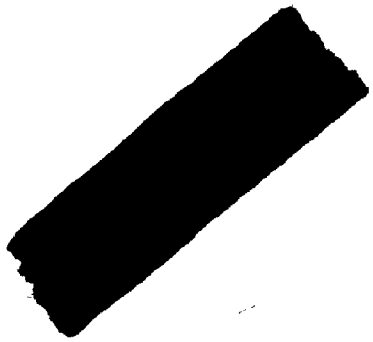
SEC. 7. There is hereby authorized to be appropriated to the Secretary of Commerce $200,000 for the fiscal year ending June 30, 1972, and each succeeding fiscal year to carry out the purposes of this Act. Appropriation.

Approved August 16, 1971.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 92-201 (Comm. on Merchant Marine and Fisheries).
SENATE REPORT No. 92-333 (Comm. on Commerce).
CONGRESSIONAL RECORD, Vol. 117 (1971):
May 17, considered and passed House.
Aug. 2, considered and passed Senate, amended.
Aug. 5, House concurred in Senate amendments.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1972—511-318 (71)



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