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SEA GRANT PROGRAM IMPROVEMENT ACT

GOVERNMENT

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JOINT HEARINGS

BEFORE THE

SUBCOMMITTEE ON OCEANS AND ATMOSPHERE

OF THE

COMMITTEE ON COMMERCE

AND THE

SUBCOMMITTEE ON EDUCATION

OF THE

COMMITTEE ON

LABOR AND PUBLIC WELFARE

UNITED STATES SENATE

NINETY-FOURTH CONGRESS

SECOND SESSION

ON

S. 709

TO PROVIDE FOR A COMPREHENSIVE, LONG-RANGE, AND COORDINATED NATIONAL PROGRAM IN MARINE SCIENCE, TO ESTABLISH A NATIONAL COUNCIL ON MARINE SCIENCE, ENGINEERING, AND RESOURCE DEVELOPMENT, AND AN ADVISORY PANEL ON MARINE SCIENCE, ENGINEERING, AND RESOURCE DEVELOPMENT

S. 3165

TO ESTABLISH A NATIONAL MARINE SCIENCE AND TECHNOLOGY POLICY FOR THE UNITED STATES, TO EXTEND THE NATIONAL SEA GRANT PROGRAM, AND FOR OTHER PURPOSES

MARCH 22 AND 23, 1976

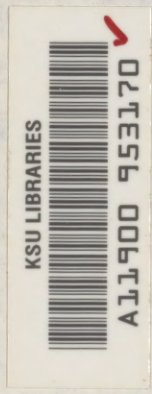
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CONTENTS

	Page
Opening statement by Senator Pell.....	1
Opening statement by Senator Hollings.....	2
Text of bills:	
S. 709.....	5
S. 3165.....	16
Agency comments on S. 709:	
Office of Management and Budget.....	51
Department of State.....	54
Department of Commerce.....	54
National Aeronautics and Space Administration.....	55
Environmental Protection Agency.....	56
Agency comments on S. 3165:	
Department of Housing and Urban Development.....	57
Comptroller General.....	58
Department of State.....	59
National Aeronautics and Space Administration.....	60

CHRONOLOGICAL LIST OF WITNESSES

MARCH 22, 1976

Corell, Dr. Robert, director, University of New Hampshire, marine program, and associate director, Cooperative University institutional sea grant program, University of Maine at Orono and the University of New Hampshire.....	121
Letter of March 1, 1976.....	124
Dubs, Marne, director, Ocean Resources Department, Kennecott Copper Corp., New York, N.Y.....	114
Knauss, Dr. John A., provost for Marine Affairs, University of Rhode Island, Narragansett, R.I.....	99
Mallon, Lawrence G., assistant sea grant director for Marine Advisory Services, University of Southern California, sea grant institutional program.....	139
McAlister, Dr., John, department of engineering-economic systems, Stanford University, Stanford, Calif.....	103
Prepared statement.....	108
Thomas, Jay, on behalf of the Coastal State Organization, Austin, Tex.....	127
Prepared statement.....	132
White, Dr. Robert M., Administrator, National Oceanic and Atmospheric Administrations; accompanied by Dr. Robert Abel, Director, National Sea Grant program.....	61
Prepared statement of Dr. White.....	70
Prepared statement of Dr. Abel.....	73

MARCH 23, 1976

Adams, Janet K., president, California Coastal Alliance, Woodside, Calif.....	175
Gaither, William S., dean and professor, College of Marine Studies and Sea Grant Program, and director, University of Delaware, Newark and Lewes, Del.....	172
Humphrey, Hon. Hubert H., U.S. Senator from Minnesota.....	143
Prepared statement.....	149
Martin, Roy E., Director of Science and Technology, National Fisheries Institute; accompanied by Gus Fritschie, director, Government Relations.....	178

	Page
Matthews, Charles D., National Ocean Industries Association, Washington, D.C.-----	183
Prepared statement-----	188
Roth, Hon. William V., U.S. Senator from Delaware-----	170
Trefny, Rudolph A., president, American Oceanic Organization-----	166
Wenk, Dr. Edward, Jr., director, program in Social Management of Technology, University of Washington, Seattle, Wash-----	154

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

Akins, Glenn, coordinator, Division of Policy Development and Planning, Office of the Governor, State of Alaska, letter of April 7, 1976-----	233
Bardin, David J., commissioner, Department of Environmental Protection, State of New Jersey, letter of April 13, 1976-----	235
Beeton, Alfred M., director designate of the Great Lakes and Marine Waters Centers, University of Michigan, statement-----	203
Butler, W. H., Jr., Leonard W. Crosby, Jr., Fulton Love, Dinky Minor, George C. Nixon, Jr., and Ellis Phillips, independent commercial fisherman, Richmond Hill, Ga., letter of March 22, 1976-----	205
Dow, Robert L., research director, Department of Marine Resources, letter of March 24, 1976-----	209
Gaul, Roy D., statement-----	197
Gilchrist, John P., secretary-manager, California Seafood Institute, letter of March 25, 1976-----	212
Greene, George F., Jr., coordinator, aquaculture products, Agricultural and Veterinary Products Division, Abbot, letter of March 23, 1976-----	206
Hargis, William J., Jr., chairman, National Advisory Committee on Oceans and Atmosphere, letter of April 21, 1976-----	235
Johrde, Mary K., head, office for Oceanographic Facilities and Support, National Science Foundation, letter of April 2, 1976-----	231
McDougall, Charles W., Acting Administrator, Extension Service, Department of Agriculture, letter of March 26, 1976-----	213
Pond, T. A., executive vice president, State University of New York, letter of April 13, 1976-----	234
Ragotzkie, Robert A., statement-----	201
Sea Grant Pays Off, article in the Evening Tribune-----	231
Sullivan, James J., program manager, Institute of Marine Resources, University of California, letter of March 29, 1976-----	215
Suttle, A. D., Jr., Ph. D., professor and deputy, Marine Biomedical Institute, University of Texas Medical Branch at Galveston, letter of March 29, 1976-----	214
Tribbitt, Hon. Sherman W., Governor, State of Delaware, letter of April 2, 1976-----	232
Tunney, Hon. John V., U.S. Senator from California, letter of March 22, 1976-----	204
Van Lopik, Dr., Jack R., director, Louisiana Sea Grant Program and the Center for Wetland Resources, Louisiana State University, statement-----	199
Vernberg, F. John, president, Estuarine Research Federation, University of South Carolina, letter of March 24, 1976-----	208
Wallace, David H., Associate Administrator for Marine Resources, National Oceanic and Atmospheric Administration, Department of Commerce, letter of January 13, 1976-----	93
Waters, Joseph B., Beak Consultants Inc., letter of March 25, 1976-----	210
Wilkins, Bruce T., acting director, New York Sea Grant Institute, State University of New York, letter of April 9, 1976-----	234

SEA GRANT PROGRAM IMPROVEMENT ACT

MONDAY, MARCH 22, 1976

U.S. SENATE,
COMMITTEE ON COMMERCE AND
COMMITTEE ON LABOR AND PUBLIC WELFARE,
Washington, D.C.

The committees met at 10:35 in room 4200, Dirksen Senate Office Building, Hon. Claiborne Pell presiding.

OPENING STATEMENT BY SENATOR PELL

Senator PELL. We are beginning today 2 days of joint hearings by the Subcommittee on Education of the Senate Labor and Public Welfare Committee and the Subcommittee on Oceans and Atmosphere of the Senate Commerce Committee on S. 3165, the Sea Grant Program Improvement Act, and S. 709, the Marine Science, Engineering, and Resource Development Act.

Both of these measures are bills of significance and importance to our national oceans program.

The Marine Science, Engineering, and Resource Development Act, introduced by Senator Humphrey, would establish in the Executive Office of the President a National Council on Marine Science, Engineering, and Resource Development to assist the President in developing a comprehensive national program of marine activities.

The Sea Grant Program Improvement Act would extend and strengthen the national sea grant college program and, in addition, strengthen the capabilities of the National Oceanic and Atmospheric Administration (NOAA) in planning, implementing, and coordinating a national program in marine resources, science, and technology.

I had the pleasure of introducing S. 3165 with my distinguished colleagues, Senators Hollings, Magnuson, Pastore, Stevens, and Tunney.

As the original Senate sponsor of the legislation that established the national sea grant college program 10 years ago, in 1966, I have followed closely the development and achievements of the program.

The intent of the original Sea Grant College Act was to bring to bear on our Nation's rich ocean and coastal resources the same mechanisms that our system of land-grant colleges applied so successfully to the development of our Nation's agricultural resources, through education, applied research, and advisory and extension services.

Staff members assigned to these hearings: Deborah Stirling and Gerald Kovach.

I believe the sea grant program, despite limited funding, has demonstrated through its achievement the wisdom of the Congress in approving and supporting the sea grant approach for development and wise use of our marine and coastal resources.

The legislation we are considering today is the result of several months of study of the program by the National Ocean Policy Study, of which Senator Hollings is Chairman, and on which I serve as a member.

The sea grant authorization bill presented today preserves the essential quality of characteristics of the program, and adds several provisions designed to strengthen its capabilities as a component of NOAA. The major change is the addition of a separately authorized program of grants, with no matching requirements, for research designed to meet national needs in addition to the existing matching grants for marine programs which may be primarily responsive to regional, State, or local needs. This provision will enhance the capability of sea grant to meet national research needs as determined within NOAA.

In addition, the legislation gives specific authority for some activities already being conducted under the broad authority of the existing Sea Grant College Act, including the participation by regional consortia, and the sponsorship of sea grant fellowships by participating universities.

This legislation also includes under a separate title significant provisions designed to strengthen NOAA's capabilities for policy planning, research, technology assessment, and management of ocean and coastal resources. This would be accomplished primarily through a new Office of Marine Resources, Science, and Technology headed by an Associate Administrator of NOAA.

This legislation already has benefited in the course of its preparation from comments and suggestions offered by a broad national cross section of the national oceans and marine affairs community. I would emphasize that the bill is still subject to modification and improvement.

I look forward, accordingly, to the comments and suggestions from the witnesses at this hearing.

First I would ask Senator Hollings, who has provided the framework for this new legislation, if he has any comments.

OPENING STATEMENT BY SENATOR HOLLINGS

Senator HOLLINGS. Thank you very much, Senator Pell.

It is a privilege to join Senator Pell, the father of our sea grant program, in updating his program.

I am glad to cosponsor Senator Pell's bill and I am sure working together and with NOAA, Dr. White, and Dr. Able, we will be able to update, give greater emphasis, and greater support to the program from the Congress; and I welcome what I find to be a yearning on behalf of the public to do even more in this particular area.

It has been 10 years since the Congress passed the National Sea Grant College and Program Act. Its creators recognized then that marine resources were a vast, untapped asset of tremendous potential significance to this Nation and its people. To wisely utilize the

resources of the oceans and coastal zone, it was realized that cooperative programs with State and local governments, academic institutions, and industry were necessary. Ten years is a long time, and therefore, through the National Ocean Policy Study, we have undertaken an appraisal of the accomplishments of sea grant in view of the need for reauthorization.

Sea grant's unique character has been its recognition from the outset that cooperative programs to develop marine resources require a balance between research, education and training, and advisory services. As presently administered by the National Oceanic and Atmospheric Administration, the emphasis of the sea grant mechanism has been to apply marine science research to practical problems and needs at the State and local level.

The record of accomplishments by sea grant has been checkered. I am delighted that the program has been successful in a number of areas. However, in looking toward the future, I am doubtful that sea grant as presently administered will be able to be as strong and effective as the Congress desires unless it receives a revised and updated mandate to address national needs as well as increased financial support. To face the challenge of the next decade, sea grant must be reoriented to deal with national as well as State and local problems. Sea grant must be part of a dynamic and strong, policy-oriented parent organization. Without proper planning and management in NOAA to meet future needs, more funds, in the absence of a strong mandate and institutional reform, will not be sufficient. That is why I am cosponsoring with my distinguished colleague from Rhode Island, Mr. Pell, the Sea Grant Program Improvement Act. This bill is the result of nearly 2 years of observation of the sea grant program and its parent agency, the National Oceanic and Atmospheric Administration.

The bill would promote the effective utilization and conservation of marine and coastal resources to meet national, international, and local needs through: (1) the wise development, application and dissemination of marine science and technology; (2) a strengthened capability in NOAA as the lead Federal agency for planning, research, technology assessment and management of marine and coastal resources; and (3) the reauthorization and improvement of the National Sea Grant Act.

The bill proposes that NOAA be assigned lead responsibility to implement congressionally mandated policy for marine science and technology, filling the void resulting from deficiencies in Reorganization Plan No. 4 of 1970. These responsibilities, including sea grant, would be administered by an Associate Administrator through a new Office of Marine Resources, Science, and Technology. It would be the function of this office to strengthen the planning, coordination, and management capabilities of NOAA in utilizing marine science and technology to meet national objectives. In this office there also would be a National Ocean and Coastal Advisory Service to coordinate all advisory services within NOAA and to work with other Federal agencies involved in ocean and coastal affairs to get information about their services to the widest practicable audience of users.

As national ocean and coastal problems and opportunities emerge in the decades ahead, we must be assured that Government will be more capable of making and implementing policy level decisions. Through this bill we will place sea grant at the cutting edge of solving problems and seeking opportunities of national, international, and State significance. Moreover, we will insure that NOAA meets the expectations the Congress has for a strong, decisive, and forward looking ocean agency.

One need look only to the legislation which has passed Congress in the past few years to recognize the opportunities which lie ahead in the oceans and coastal zone :

The Coastal Zone Management Act of 1972 gave NOAA lead agency responsibility to carry out a new land use program for the Nation's coastal regions, including Federal aid to States to establish management programs to determine proper uses of coastal lands and waters.

The Coastal Zone Management Act Amendments of 1975, now in conference with the House, will require NOAA to administer a significantly larger program, including loans, grants, and other assistance to the States to help them deal with energy facility siting in coastal areas, public access to beaches, and major interstate and regional land use problems.

The Outer Continental Shelf Lands Act Amendments (S. 521) would vest significant new authorities in NOAA to conduct and monitor offshore environmental studies related to OCS oil and gas development.

The Deepwater Port Act requires NOAA to play a significant role in determining the landside impact solutions involved in proposed offshore oil import terminals such as those proposed in the Gulf of Mexico.

H.R. 200, the legislation establishing a 200-mile economic resource zone and Federal/State management of marine fisheries, will require significantly new responsibilities for NOAA as well as an unprecedented international negotiation undertaking.

Moreover, the Congress may this year move legislation dealing with deep seabed mining, requiring expansion of NOAA's new Office of Marine Minerals.

There are other new initiatives, which do not need enumeration here today. Suffice it to say that the ocean and coastal challenge of today is far greater and more complex than that which faced us in 1970 when the President by Executive order established the National Oceanic and Atmospheric Administration within the Department of Commerce. NOAA is at the crossroads of moving from being simply a scientific service agency to a major resource management agency in the oceans and coastal zone. Today's challenges call for new organization initiatives, broadened vision, and aggressive action. This legislation is aimed at making NOAA such an organization, and giving sea grant a vital role in this expanded mission.

I look forward to wide support and prompt handling of this legislation by the Senate as we begin hearings today.

[The bill and agency comments follow:]

94TH CONGRESS
1ST SESSION

S. 709

IN THE SENATE OF THE UNITED STATES

FEBRUARY 18, 1975

MR. HUMPHREY introduced the following bill; which was read twice and referred to the Committee on Commerce

A BILL

To provide for a comprehensive, long-range, and coordinated national program in marine science, to establish a National Council on Marine Science, Engineering, and Resource Development, and an Advisory Panel on Marine Science, Engineering, and Resource Development.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That this Act may be cited as the "Marine Science, Engi-
4 neering, and Resource Development Act of 1975".

5 SEC. 2. (a) It is hereby declared to be the policy of the
6 United States to develop, encourage, and maintain a co-
7 ordinated, comprehensive, and long-range national program
8 in marine science, engineering, and resource development for
9 the benefit of mankind, to assist in protection of health and

1 property, enhancement of commerce, transportation, national
2 security, and rehabilitation of our commercial fisheries, and
3 to increase the responsible utilization of these and other
4 resources.

5 (b) The marine science activities of the United States
6 should be conducted so as to contribute to the following
7 objectives:

8 (1) Coordinated development of the resources of
9 the marine environment.

10 (2) The expansion of human knowledge and infor-
11 mation of the marine environment.

12 (3) The encouragement of private investment en-
13 terprise in exploration, technological development, ma-
14 rine commerce, and economic utilization of the resources
15 of the marine environment.

16 (4) The maintenance and expansion of the role of
17 the United States as a leader in marine science and re-
18 source development.

19 (5) The advancement of education and training in
20 marine science.

21 (6) The development and improvement of the ca-
22 pabilities, performance, use, and efficiency of vehicles,
23 equipment, and instruments for use in exploration, re-
24 search, surveys, the recovery of resources, and the trans-
25 mission of energy in the marine environment.

- 1 (1) The Vice President, who shall be Chairman of
- 2 the Council.
- 3 (2) The Secretary of State.
- 4 (3) The Secretary of the Navy.
- 5 (4) The Secretary of the Interior.
- 6 (5) The Secretary of Commerce.
- 7 (6) The Secretary of Transportation.
- 8 (7) The Director of the National Oceanic and At-
- 9 mospheric Administration.
- 10 (8) The Director of the National Science Founda-
- 11 tion.
- 12 (9) The Administrator of the Energy Research and
- 13 Development Administration.
- 14 (10) The Director of the Environmental Protection
- 15 Agency.
- 16 And the following nonvoting members:
- 17 (11) The Secretary of Health, Education, and
- 18 Welfare.
- 19 (12) The Secretary of the Treasury.
- 20 (13) The Secretary of Agriculture.
- 21 (14) The Attorney General of the United States.
- 22 (15) The Director of Office of Management and
- 23 Budget.
- 24 (16) The Chairman of Council of Economic
- 25 Advisers.

1 (b) The President may name to the Council such other
2 officers and officials as he deems advisable.

3 (c) The President shall from time to time designate
4 one of the members of the Council to preside over meetings
5 of the Council during the absence, disability, or unavailabil-
6 ity of the Chairman.

7 (d) Each member of the Council, except those desig-
8 nated pursuant to subsection (b), may designate any officer
9 of his department or agency appointed with the advice and
10 consent of the Senate to serve on the Council as his alternate
11 in his unavoidable absence.

12 (e) The Council may employ a staff to be headed by a
13 civilian executive secretary who shall be appointed by the
14 President with confirmation by the Senate and shall receive
15 compensation at a rate established by the President at not
16 to exceed that of level II of the Federal Executive Salary
17 Schedule. The executive secretary, subject to the direction of
18 the Council, is authorized to appoint and fix the compensa-
19 tion of such personnel, including not more than ten profes-
20 sional staff members who may be appointed without regard
21 to civil service laws or the Classification Act of 1949 and
22 compensated at not to exceed the highest rate of grade 18 of
23 the General Schedule of the Classification Act of 1949, as
24 amended, as may be necessary to perform such duties as may
25 be prescribed by the President.

RESPONSIBILITIES

1

2 SEC. 4. (a) In conformity with the provisions of sec-
3 tion 2 of this Act, it shall be the duty of the President with
4 the advice and assistance of the Council to—

5 (1) survey all significant marine science activities,
6 including the policies, plans, programs, and accomplish-
7 ments of all departments and agencies of the United
8 States engaged in such activities.

9 (2) develop a comprehensive long-range program
10 of marine activities, including but not limited to explora-
11 tion, description and prediction of the marine environ-
12 ment, development and conservation of the resources of
13 the marine environment, marine engineering, studies of
14 air-sea interaction, transmission of energy and communi-
15 cations, to be conducted by departments and agencies of
16 the United States, independently or in cooperation with
17 such non-Federal organizations as States, institutions
18 and industry;

19 (3) evaluate and fix responsibility for the conduct
20 of foregoing marine science activities by departments
21 and agencies of the United States;

22 (4) insure cooperation and resolve differences aris-
23 ing among departments and agencies of the United
24 States with respect to marine science activities under

1 this Act, including differences as to whether a particu-
2 lar project is a marine science activity;

3 (5) undertake a comprehensive study, by contract
4 or otherwise, of new legal problems arising out of the
5 management, use, development, recovery, and control
6 of the resources of the marine environment;

7 (6) undertake studies of the impacts on United
8 States economy, security, health, and welfare to be
9 gained from marine resources, engineering, and science,
10 and the costs involved in obtaining such benefits;

11 (7) review annually all marine science activities
12 conducted by departments and agencies of the United
13 States in light of the policies, plans, programs, and priori-
14 ties developed pursuant to this Act; and

15 (8) encourage national participation in the compre-
16 hensive long-range program of marine activities, estab-
17 lished by the President, by distributing research funds
18 to organizations, individuals, or governmental agencies in
19 promotion of the above program.

20 (b) In the planning and conduct of a coordinated Fed-
21 eral program the President and the Council shall utilize such
22 staff, interagency, and non-Government advisory arrange-
23 ments as they may find necessary and appropriate and shall
24 consult with departments and agencies concerned with marine

1 science activities and solicit the views of non-Federal orga-
2 nizations and individuals with capabilities in marine sciences.

3 THE ADVISORY PANEL ON MARINE SCIENCE, ENGINEERING,
4 AND RESOURCE DEVELOPMENT

5 SEC. 5. (a) The Council shall establish an Advisory
6 Panel on Marine Science, Engineering, and Resource Devel-
7 opment (hereinafter referred to as the "Panel"). The Panel
8 shall be composed as follows:

9 (1) members of the National Advisory Committee
10 on Oceans and the Atmosphere.

11 (2) Members from each House of Congress ap-
12 pointed by the Speaker of the House and the majority
13 leader of the Senate.

14 (b) The Panel shall—

15 (1) Review and make recommendations to the
16 Council on activities undertaken by the Council;

17 (2) Review and make recommendations to the
18 Council on the findings of any study made by or for the
19 Council;

20 (3) Undertake such additional related tasks as the
21 Council may direct.

22 (c) The Panel, by majority vote, shall elect from its
23 members appointed under subsection (a) (1) (2) of this sec-
24 tion a Chairman and a Vice Chairman, who shall serve for
25 such time and under such conditions as the Panel may pre-

1 scribe. In the absence of the Chairman, or in the event of
2 his incapacity, the Vice Chairman shall act as Chairman.

3 (d) The term of office of each member of the Panel
4 appointed under subsection (a) (1) (2) shall be four years
5 except that any such member appointed to fill a vacancy
6 occurring prior to the expiration of the term for which his
7 predecessor was appointed shall be appointed for the re-
8 mainder of such term. No person shall be appointed a mem-
9 ber of the Panel under subsection (a) (1) (2) more than
10 twice. Terms of the members appointed under subsection
11 (a) (1) (2) shall be staggered so as to establish a rotating
12 membership according to such method as the Council may
13 devise.

14 (e) (1) The members of the Panel other than those
15 appointed under subsection (a) (1) (2) shall receive no
16 pay for their services as members of the Council, but shall
17 be allowed necessary travel expenses (or, in the alterna-
18 tive, mileage for use of privately owned vehicles and a per
19 diem in lieu of subsistence at not to exceed the rate pre-
20 scribed in sections 5702 and 5704 of title 5, United States
21 Code), and other necessary expenses incurred by them in
22 the performance of duties vested in the Panel, without re-
23 gard to the provisions of subchapter 1 of chapter 57 and
24 section 5731 of title 5, United States Code, and regulations
25 promulgated thereunder.

1 (2) The members of the Panel appointed under sub-
2 section (a) (1) shall receive compensation for each day en-
3 gaged in the actual performance of duties vested in the
4 Panel at rates of pay not in excess of the daily equivalent
5 of the highest rate of basic pay set forth in the General
6 Schedule of section 5332 (a) of title 5, United States Code,
7 and in addition shall be reimbursed for travel, subsistence,
8 and other necessary expenses in the manner provided for
9 other members of the Panel under paragraph (1) of this
10 subsection.

11 SEC. 6. (a) The President with consultation by the
12 Council and Panel shall transmit to the Congress in March of
13 each year a report, which shall include—

14 (1) a comprehensive description of the national
15 long-range program of marine activities and delineat-
16 ing those changes occurring in this program during the
17 previous year;

18 (2) a comprehensive description of the activities
19 and the accomplishments of all agencies and depart-
20 ments of the United States in the field of marine sci-
21 ence, engineering, and resource development during the
22 preceding year; and

23 (3) an evaluation of such activities and accom-
24 plishments in terms of the objectives set forth pursuant
25 to this Act.

1 (b) Reports made under this section shall contain such
2 recommendations for legislation as the President may con-
3 sider necessary or desirable for the attainment of the objec-
4 tives of this Act, and shall contain an estimate of funding
5 requirements of each agency and department of the United
6 States for marine science activities during the succeeding
7 fiscal year.

8 AUTHORIZATION

9 SEC. 7. There are hereby authorized to be appropri-
10 ated such sums as may be necessary to carry out the provi-
11 sions of this Act.

94TH CONGRESS
2D SESSION

S. 3165

IN THE SENATE OF THE UNITED STATES

MARCH 17, 1976

Mr. PELL (for himself, Mr. HOLLINGS, Mr. MAGNUSON, Mr. PASTORE, Mr. STEVENS, and Mr. TUNNEY) introduced the following bill; which was read twice and referred to the Committees on Labor and Public Welfare and Commerce jointly by unanimous consent

A BILL

To establish a national marine science and technology policy for the United States, to extend the national sea grant program, and for other purposes.

- 1 *Be it enacted by the Senate and House of Representa-*
 2 *tives of the United States of America in Congress assembled,*
 3 That this Act with the following table of contents may be
 4 cited as the "Ocean and Coastal Resources Act of 1976".

TABLE OF CONTENTS

	Page
Sec. 2. General purposes.....	2
Sec. 3. Definitions	3

TITLE I—MARINE SCIENCE AND TECHNOLOGY POLICY

Sec. 101. Declaration of policy and national principles.....	4
Sec. 102. Office of Marine Resources, Science, and Technology....	7
Sec. 103. Annual report and evaluation.....	16
Sec. 104. Distinguished research awards.....	18
Sec. 105. Conforming and miscellaneous provisions.....	19
Sec. 106. Authorization of appropriations.....	20

TABLE OF CONTENTS—Continued

TITLE II—NATIONAL SEA GRANT PROGRAM
AMENDMENTS

Sec. 201. Amendment to the National Sea Grant College and Program Act of 1966.....	21
“Sec. 201. Short title.....	21
“Sec. 202. Declaration of policy.....	21
“Sec. 203. Definitions	22
“Sec. 204. National Sea Grant Program.....	26
“Sec. 205. Administration	28
“Sec. 206. Sea Grant Colleges and Regional Consortia.....	31
“Sec. 207. Fellowships	32
“Sec. 208. Sea Grant Review Panel.....	32
“Sec. 209. Authorization of appropriations.....	35

GENERAL PURPOSES

1
2 SEC. 2. It is the purpose of the Congress in this Act to
3 improve the utilization and conservation of ocean and
4 coastal resources of the United States—

5 (1) through the encouragement of marine science
6 and technology directed toward the wise development
7 and conservation of ocean and coastal resources, the
8 promotion of long-range planning capability, the training
9 of the skilled manpower necessary, and the dissemination
10 and application of the knowledge so developed, for ocean
11 and coastal resource assessment, development, utilization,
12 and conservation;

13 (2) by establishing an Office of Marine Resources,
14 Science, and Technology and a national ocean and
15 coastal advisory service within the National Oceanic and
16 Atmospheric Administration to stimulate and coordinate
17 such planning, development, promotion, training, dis-

1 TITLE I—MARINE SCIENCE AND TECHNOLOGY
2 POLICY

3 DECLARATION OF POLICY AND NATIONAL PRINCIPLES

4 SEC. 101. (a) FINDINGS.—The Congress finds the
5 following:

6 (1) The resources of the oceans and of the coastal
7 zone would, through the development and wise applica-
8 tion of marine science and technology, satisfy many
9 human needs and contribute to the achievement of na-
10 tional and international objectives. The oceans and the
11 coastal zone can supply food, energy, and minerals, and
12 can contribute to human health and the quality of the
13 environment, the national security, and the enhancement
14 of commerce.

15 (2) A successful marine resources, science, and
16 technology program for the United States would return
17 enormous benefits. Such a program requires (A) the
18 establishment and maintenance of a strong research
19 capability in government, industry, and the universities;
20 (B) systematic assessment and forecasting of needs,
21 capabilities, and consequences and the setting of research
22 priorities; (C) a continuing partnership between the
23 Federal Government and State and local governments,
24 private industry, universities, scientists, and individuals
25 and groups concerned with and affected by ocean and

1 coastal resources and the marine environment; (D)
2 prompt dissemination and ready availability to potential
3 users of the knowledge gained through research; (E) in-
4 ternational communication and cooperation in scientific
5 and technological ventures; (F) the investment and
6 efficient expenditure of public funds; (G) coordination
7 of effort to avoid duplication, waste, and delay; and
8 (H) encouragement and leadership from the Federal
9 Government and the establishment, within the Federal
10 Government, of a central focus for the implementation of
11 policy and the promotion of marine science and technol-
12 ogy activities.

13 (3) Such a program is needed and feasible.

14 (b) PURPOSES.—It is therefore declared to be the pur-
15 pose of the Congress in this title to recognize the National
16 Oceanic and Atmospheric Administration as the central focus
17 for the planning, development, and implementation of a
18 successful marine resources, science, and technology program
19 for the United States, and to establish an Office of Marine
20 Resources, Science, and Technology within the Administra-
21 tion to carry out this function in accordance with the national
22 principles set forth in subsection (c) of this section.

23 (c) NATIONAL PRINCIPLES.—(1) Effective and proper
24 management, conservation, protection, and utilization of the
25 Nation's ocean and coastal resources require coordinated

1 planning, the setting of priorities, and continuing assessment
2 of national policies. Basic research; applied research; tech-
3 nological development, application, and transfer; and educa-
4 tion and training programs are all prerequisites for the
5 achievement of these objectives.

6 (2) Basic research in marine science adds to mankind's
7 understanding and knowledge of the resources and processes
8 of the oceans and the coastal zone and is an essential pre-
9 requisite for future development. Such basic research should
10 be fostered by the Federal Government through the encour-
11 agement and support of theoretical and empirical efforts in
12 the traditional scientific disciplines, and through the pro-
13 motion of interdisciplinary research activities which seek to
14 integrate and advance the knowledge gained by disparate
15 disciplines.

16 (3) Applied research in marine science and technology
17 utilizes this understanding and knowledge and should receive
18 continuing support from the Federal Government in order
19 to achieve the following national objectives:

20 (A) the strengthening of national well-being and
21 security;

22 (B) the management, conservation, protection, and
23 enhanced utilization of living and nonliving resources of
24 the oceans and the coastal zone;

1 (C) the discovery and utilization of renewable
2 energy resources;

3 (D) the prevention, control, and elimination of pol-
4 lution; and

5 (E) the monitoring and predicting of conditions of
6 the global environment.

7 (4) Technological development, application, and trans-
8 fer should be advanced through Federal programs of engi-
9 neering development and technological innovation, encour-
10 agement of private investment in technological development,
11 and public participation in the decisionmaking processes
12 relating to technological development, application, and
13 transfer.

14 (5) Education and training programs in marine science
15 and technology, including interdisciplinary programs, should
16 be encouraged and supported by the Federal Government.

17 OFFICE OF MARINE RESOURCES, SCIENCE, AND TECHNOLOGY

18 SEC. 102. (a) ESTABLISHMENT.—There shall be estab-
19 lished, within 60 days after the date of enactment of this
20 Act, a new Office in the Administration to be known as the
21 Office of Marine Resources, Science, and Technology. The
22 Office shall function continuously pursuant to the provisions
23 of this title.

24 (b) ASSOCIATE ADMINISTRATOR.—The Office shall be

1 directed by one of the Associate Administrators of the Ad-
2 ministration as provided in section (2) (e) of Reorganiza-
3 tion Plan Numbered 4 of 1970, as amended by section 105
4 (d) of this Act.

5 (e) DUTIES.—In addition to its duties and responsi-
6 bilities under other provisions of this Act, the Office, in
7 accordance with the national principles set forth in section
8 101 (c) of this title and with the national plan prepared
9 under subsection (d) of this section—

10 (1) shall develop and implement a program for
11 marine resources, science, and technology within the
12 Administration;

13 (2) shall coordinate marine research, technology
14 development, and demonstration programs and projects
15 within the Administration, and may initiate such supple-
16 mentary research in marine resources, science, and tech-
17 nology as may be appropriate, in accordance with sub-
18 section (d) and subsection (e) of this section;

19 (3) shall conduct planning activities, including the
20 identification of national and international objectives and
21 human needs which may be satisfied through marine
22 science and technology, undertake technology assess-
23 ment, and establish a means for determining, and deter-
24 mine, priorities for research and technological develop-
25 ment, application, and transfer;

1 (4) shall review and make recommendations to the
2 Administrator on the budgetary requests of the various
3 ocean and coastal programs in the Administration to
4 the extent that such requests pertain to marine science
5 and technology;

6 (5) may participate in and cooperate with marine
7 resources, science, and technology programs conducted
8 by other agencies and entities;

9 (6) shall establish and maintain an information
10 service and exchange or other facility, for the prompt
11 and timely dissemination to potential users and inter-
12 ested persons, of the results of marine research;

13 (7) shall develop measures for evaluating, and
14 shall evaluate, to the fullest extent practicable, the
15 impacts of marine science and technology activities
16 carried on by the Administration in relation to the
17 amount of Federal investment therein;

18 (8) shall assist the Administrator in the preparation
19 of the annual report;

20 (9) may initiate and promote cooperative research
21 and development projects and programs involving the
22 Administration, State and local governments, private
23 industry, universities, and individual qualified persons
24 in accordance with subsection (e) of this section; and

1 (10) shall report on its activities to, and shall carry
2 out such additional functions and responsibilities as may
3 be assigned by the Administrator.

4 (d) PLAN.—(1) The Administrator with the assist-
5 ance of the Office shall prepare and the Secretary shall submit
6 to the Congress and the President and shall publish, not more
7 than 365 days after the establishment of the Office, a 6-year
8 national plan for research and development in marine science
9 and technology and for the demonstration and practical im-
10 plementation of marine science and technology developments.
11 Such plan shall assess the potential benefits and estimated
12 costs involved, and shall set forth requirements and conditions
13 for successful implementation. In the development of this
14 plan, the Office shall seek the cooperation of, and assistance
15 from, the National Academies of Sciences and Engineering,
16 the National Advisory Committee on Oceans and Atmos-
17 phere, the academic community, industry, State and local
18 governments, and other interested parties. The plan shall be
19 revised from time to time to reflect new data and information.

20 (2) Each department, agency, and independent instru-
21 mentality of the Federal Government is authorized and
22 directed to cooperate with the Secretary in carrying out
23 the purposes of this subsection and, to the extent permitted
24 by law, to provide such information as may be requested.

25 (e) RESEARCH ASSISTANCE.—(1) Specific projects

1 shall be identified and specific proposals invited by the Office
2 in accordance with regulations promulgated by the Admin-
3 istrator, for financial assistance in the form of grants or
4 contracts for the conduct of planning and research in marine
5 resources, science, and technology. Such assistance is for
6 the purpose of ensuring that the objectives of sections 101
7 (c) and 102 (d) are being carried out when existing pro-
8 grams within the Administration are not able to provide the
9 necessary assistance. Such assistance shall be administered
10 through existing programs where appropriate.

11 (2) Each recipient of financial assistance under this
12 subsection shall keep such records as the Associate Adminis-
13 trator shall prescribe, including records which fully disclose
14 the amount and disposition by such recipient of the proceeds
15 of such assistance, the total cost of the project or undertaking
16 in connection with which such assistance was given or used,
17 the amount of that portion of the cost of the project which
18 was supplied by other sources, and such other records as will
19 facilitate an effective audit. Such records shall be maintained
20 for 3 years after the completion of such a project or under-
21 taking. The Administrator and the Comptroller General of
22 the United States, or any of their duly authorized representa-
23 tives, shall have access, for the purpose of audit and exami-
24 nation, to any books, documents, papers, and records of re-
25 cepts which, in the opinion of the Administrator or of the

1 Comptroller General, may be related or pertinent to such
2 financial assistance.

3 (f) NATIONAL OCEAN AND COASTAL ADVISORY SERV-
4 ICE.—(1) The Office shall operate and maintain, in ac-
5 cordance with the provisions of this subsection, a service to
6 be known as the national ocean and coastal advisory service.
7 The service shall impart useful information, knowledge, and
8 technique to organizations and individuals employed or other-
9 wise interested in the assessment, development, utilization,
10 and/or conservation of ocean and coastal resources; and
11 shall communicate research needs to the Associate Admin-
12 istrator. The service shall be headed by a Director, who
13 shall be appointed by the Administrator and subject to the
14 supervision of the Associate Administrator. Such Director
15 shall be appointed and compensated, without regard to the
16 provisions of title 5, United States Code, governing appoint-
17 ments in the competitive service, classification, and General
18 Schedule pay rates, at a rate not in excess of the maximum
19 rate for GS-18 of the General Schedule under section 5332 of
20 such title.

21 (2) In order to (A) increase the supply of available
22 useful information, (B) facilitate the coordination of ad-
23 visory services, and (C) prevent unnecessary duplication,
24 the service may enter into a formal agreement and conduct a
25 joint or cooperative program of ocean and coastal advisory

1 services with any other agency or instrumentality of the
2 Federal Government which is engaged in programs or activi-
3 ties relating to ocean or coastal resources. The service shall,
4 pursuant to such an agreement and program, process and
5 disseminate the knowledge and techniques so generated. Any
6 such agency or instrumentality shall provide, within the dis-
7 cretion of the Director, up to but not exceeding one-third
8 of the costs which are attributable, directly or indirectly, to
9 such a joint or cooperative program.

10 (3) The Director of the service shall—

11 (A) support, through fund transfers, and coordi-
12 nate all advisory service programs relating to ocean and
13 coastal resources (such resources as defined in section
14 203 of the National Sea Grant Act), which are con-
15 ducted (as of the date of the establishment of the Office)
16 by or within the Administration, other than the marine
17 and environmental data dissemination programs admin-
18 istered by the Environmental Data Service;

19 (B) establish and maintain effective liaison with
20 any appropriate person (including a government entity)
21 which (i) provides ocean and coastal advisory services,
22 (ii) provides information dissemination services in sup-
23 port of government instrumentalities regarding ocean
24 and coastal resources, or (iii) plans and coordinates
25 programs for any such advisory service;

14

1 (C) formulate (and review and revise from time to
2 time, as necessary) a comprehensive plan, in accordance
3 with the national principles set forth in section 101 (c)
4 and the national plan under section 101 (d) of this title,
5 for the production and delivery of advisory services re-
6 garding ocean and coastal resources. Such plan shall be
7 developed in consultation with representatives of (i) the
8 several offices within the Administration, (ii) institu-
9 tions participating in the sea grant program, (iii) in-
10 dustry, and (iv) the interested public. Such plan shall
11 recognize that regional and local advisory services are an
12 essential activity within a balanced sea grant program,
13 shall recognize the existing capabilities and expertise of
14 the sea grant colleges, regional consortia, and programs
15 for such services, and shall provide for the support of
16 such services to the extent that they are necessary and
17 appropriate to a comprehensive ocean and coastal ad-
18 visory service system. Such plan shall include a strategy
19 for implementation and continuing review of the effec-
20 tiveness and efficiency of the advisory services involved.
21 Such plan shall be reviewed by the Administrator and
22 the Secretary and published in the Federal Register;
23 (D) implement the plan formulated and reviewed
24 under subparagraph (C) of this paragraph;

1 (E) periodically evaluate the activities of the serv-
2 ice in accordance with criteria prescribed by the Office
3 and report thereon to the Administrator; and

4 (F) carry out such other functions and responsibil-
5 ities as may be requested by the Associate Admin-
6 istrator.

7 (4) There is authorized to be appropriated to the Secre-
8 tary for the purposes of this subsection not to exceed \$3,750,-
9 000 for the fiscal transition period ending September 30,
10 1976; not to exceed \$15,000,000 for the fiscal year ending
11 September 30, 1977; not to exceed \$15,000,000 for the
12 fiscal year ending September 30, 1978; and not to exceed
13 \$15,000,000 for the fiscal year ending September 30,
14 1979. Such sums as may be appropriated under this para-
15 graph shall remain available until expended.

16 (g) OTHER FEDERAL AGENCIES.—The chief officer of
17 each department, agency, or instrumentality of the Federal
18 Government who is engaged in, or concerned with, matters
19 relating to ocean and coastal resources is authorized, upon
20 request of the Secretary, to make available to the Secretary
21 from time to time, on a reimbursable basis, or as otherwise
22 agreed, such personnel, services, and facilities as may be
23 necessary to assist the Secretary in fulfilling the purposes of
24 this Act.

1 ANNUAL REPORT AND EVALUATION

2 SEC. 103. (a) ANNUAL REPORT ON MARINE SCIENCE
3 AND TECHNOLOGY.—The Secretary shall submit to the
4 Congress and the President, not later than February 15 of
5 each year, a report on the status and prospects for marine
6 science and technology. Each such report shall include—

7 (1) a general description of the marine science
8 and technology projects and programs conducted or
9 assisted by the Federal Government;

10 (2) an analysis of such projects and programs in
11 terms of the national principles set forth in section
12 101 (c) of this title;

13 (3) an evaluation of the Nation's marine science
14 and technology capability, including the status of per-
15 sonnel, vessels, facilities, and equipment;

16 (4) a statement of the efforts undertaken to pro-
17 mote the application and utilization of the knowledge
18 gained through marine science and technology research;

19 (5) a survey of professional opportunities for indi-
20 viduals in marine science and technology; and

21 (6) a summary of the efforts undertaken and
22 planned to coordinate marine science and technology
23 activities within the Federal Government and to coordi-
24 nate such activities with similar programs of State and

1 local governments, private industry, and the scientific
2 and university communities.

3 (b) The Administrator is authorized to secure directly
4 from any executive department, agency, or independent in-
5 strumentality of the Federal Government, the information
6 required to prepare the report. Each such department,
7 agency, and instrumentality is authorized and directed to
8 cooperate with the Administrator and, to the extent per-
9 mitted by law, to furnish such information upon request to
10 the Administrator.

11 (c) EVALUATION BY NACOA.—The National Ad-
12 visory Committee on Oceans and Atmosphere shall, in ac-
13 cordance with the Act of August 16, 1971, as amended (33
14 U.S.C. 857-6 et seq.), have the opportunity to review
15 each report prepared pursuant to subsection (a) of this
16 section. Such advisory committee shall be invited to submit,
17 for inclusion in such report, comments and recommendations
18 and its own independent evaluation of the Nation's marine
19 science and technology program, including the matters set
20 forth in such subsection (a). Such material shall be trans-
21 mitted to the Secretary not later than February 1 of each
22 year, and the Secretary shall cause it to be published as a
23 separate section in the annual report submitted to the Con-
24 gress pursuant to subsection (a) of this section.

DISTINGUISHED RESEARCH AWARDS

2 SEC. 104. (a) ESTABLISHMENT AND SELECTION.—

3 There is established a National Oceanic and Atmospheric
4 Administration distinguished research award for outstanding
5 achievements and contributions in problem-oriented research
6 related to ocean and coastal resources which meets interna-
7 tional, national, and/or regional needs. One such award shall
8 be made not less than every 3 years from the date of enact-
9 ment of this Act by the Secretary with the advice of the
10 Administrator and the National Advisory Committee on
11 Oceans and Atmosphere, and shall consist of a citation and a
12 cash honorarium in the amount of \$10,000.

13 (b) ELIGIBLE NOMINEES.—Any citizen or national of
14 the United States, or group thereof, is eligible for nomination.
15 Such a nomination may issue from any source, with the ex-
16 ception of the National Advisory Committee on Oceans and
17 Atmosphere and Federal employees.

18 (c) NOMINATION.—In submitting a nomination, the
19 following shall be included: a description of the research
20 and its importance; letters of support from other researchers
21 in such field or fields; and letters of support from those
22 affected or benefited by such research.

23 (d) TAX EXEMPTION.—Any amount received as an
24 award under this section shall be exempt from any Federal,
25 State, or local income tax.

1 CONFORMING AND MISCELLANEOUS PROVISIONS

2 SEC. 105. (a) Section 7 of the Marine Resources and
3 Engineering Development Act of 1966 (33 U.S.C. 1106),
4 is repealed.

5 (b) Section 5314 of title 5, United States Code, is
6 amended by adding at the end thereof the following new
7 paragraph:

8 “(22) Administrator, National Oceanic and Atmos-
9 pheric Administration.”

10 (c) Section 5315 of title 5, United States Code, is
11 amended by adding at the end thereof the following new
12 paragraphs:

13 “(98) Deputy Administrator, National Oceanic
14 and Atmospheric Administration”.

15 “(99) Associate Administrator, National Oceanic
16 and Atmospheric Administration.”

17 (d) (1) Section 2(e) of Reorganization Plan Num-
18 bered 4 of 1970 is amended to read as follows:

19 “(e) In addition, there shall be in the Administra-
20 tion three Associate Administrators who shall perform
21 such functions as the Administrator shall from time to
22 time assign or delegate. Such Associate Administrators
23 shall be appointed by the President, by and with the
24 advice and consent of the Senate. The President shall
25 appoint such Associate Administrators from among in-

1 individuals who by reason of general background and ex-
2 perience are especially qualified in the areas of marine
3 resources, marine science or technology, or other areas
4 of particular interest to the Administration. Such Asso-
5 ciate Administrators shall receive compensation at the
6 rate now or hereafter provided for level V of the
7 Executive Pay Rates (5 U.S.C. 5316).”.

8 (2) Persons appointed by the Secretary as additional
9 officers in the Administration pursuant to section 2 (e) of
10 Reorganization Plan Numbered 4 of 1970 and serving in that
11 capacity on the effective date of this Act shall continue as
12 Associate Administrators, notwithstanding the provisions of
13 paragraph (1) of this subsection.

14 (e) Section 5316 of title 5, United States Code, is
15 amended by adding at the end thereof the following new
16 paragraph:

17 “(135) Associate Administrators, National Oceanic
18 and Atmospheric Administration (3).”.

19 AUTHORIZATION OF APPROPRIATIONS

20 SEC. 106. (2) There are authorized to be appropriated
21 to the Secretary for purposes of carrying out this title, ex-
22 cepting section 102 (f), not to exceed \$3,330,000 for the
23 fiscal transition period ending September 30, 1976; not to
24 exceed \$10,000,000 for the fiscal year ending September 30,
25 1977; not to exceed \$10,000,000 for the fiscal year ending

1 September 30, 1978; and not to exceed \$10,000,000 for the
2 fiscal year ending September 30, 1979. Such sums as may
3 be appropriated under this section shall remain available
4 until expended.

5 TITLE II—NATIONAL SEA GRANT PROGRAM
6 AMENDMENTS

7 AMENDMENT TO THE NATIONAL SEA GRANT COLLEGE AND
8 PROGRAM ACT OF 1966

9 SEC. 201. The National Sea Grant College and Pro-
10 gram Act of 1966 (33 U.S.C. 1122 et seq.) is amended
11 to read as follows:

12 "SHORT TITLE

13 "SEC. 201. This title may be cited as the 'National Sea
14 Grant Act'.

15 "DECLARATION OF POLICY

16 "SEC. 202. (a) FINDINGS.—The Congress finds:

17 "(1) The vitality of the Nation and the quality of life
18 of its citizens depend increasingly on the understanding,
19 assessment, development, utilization, and conservation of
20 ocean and coastal resources.

21 "(2) A strong educational base, responsive research
22 and training activities, and broad and prompt dissemination
23 of knowledge and technique are an essential prerequisite to
24 such understanding, assessment, development, utilization, and
25 conservation.

1 “(1) ‘Administration’ means the National Oceanic
2 and Atmospheric Administration;

3 “(2) ‘Administrator’ means the Administrator of
4 the National Oceanic and Atmospheric Administration;

5 “(3) ‘Associate Administrator’ means the Associ-
6 ate Administrator within the National Oceanic and At-
7 mospheric Administration who directs the Office of Ma-
8 rine Resources, Science, and Technology;

9 “(4) ‘coastal environment’ means the coastal
10 zone, as defined in section 304 (2) of the Coastal Zone
11 Management Act of 1972 (16 U.S.C. 1453 (a)), and
12 the fish, wildlife, and other living resources, and the non-
13 living resources, located in such zone;

14 “(5) ‘coastal resource’ means any of the natural
15 or manmade resources of the coastal environment and
16 any other resource, tangible or intangible, actual or
17 potential, which is located in or traceable to the
18 coastal environment and which is or may be of value to
19 mankind. The term includes recreational, commercial,
20 scenic, habitational, economic, conservation, esthetic, and
21 biological values, and the wildlife habitat, the coastal
22 space, the marine and coastal ecosystems, the nutrient-
23 rich areas, and the other components of the coastal envi-
24 ronment from which such values result. The living coastal

1 resources include natural and cultured plant life, fish,
2 shellfish, marine mammals, and wildlife. The nonliv-
3 ing coastal resources include energy sources, minerals,
4 and chemical substances;

5 “(6) ‘Director of the program’ means the Director
6 of the national sea grant program appointed under sec-
7 tion 205 (a) of this Act;

8 “(7) ‘marine environment’ means the coastal en-
9 vironment; the Great Lakes; the waters of the con-
10 tiguous zone and waters of the high seas; the seabed, sub-
11 soil, and waters of the territorial sea; the seabed and sub-
12 soil of and beyond the Outer Continental Shelf; and the
13 fish, wildlife, and other living and nonliving resources
14 located therein;

15 “(8) ‘ocean resource’ means any of the natural or
16 manmade resources of the marine environment, including
17 the natural and cultured living (that is, plant life, fish,
18 shellfish, marine mammals, and wildlife) and nonliving
19 (that is, energy sources, minerals, and chemical sub-
20 stances) resources; the physical, chemical, geological,
21 biological, recreational, economic, esthetic, and social
22 resources; and any other resource, tangible or intangible,
23 actual or potential, which is located in or traceable to the
24 marine environment and which is or may be of value to
25 mankind;

25

1 “(9) ‘Office of Marine Resources, Science, and
2 Technology’ means the Office of Marine Resources, Sci-
3 ence and Technology of the Administration established
4 by the Ocean and Coastal Resources Act of 1976;

5 “(10) ‘panel’ means the sea grant review panel
6 authorized under section 208 of this Act;

7 “(11) ‘sea grant college’ means any suitable public
8 or private institution of higher education which conducts
9 major sea grant programs and which is designated as
10 such by the Secretary;

11 “(12) ‘sea grant program’ means any activities
12 involving education, training, advisory services, or re-
13 search which are related to ocean and coastal resource
14 understanding, assessment, development, utilization, and
15 conservation, and which are supported by contracts with
16 or grants to institutions of higher education, institutes,
17 laboratories, persons, and public or private agencies pur-
18 suant to the provisions of this Act;

19 “(13) ‘sea grant regional consortium’ means an
20 association or combination of two or more institutions
21 of higher education, institutes, laboratories, or public or
22 private agencies, which is established for the purpose of
23 sharing expertise, research facilities, educational facilities,
24 and similar resources, in order to facilitate research, edu-
25 cation, training, and/or advisory services for understand-

1 ing, assessing, developing, utilizing, and conserving ocean
2 and coastal resources;

3 “(14) ‘Secretary’ means the Secretary of Com-
4 merce.

5 “NATIONAL SEA GRANT PROGRAM

6 “SEC. 204. (a) ESTABLISHMENT.—There shall be
7 maintained within the Administration, in accordance with
8 this Act, a program of research, education, training, and
9 advisory services to be known as the national sea grant
10 program. The national sea grant program shall be admin-
11 istered by the Office of Marine Resources, Science, and
12 Technology.

13 “(b) CONTENT.—The national sea grant program shall
14 be designed and administered to further, and it shall promote,
15 research, education, training, and advisory services in ocean
16 and coastal resource understanding, assessment, development,
17 utilization, and conservation, including relevant research,
18 education, and training in such elements of marine science
19 and technology as ecology, engineering, education, eco-
20 nomics, sociology, communications, law, planning, and pub-
21 lic administration.

22 “(c) CONTRACTS AND GRANTS.—(1) The national
23 sea grant program shall include the making of grants and
24 contracts in accordance with specifically identified national

1 needs and problems. The Director of the program shall iden-
2 tify such specific needs and problems of a national nature in
3 fields related to ocean and coastal resources, and may invite
4 sea grant colleges, regional consortia, other suitable institu-
5 tions of higher education, institutes, laboratories, public or
6 private agencies, and persons to submit proposals which are
7 responsive to such needs and problems. The activity sup-
8 ported by any such grants and contracts should be interdisci-
9 plinary in nature, to the extent practicable. The total amount
10 paid pursuant to any grant or contract under this subpara-
11 graph may, in the discretion of the Director of the program,
12 be up to 100 percent of the total cost of the program, project,
13 or activity involved. There is authorized to be appropriated
14 to the Secretary for the purposes of this paragraph not to ex-
15 ceed \$3,750,000 for the fiscal transition period ending Sep-
16 tember 30, 1976; not to exceed \$15,000,000 for the fiscal
17 year ending September 30, 1977; not to exceed \$15,000,000
18 for the fiscal year ending September 30, 1978; and not to
19 exceed \$15,000,000 for the fiscal year ending September 30,
20 1979. Such sums as may be appropriated under this para-
21 graph shall remain available until expended.

22 “(2) The national sea grant program shall include the
23 making of grants and contracts in accordance with the needs
24 and problems of individual States. The total amount paid

1 pursuant to any such grant or contract shall not exceed $66\frac{2}{3}$
2 percent of the total cost of the program, project, or activity
3 involved.

4 “(d) LIMITATIONS.—The following limitations shall
5 apply to payments made under any grant or contract
6 awarded or entered into pursuant to subsection (c) of this
7 section:

8 “(1) No such payment, or portion thereof, may be
9 applied to (A) the purchase or rental of any land; (B)
10 the rental, purchase, construction, preservation, or repair
11 of any building or dock; or (C) the purchase, construc-
12 tion, preservation, or repair of any vessel; except that
13 such payments may, if approved by the Director of the
14 program, be applied to non-self-propelled habitats,
15 buoys, platforms, other similar devices or structures, and
16 to the rental or lease of a research vessel used principally
17 for ocean and coastal resource research purposes.

18 “(2) No more than 15 percent of the total amount
19 appropriated in any fiscal year to carry out the purposes
20 of this Act shall be obligated or expended during such
21 year within any one State.

22 “ADMINISTRATION

23 “SEC. 205. (a) DIRECTOR.—There shall be, within the
24 Office of Marine Resources, Science, and Technology a Di-
25 rector of the national sea grant program who shall be ap-

1 pointed by the Administrator and who shall be subject to
2 the supervision of the Associate Administrator. The Director
3 shall be appointed and compensated, without regard to the
4 provisions of title 5, United States Code, governing appoint-
5 ments in the competitive service, classification, and General
6 Schedule pay rates, at a rate not in excess of the maximum
7 rate for GS-18 of the General Schedule under section 5332
8 of such title.

9 “(b) DUTIES.—In carrying out the duties assigned
10 under this title, the Director shall—

11 “(1) establish long-range planning guidelines, con-
12 sonant with the guidelines established under the plan
13 prepared under section 102 (d) of the Ocean and Coastal
14 Resources Act of 1976, for the administration of the
15 national sea grant program;

16 “(2) establish priorities consonant with the priori-
17 ties established by the Office of Marine Resources, Sci-
18 ence, and Technology under section 102 (c) of the Ocean
19 and Coastal Resources Act of 1976, for the national sea
20 grant program. Programs of advisory services shall be
21 supported under and subject to section 102 (f) of the
22 Ocean and Coastal Resources Act of 1976;

23 “(3) advise the Associate Administrator of existing
24 expertise and capabilities within the national sea grant
25 program, which are or could be of use to other offices

1 and programs within the National Oceanic and Atmos-
2 pheric Administration;

3 “(4) administer grants to, or contracts with, suit-
4 able public or private institutions of higher education, in-
5 stitutes, laboratories, persons, and public or private agen-
6 cies which are engaged in, or concerned with, marine
7 and coastal resource understanding, assessment, develop-
8 ment, utilization, and conservation, with the advice of
9 the sea grant review panel;

10 “(5) advise the Administrator and the Secretary
11 on the designation of sea grant colleges and sea grant
12 regional consortia in consultation with the sea grant
13 review panel;

14 “(6) provide support for sea grant fellowships
15 through institutions of higher education for educational
16 and training assistance to persons in fields related to
17 marine and coastal resource understanding, assessment,
18 development, utilization, and conservation, on the under-
19 graduate and graduate levels of education, in consulta-
20 tion with the sea grant review panel;

21 “(7) cooperate with the national ocean and coastal
22 advisory service to the fullest extent possible, and advise
23 the Director of the service of the existing expertise
24 and capabilities within the national sea grant program

1 to expedite advisory services related to ocean and coastal
2 resources understanding, assessment, development, utili-
3 zation, and conservation; and

4 (8) serve in a nonvoting capacity on the sea grant
5 review panel.

6 "SEA GRANT COLLEGES AND REGIONAL CONSORTIA

7 "SEC. 206. (a) DESIGNATION.—The Secretary is auth-
8 orized to designate, through the national sea grant program,
9 sea grant colleges and, where appropriate, sea grant regional
10 consortia. Any such sea grant college and regional consor-
11 tium shall initiate, conduct, and support programs of re-
12 search, education, training, and advisory services in disci-
13 plines and fields that are relevant to the understanding, as-
14 sessment, development, utilization, and conservation of ocean
15 and coastal resources. Each sea grant regional consortium
16 shall focus upon ocean and coastal resource needs of a re-
17 gional character and shall encourage a regional approach to
18 problem solving, in cooperation with any sea grant colleges
19 and programs in the region served by such consortium.

20 "(b) GUIDELINES.—The Secretary shall, in accordance
21 with section 553 of title 5, United States Code, issue guide-
22 lines with respect to the obligation of entities which are
23 designated as sea grant colleges and sea grant regional
24 consortia.

1 "FELLOWSHIPS

2 "SEC. 207. (a) ESTABLISHMENT.—The Director of the
3 program shall support a sea grant fellowship program to
4 provide educational and training assistance to qualified indi-
5 viduals at the undergraduate and graduate levels of education
6 in fields related to ocean and coastal affairs, through sea
7 grant colleges and regional consortia, institutions of higher
8 education, and suitable institutes, both public and private.

9 "(b) LIMITATION.—The total amount of fellowship
10 grants under the sea grant fellowship program available in
11 any fiscal year shall not exceed 5 percent of the total amount
12 appropriated for the purposes of this Act for such fiscal
13 year.

14 "SEA GRANT REVIEW PANEL

15 "SEC. 208. (a) ESTABLISHMENT.—There is established
16 a committee of seventeen members to be known as the sea
17 grant review panel. The panel shall supersede the sea grant
18 advisory panel chartered pursuant to the Federal Advisory
19 Committee Act.

20 "(b) DUTIES.—The panel shall function solely as an
21 advisory body to the Director of the national sea grant pro-
22 gram to review and advise on—

23 "(1) institutional programs, individual project pro-
24 posals, and the fellowship program for support under
25 this Act;

1 “(2) the establishment and operation of a regional
2 and local network of sea grant colleges and regional
3 consortia; and

4 “(3) such other matters as the Administrator may
5 find appropriate.

6 The Director of the program shall make available to the
7 panel such information, personnel, and administrative serv-
8 ices and assistance as it may reasonably require to carry out
9 its duties.

10 “(c) MEMBERSHIP, TERMS, POWERS.—(1) The mem-
11 bers of the panel shall be appointed by the Secretary upon
12 the recommendation of the Administrator and the Director
13 of the program. Not to exceed seven members of the panel
14 shall be individuals who, by reason of background and ex-
15 perience, are especially qualified in marine science and tech-
16 nology. The remaining members of the panel shall be indi-
17 viduals who, by reason of background and experience, are
18 especially qualified in, or representative of, the areas of edu-
19 cation, State government, industry, economics, planning,
20 or other appropriate areas. No member of the panel may
21 serve concurrently as the director of a sea grant college,
22 regional consortium, or State or local sea grant program, be
23 the recipient of a grant under this Act, or be a full-time
24 officer or employee of the United States; except that the
25 Director of the program and a representative of the national

1 ocean and coastal advisory service shall serve in a nonvoting
2 capacity on the panel. The Chairman may appoint additional
3 temporary members of the panel who have special expertise
4 for the purpose of reviewing specific subject areas during a
5 given fiscal year.

6 “(2) The term of office of a member of the panel shall
7 be 3 years, except that of the original appointees, five shall
8 be appointed for a term of 1 year, five shall be appointed
9 for a term of 2 years, and five shall be appointed for a term
10 of 3 years.

11 “(3) Any member appointed to fill a vacancy occurring
12 prior to the expiration of the term for which his predecessor
13 was appointed shall be appointed only for the remainder of
14 such term. A member may serve after the expiration of his
15 term until his successor has taken office or until 90 days after
16 such expiration, whichever is earlier.

17 “(4) The panel shall select one member as the Chair-
18 man and one member as the Vice Chairman. The Vice
19 Chairman shall act as Chairman in the absence or incapacity
20 of the Chairman.

21 “(5) Members and temporary members of the panel,
22 who are not employed by the Federal Government or any
23 State or local government, shall receive compensation at the
24 daily rate for GS-18 of the General Schedule when engaged
25 in the actual performance of duties for such panel; and such

1 members and temporary members shall be reimbursed for
2 actual expenses incurred in the performance of such duties.

3 “(6) The members of the panel shall meet on a quar-
4 terly basis, and at such other times as the Chairman may
5 request.

6 “(7) The panel is authorized to exercise such powers
7 as are reasonably necessary in order to carry out its duties
8 under subsection (b) of this section.

9 “AUTHORIZATION OF APPROPRIATIONS

10 “SEC. 209. There is authorized to be appropriated to the
11 Secretary for purposes of carrying out the provisions of this
12 Act, other than section 204 (c) (1); not to exceed \$8,750,-
13 000 for the fiscal transition period ending September 30,
14 1976; not to exceed \$35,000,000 for the fiscal year ending
15 September 30, 1977; not to exceed \$35,000,000 for the
16 fiscal year ending September 30, 1978; and not to exceed
17 \$35,000,000 for the fiscal year ending September 30, 1979.
18 Such sums as may be appropriated under this section shall
19 remain available until expended.”.

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF MANAGEMENT AND BUDGET,
Washington, D.C., April 23, 1976.

HON. ERNEST F. HOLLINGS,
Chairman, Subcommittee on Oceans and Atmosphere, Committee on Commerce,
U.S. Senate, Dirksen Senate Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your letter of March 24, 1976, requesting our comments on S. 3165 and S. 709.

While we support the general objective of these two bills—to improve the management and coordination of the Federal Government's marine programs—we do not believe S. 3165 and S. 709 would effectively achieve that objective and recommend against their enactment.

S. 3165

S. 3165 is intended to improve the National Oceanic and Atmospheric Administration's (NOAA) capability to manage its marine programs and to reauthorize and strengthen the Sea Grant program. Its most significant provision would establish a new Office of Marine Resources, Science, and Technology in NOAA.

The Office of Management and Budget supports the objective of improving the management of the marine programs within NOAA. We recognize the continuing problems of assuring that the several marine programs in NOAA are working together. A new Office of Marine Resources, Science, and Technology might be useful in coordinating NOAA's marine programs and in making the Sea Grant program a more integral part of the NOAA marine effort. However, legislatively requiring this new organizational structure will significantly reduce the ability of the NOAA Administrator to manage NOAA; it will be more difficult to respond to changed demands and needs. We also believe that it is inappropriate to mandate by legislation this level of organization in Federal agencies. Efforts to improve the management and coordination of NOAA's programs should be done administratively, not legislatively.

There are several other provisions in S. 3165 that are troublesome. Those which are of greatest concern are discussed briefly below:

The bill provides for a new national ocean and coastal advisory service. We believe that this is unnecessary. The Sea Grant program has authority for such a service, and a new advisory service could in large part duplicate the Sea Grant effort. If the Sea Grant advisory service is not effective, it would be better to work to improve that program than to create a second service which could diffuse resources and management attention. The proposed appropriation authorization of \$15 million a year for the new advisory service is unnecessary, and would lead to undesirable increased Federal spending.

Section 204(c) provides that the Director of the Sea Grant program shall identify specific needs and problems of a national nature in fields related to ocean and coastal resources and shall make grants and contracts related to those needs and problems. We believe that the Director of the Sea Grant program is not in a position to identify such national needs or problems. Programs to deal with national problems in the marine area have been and should continue to be the responsibility of agencies which have been given specific missions by the Congress and the President. These mission agencies should be responsible for allocating funds for research, development, training, etc., to achieve their objectives. If it is desirable to use Sea Grant institutions to help solve these national problems, then the mission agencies should provide funds for those institutions.

Section 102(d) requires NOAA to prepare and publish a six-year "national plan" for research and development in marine science and technology, including plans for the demonstration and implementation of marine science and technology developments. We believe that this requirement would result in wasting much of NOAA's management time and resources. It is unrealistic to expect NOAA to develop a six-year plan for the science and technology efforts by the Department of Defense in the marine area for purposes of national defense. Nor should NOAA be expected to develop a six-year plan for Interior's ocean mining program responsibilities or Coast Guard's responsibilities. NOAA should not be required to try to develop a *national* plan for marine science and technology for the Federal Government.

The statement of purpose in Title I of the bill indicates that NOAA is to be the "central focus for the planning, development, and implementation of a successful marine resources, science, and technology program for the United States . . ." We believe this is inappropriate. The proposed bill would in fact not give NOAA the authority or the means to implement marine sciences programs related to the missions of other agencies such as the Navy, NSF, the Coast Guard and Interior. NOAA should focus on improving the coordination of its own marine science efforts in support of its own specific fisheries and environmental missions.

Section 103 requires the Department of Commerce to prepare an annual report on the status and prospects for marine science and technology, including marine science and technology projects and programs throughout the Federal Government. It is not feasible for Commerce to usefully discuss the progress of marine science and technology except as it relates to achieving the objectives being pursued in that Department. This bill would require NOAA to discuss the status of the Navy programs, the Coast Guard programs, Interior programs and the basic ocean exploration programs of NSF, in addition to NOAA's own mission. We believe that any such report is inappropriate.

S. 709

S. 709 would establish a National Council on Marine Science, Engineering, and Resource Development in the Executive Office of the President, for the primary purpose of developing and coordinating a "comprehensive long-range program of marine activities . . ."

We do not believe a council should be created within the Executive Office for the special purpose of coordinating marine science and technology. There already are several mechanisms within the Executive Office for Federal policy development and for coordinating programs. These include the Domestic Council, the National Security Council, and the Economic Policy Board. All of the agency members on the proposed council have opportunities to participate in the existing policy development and coordinating mechanisms. As problems or concerns arise in the marine area which require interagency consideration, the existing mechanisms can and do respond to those needs.

The answers to the specific questions enclosed with your letter are set forth in the enclosure to this letter.

I hope these comments will be helpful to the Committee in considering this legislation.

Sincerely yours,

JAMES T. LYNN,
Director.

Enclosure

ANSWERS TO QUESTIONS

S. 709

Question 1. Do you see a need for improved coordination among Federal agencies conducting programs in ocean and coastal affairs? If so, do you feel that the establishment of a "Marine Council" is a wise solution, or do you suggest an alternative mechanism?

Answer. There is always room for improvement in coordinating the activities of Federal agencies, but we do not believe there is a serious problem in coordination of programs related to ocean and coastal affairs. There are extensive formal and informal coordination activities in this area. An additional permanent staff in the Executive Office is not likely to be helpful in improving this coordination process.

S. 3165

Question 1. Do you support the findings, purposes, and national principles contained in Section 101 and do you feel that NOAA and other Federal agencies will benefit from such a Congressional mandate?

Answer. The findings refer to a "marine resources, science and technology program." We do not believe it is feasible to attempt to pull together all marine related science and technology activities into a single program. It would be more useful to look at the several separate national programs related to the marine area, and then consider how those national programs should be coordinated. For example, we might focus on a national fisheries program, a mineral resource program, an environmental conservation program, the

weather prediction program, the ocean shipping program and a basic ocean research program. These programs are all related to marine science and technology, but the research and development needs vary significantly among them. The needs of these separate programs should drive the science and technology activities, rather than have a central marine science and technology effort going its own way.

As stated in our comments on the bill, we object to naming NOAA as the central focus for the planning, development and implementation of a single marine program.

We generally agree with the statement of principles and believe that these are largely being followed now.

Question 2. Do you support the management philosophy implicit in the current NOAA "matrix" organization? Is the current structure adequate to anticipate and meet future needs? Is NOAA's concept of "functional cognizance" a viable management technique? Does the alternative line authority suggested in S. 3165 seem advantageous?

Answer. We do not have serious problems with the current NOAA organization. It may be possible to more effectively focus NOAA resources on the major program objectives of the agency but this should not be done without a total review of the NOAA structure. We believe that, generally, agencies should be organized based on missions or objectives, rather than processes or geographic areas. In this respect the Sea Grant program represents a delivery process rather than any specified program objective. We believe it is not appropriate to use the "oceans" or "marine science and technology" as organizing principles. The oceans are neither a "problem" as such nor are they a "need." The term "oceans" covers too broad a range of concerns and interests to be a useful basis for organization. Science and technology are potential means of partially achieving national objectives, and generally should not be the basis for organization.

While the organizational changes proposed in S. 3165 may help make the Sea Grant program more responsive to the needs of NOAA's mission, such changes should be carried out only after a review of the entire agency. This bill, however, deals with only a relatively small part of NOAA's organization. It may be desirable to take a more fundamental look at the entire NOAA structure before changing small pieces. Rather than attempting to legislate NOAA's internal organization, it would be preferable to ask the Secretary of Commerce to reexamine the entire NOAA structure to see how it might be improved.

Question 3. Is the research management and delivery program described in section 102 needed? Does it go too far or not far enough?

Answer. We believe the research management program described in Section 102 is unnecessary for the reasons discussed in our comments on the bill. In particular, we believe it is inappropriate for NOAA to attempt to plan and coordinate research programs which are outside its mission responsibilities.

Question 4. Should Sea Grant, as the outreach component of NOAA's marine science program, be better coordinated with internal NOAA research programs?

Answer. Yes. We agree that it should be better coordinated with internal NOAA research programs. Both the Sea Grant program and the internal research programs should be viewed as alternative means of pursuing the program missions of NOAA. The internal and external research efforts should be complementary.

Question 5. Is the NOAA Marine Advisory Service, as distinct from the set of local Sea Grant advisory services, effective in reality or only on paper? Should the NOAA Marine Advisory Service be located in the Office of Sea Grant, or should it be part of an overall program for planning, implementing, and delivering both NOAA and Sea Grant research? Do other Federal agencies involved in ocean and coastal affairs deliver their research results to interested users; do they duplicate NOAA services?

Answer. We agree that the NOAA Marine Advisory Service as it has functioned within Sea Grant may not be very effective. However, we believe that the solution is not a new, separate advisory service, but rather a more efficient service within Sea Grant. There is no reason why the Sea Grant process could not become an effective mechanism for disseminating results of all NOAA marine research programs.

DEPARTMENT OF STATE,
Washington, D.C., May 4, 1976.

HON. WARREN G. MAGNUSON,
Chairman, Committee on Commerce, U.S. Senate

DEAR MR. CHAIRMAN: Your letter of March 11 requested the Department's comments on S. 709, a bill to provide for a comprehensive, long-range, and coordinated national program in marine science, to establish a National Council on Marine Science, Engineering, and Resource Development, and an Advisory Panel on Marine Science, Engineering, and Resource Development.

The Department is in accord with the intent of the proposed legislation. However, the Department feels that enactment of S. 709 would be premature at this time.

The major focus internationally, and in many respects domestically, on ocean policy issues at present is found in the Third United Nations Conference on the Law of the Sea. The National Security Council's Interagency Task Force on the Law of the Sea has provided a mechanism for coordinating the United States efforts in the Law of the Sea negotiations. This important international effort is now in a critical phase. Until the Law of the Sea negotiations are clearly perceived to be in the final stages, it would be disruptive to our most important initiatives in this field to create a competing Governmental coordinating mechanism. Although no intention exists to create competition and overlap in dealing with critical ocean policy issues, this could come about unless careful attention is paid to the terms of reference of a Cabinet level body charged with dealing with ocean policy, and especially to the timing of the creation of such a body.

An internationally visible substantive reorganization within the U.S. Government for dealing with ocean policy could be taken as a weakening of our commitment to achieving a Law of the Sea treaty, again unless careful attention is paid to the terms of reference and timing. Moreover, the public action taken to create an ocean policy body should be carefully designed to further our oceans policy objectives internationally as well as domestically.

There is a rapid move, both domestically and internationally, toward extended jurisdiction in the oceans, and uses of the oceans for all purposes are increasing. Development of oceans-related technology has burgeoned in recent years, and the trend will continue. The policy of the United States looks to the successful conclusion of the Law of the Sea effort this year.

Thus, the question of dealing with ocean policy issues is timely, and should be dealt with deliberately. The Department of State is prepared to, and plans to, cooperate within the Executive and with the Congress to determine the most appropriate terms of reference, mode, and timing of any improved organizational mechanism to deal with ocean policy issues and to coordinate agency programs.

The Office of Management and Budget advises that from the standpoint of the Administration's program there is no objection to the submission of this report.

Sincerely yours,

ROBERT J. McCLOSKEY,
Assistant Secretary for Congressional Relations.

GENERAL COUNSEL OF THE DEPARTMENT OF COMMERCE,
Washington, D.C., May 7, 1976.

HON. WARREN G. MAGNUSON,
Chairman, Committee on Commerce, U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your recent request for the Department of Commerce to provide you its views on S. 709, a bill "To provide for a comprehensive, long-range, and coordinated national program in marine science, to establish a National Council on Marine Science, Engineering, and Resource Development, and an Advisory Panel on Marine Science, Engineering, and Resource Development."

The proposed legislation would establish in the Executive Office of the President, the National Council on Marine Science, Engineering, and Resource Development. The Council would be chaired by the Vice President and composed of the following voting members: The Secretaries of State, Navy, In-

terior, Commerce, Transportation, the Administrators of the National Oceanic and Atmospheric Administration, the Energy Research and Development Administration, the Environmental Protection Agency, and the Director of the National Science Foundation. The Council would also have non-voting members that include the Secretaries of Health, Education and Welfare, Treasury, Agriculture; the Attorney General of the United States; the Director of the Office of Management and Budget; the Chairman of the Council of Economic Advisors and such other officers and officials as may be named by the President.

The purpose of the legislation is to develop a comprehensive long-range program of marine activities, evaluate and fix the responsibility for the conduct of such a program, and insure cooperation and resolve differences arising among departments and agencies of the United States. The Council would make as much review of marine activities and undertake such studies as may be required in the development and implementation of the national program.

The thrust of the proposed legislation is to strengthen the Nation's marine science, engineering and resource program by providing for improved policy formulation, planning, coordination and management with the Federal Government. It would establish a specific statutory mechanism for carrying out these objectives. Policy formulation, planning and coordination which involve the activities of many Federal agencies are often best carried out by an inter-agency body of top level policy officials representing the various agencies and departments of the Government. The bill, S. 709, seeks to achieve this by establishing a Marine Council at the Cabinet level.

The Department of Commerce believes that if such a policy body is needed at this level, its timing, composition, and function should be left to the decision of the President.

Furthermore, in our opinion there are a number of specific defects in the bill.

(1) There is no explanation or procedure indicated for voting on the Council.

(2) Section 3(a) of the bill refers to the "Director" of NOAA and EPA. Their correct title is "Administrator."

(3) Section 5(d) provides for four-year terms of office for members of the Advisory Panel, including members of each House of Congress. Since Members of the House of Representatives only serve two-year terms, this part of the bill should be changed.

(4) There appears to be an inconsistency between subsection 5(e)(1) and 5(e)(2) with regard to pay.

(5) Section 4(a) provide that the Council will give "advice and assistance" to the President. Section 5 then establishes an Advisory Panel to advise the "advisory" Council. Because the bill does not repeal P.L. 92-125 which established the National Advisory Committee on Oceans and Atmosphere (NACOA), and in fact the members of NACOA are to be members of the Advisory Panel established by Section 5 of the bill, it would appear that a circular pattern is being created since NACOA will be advising the Advisory Panel as well as the President, who also will be getting advice from the Council to whom the Advisory Panel also reports. It would seem this process needs clarification.

Accordingly, we believe that while the intent of the bill may be meritorious, it is unnecessarily duplicative and cumbersome and we oppose enactment of S. 709.

We have been advised by the Office of Management and Budget that there would be no objection to the submission of our report to the Congress from the standpoint of the Administration's program.

Sincerely,

J. T. SMITH,
General Counsel.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
Washington, D.C., May 20, 1976.

HON. WARREN G. MAGNUSON,
Chairman, Committee on Commerce, U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: This is in further reply to your request for the comments of the National Aeronautics and Space Administration on the bill S. 709, "To provide for a comprehensive long-range, and coordinated national program in marine science, to establish a National Council on Marine Science, Engineer-

ing, and Resource Development, and an Advisory Panel on Marine Science, Engineering, and Resource Development."

The bill would establish in the Executive Office of the President, the National Council on Marine Science, Engineering, and Resource Development to be composed of various Federal agency and department heads and other such officials as the President deems advisable. The President with the advice and assistance of the Council would be directed to survey governmental marine science activities, to develop a comprehensive long-range program of marine activities, to evaluate and fix agency responsibilities for marine science activities and to insure cooperation and coordination among Federal agencies in carrying out marine programs. In addition, the Council would be directed to establish an Advisory Panel on Marine Science, Engineering, and Resource Development, composed of members of the National Advisory Committee on Oceans and the Atmosphere and members from each House of Congress, to review and make recommendations to the Council on activities undertaken by the Council.

NASA is now and has, for some time, been involved in the expansion of man's knowledge of the marine environment. A good example of our ongoing activity in this area is our program of ocean dynamics monitoring and forecasting. With the satellites GEOS-3, launched in April 1975, and Seasat A, to be launched in mid-1978, we will monitor and forecast sea state, ocean currents and circulation, sea surface topography, and the air-sea boundary. Improvement in our knowledge of these oceanographic features can be related to better and more economical performance of a broad range to marine operations including shipping, off-shore construction and operations, and fishing. In addition, the monitoring and forecasting of ocean conditions are expected to contribute significantly to the development of long-range global weather forecasting and to protection of sea coasts from erosion and storms.

Currently, the remote sensing capabilities of this agency are being evaluated by several Federal agencies to determine whether they can be utilized to monitor ocean activity. For example, the National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey have recently developed computer processing techniques using Landsat data that assist in the identification of oil slicks on marine waters. In addition, NASA has cooperated with NOAA and the Environmental Protection Agency in their investigation of the ocean environment in the New York Bight—that offshore area between Cape May, New Jersey, and Montauk Point, Long Island. NASA is also engaged in a cooperative effort with the State of Florida to apply remote sensing technology to early identification and discrimination between toxic red tides and harmless algal blooms.

NASA shares a great interest in applying its technology to the conservation and prudent development of our marine resources. However, as to the need for or the desirability of creating such a Council the National Aeronautics and Space Administration would defer to the Administration and the more directly involved agencies for substantive comments.

The Office of Management and Budget has advised that, from the standpoint of the Administration's program, there is no objection to the submission of this report to the Congress.

Sincerely,

JOSEPH P. ALLEN,
Assistant Administrator for Legislative Affairs.

U.S. ENVIRONMENTAL PROTECTION AGENCY,
Washington, D.C., May 21, 1976.

HON. WARREN G. MAGNUSON,
*Chairman, Committee on Commerce, U.S. Senate,
Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to your request of March 11, 1976 for comments on S. 709, a bill to provide a long-range and coordinated national program in marine science, to establish a National Council on Marine Science, Engineering, and Resource Development (hereinafter Council) and an Advisory

Panel on Marine Science, Engineering, and Resource Development (hereinafter Panel).

S. 709 creates the Council in the Executive Office of the President which is composed of the voting members including the Vice President, who shall be chairman, the Administrator of the Environmental Protection Agency, the Director of NOAA and the heads of various agencies with involvement in the matters related to the oceans. The Council also has several non-voting members. The Council is authorized to employ a staff that is headed by a civilian executive secretary and may include not more than ten professional staff members.

The Council shall establish the Panel. The Panel shall be composed of members of the National Advisory Committee on Oceans and Atmosphere and members from each House of Congress. The role of the Panel is to advise the Council and give recommendations to the Council on activities conducted by the Council.

Finally, S. 709 provides that the President with consultation by the Council and the Panel shall transmit to Congress an annual report. The report shall include a comprehensive description of the national long-range program of marine activities and a comprehensive description of the activities and the accomplishments of all agencies and departments in the field of marine science, engineering, and resource development during the preceding year. The report also shall contain legislative recommendations that the President considers necessary to carry out the objectives of S. 709.

The Environmental Protection Agency strongly feels that through proper development and conservation, our marine resources can provide much food and raw materials to satisfy many human needs. Proper development and conservation have been hindered by a lack of long-range planning and coordination of marine related research and study. However, because the Council is established in the Executive Office of the President, we defer to the opinions of that Office as to whether S. 709 is the proper vehicle to give the necessary long-range planning and coordination in this vital area.

Thank you for this opportunity to express our views on S. 709.

The Office of Management and Budget advises us that there is no objection to the submission of this report from the standpoint of the President.

Sincerely yours,

RUSSELL E. TRAIN.

THE GENERAL COUNSEL OF HOUSING AND URBAN DEVELOPMENT,
Washington, D.C., April 14, 1976.

HON. WARREN G. MAGNUSON,
Chairman, Committee on Commerce, U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: This is in further response to your request for the views of this Department on S. 3165, a bill "To establish a national marine science and technology policy for the United States, to extend the national sea grant program, and for other purposes."

Among other things, S. 3165 would establish a new Office of Marine Resources, Science, and Technology within the National Oceanic and Atmospheric Administration in the Department of Commerce to administer marine resources, science, and technology programs. It would also amend the National Sea Grant College and Program Act of 1966 to provide additional authorizations for the existing program of matching grants for marine programs of local significance and to establish a new program of 100 percent grants for a marine program responsive to national needs.

The Department of Housing and Urban Development defers to those Federal agencies which would be directly affected by the bill regarding the desirability and adequacy of its provisions.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely,

ROBERT R. ELLIOTT.

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., April 20, 1976.

HON. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate

DEAR MR. CHAIRMAN: This refers to your request for our views on S. 3165, 94th Congress, the proposed "Ocean and Coastal Resources Act of 1976," which would establish a national marine science and technology policy for the United States, extend the national sea grant program, and for other purposes.

The bill's purpose is to improve the utilization and conservation of ocean and coastal resources of the United States. This would include (section 2(2)) the establishment of an Office of Marine Resources, Science, and Technology and a national ocean and coastal advisory service within the National Oceanic and Atmospheric Administration (NOAA) to stimulate and coordinate planning, development, promotion, training, dissemination, and application, and to maintain a complete and accessible national center of information and expertise relating to the utilization and conservation of these resources.

Additionally, section 102(c)(6) of S. 3165 provides that the new Office of Marine Resources, Science, and Technology would establish and maintain an information service and exchange or other facility, for the prompt and timely dissemination to potential users and interested persons of the results of marine research.

Our principal concern is the potentially duplicative nature of these provisions.

The Environmental Data Service, a component of NOAA, has an Environmental Science Information Center, which, according to the NOAA Organizational Manual, has the following responsibilities:

"Coordinates and supervises the scientific and technical information, documentation, publication, and library activities of NOAA and develops them into a comprehensive program. Conducts this program to serve all components of NOAA and to facilitate the transfer of scientific and technical information throughout NOAA and between NOAA and other Government agencies, the scientific community, and other national and international interests. Analyzes the transfer processes; improves the related techniques, procedures, and facilities; and integrates them into an efficient, coordinated NOAA scientific information and documentation system compatible with interacting systems both within and outside NOAA. Develops and maintains scientific publication policies, standards, and procedures. Serves as the 'Publications Clearance Officer' for applicable NOAA scientific and technical publications. Coordinates scientific reviewing and clearing of manuscripts by the NOAA editorial boards. Provides technical writing, editing, and publishing services. Provides library services and operates a NOAA scientific information center. Provides a secretariat for the NOAA Scientific Information and Documentation Council and responds to its advice on matters of common interest."

In addition, the Office of Coastal Zone Management, another component of NOAA, has established a small information capability as a result of a recommendation contained in the Fourth Annual Report (June 30, 1975) of the National Advisory Committee on Oceans and Atmosphere (NACOA). NACOA's recommendation to the Secretary of Commerce and his reply are as follows:

"Recommendation

"The Office of Coastal Zone Management of the National Oceanic and Atmospheric Administration (NOAA) expand its informational services to fulfill the function of a Federal coastal information coordinating center and to assure effective inter-communication with state centers and Federal and other sources."

"Secretary's reply

"I have already indicated that I concur a need exists for expanded informational services to the states to facilitate carrying out their responsibilities under the Coastal Zone Management Act. I have directed the Administrator of NOAA to take steps to implement this recommendation within the resources available. It is our intention to bring to bear upon this problem the full environmental information capabilities of NOAA, including those of our Environmental Data Service, our Sea Grant Program, and our Environmental Research Laboratories under the coordination of the Office of Coastal Zone Management, I am asking that this office also insure that the information and data resources

of other agencies are brought to bear to address the needs outlined by NACOA. "In fact, OCZM has been attentive to the informational needs of the individual state agencies charged with preparing state programs. For instance, when the OCS leasing issue became controversial, OCZM prepared a comprehensive document outlining the OCS process and providing sources of additional, more detailed information so that state officials could become familiar quickly with the issues under debate. Technical assistance in such areas as mapping and defining boundaries has been and will continue to be supplied in timely fashion to the states."

In view of the foregoing, we believe that the Committee may wish to consider whether the provisions of S. 3165 relating to the establishment of an information service and exchange within the newly created Office of Marine Resources, Science, and Technology would result in the possible duplication of similar efforts within NOAA.

Sincerely yours,

ROBERT F. KELLER,
Deputy Comptroller General of the United States.

DEPARTMENT OF STATE,
Washington, D.C., May 4, 1976.

HON. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate

DEAR MR. CHAIRMAN: Your letter of March 25 requested the Department's comments on S. 3165, a bill to establish a national marine science and technology policy for the United States, to extend the national sea grant program, and for other purposes. The bill would, inter alia, create an Office of Marine Resources, Science, and Technology within the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce.

The Department is in accord with the national goals and intent of the proposed legislation with regard to policy, and with the extension of the national sea grant program. However, for the reasons stated below, the Department opposes enactment of S. 3165.

Many agencies of this Government are involved with marine science and technology, ocean resource development, and ocean policy generally, including the Department of State. The Department notes with concern that many functions of the proposed new Office in NOAA would impinge on the functions of other agencies. For example, under Section 102(c) (3) the Office "shall conduct planning activities, including the identification of national and international objectives and human needs which may be satisfied through marine science and technology, undertake technology assessment, and establish a means for determining, and determine, priorities for research and technological development, application, and transfer." It would also, pursuant to Section 102(d) develop "a 6-year national plan for research and development in marine science and technology and for the demonstration and practical implementation of marine science and technology developments." Moreover, under Section 103(a) the Secretary of Commerce would "submit to the Congress and President, not later than February 15 of each year, a report on the status and prospects for marine science and technology. Each such report shall include—

(1) A general description of the marine science and technology projects and programs conducted or assisted by the Federal Government; . . .

(6) A summary of the efforts undertaken and planned to coordinate marine science and technology activities within the Federal Government . . ."

While the Department certainly concurs that NOAA and the Secretary of Commerce should be involved heavily in these activities, it considers that they involve responsibilities of a nature broader than those of NOAA as such. Moreover, they involve ocean policy issues and coordination of agency programs which are broader than marine science and technology. Even the provisions calling for cooperation of other agencies in Sections 101(d) (2) and 103 (b) do not ensure that these broad responsibilities will be dealt with adequately or that all concerned agencies will participate on an appropriate footing.

There have been other proposals for dealing with ocean policy issues and with coordination of agency programs, such as found in S. 709 on which the Department is reporting separately. As stated in that report, the Department

believes that these matters should be dealt with very carefully, with particular reference to the impact on United States negotiations in the Third United Nations Conference on the Law of the Sea. Accordingly, the Department believes that this matter should be pursued as indicated in that report rather than as proposed in S. 3165.

If there are matters strictly within the purview of the Secretary of Commerce and NOAA which should be dealt with legislatively, such as the organization and implementation of programs dealing with marine science and technology and marine resources within NOAA, the Department would defer to the views of the Department of Commerce.

With regard to Title II, the Department perceives the national sea grant program administered by NOAA to be a valuable component of the national programs for dealing with marine science and technology and marine resources. As such it contributes materially to national objectives and to the international posture of the United States in these fields. For this reason, the Department supports the Administration bill, S. 3203, to continue the sea grant program.

The Office of Management and Budget advises that from the standpoint of the Administration's program there is no objection to the submission of this report.

Sincerely yours,

ROBERT J. McCLOSKEY,
Assistant Secretary for Congressional Relations.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
Washington, D.C., May 20, 1976.

HON. WARREN G. MAGNUSON,
*Chairman, Committee on Commerce, U.S. Senate,
Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the comments on the National Aeronautics and Space Administration on the bill S. 3165, "To establish a national marine science and technology policy for the United States, to extend the national sea grant program, and for other purposes."

Title I of the bill would establish a new Office of Marine Resources, Science, and Technology within the National Oceanic and Atmospheric Administration (NOAA) to develop, implement and coordinate a program for marine resources, science, and technology within NOAA, to initiate such research as may be appropriate, to cooperate with other agencies and to disseminate information of marine research activities. The Office would further be directed to establish a national ocean and coastal advisory service to impart useful information, knowledge, and technique to organizations and individuals interested in the assessment, development, utilization, or conservation of ocean and coastal resources, and to communicate research needs to the Office.

Title II would amend the National Sea Grant College and Program Act of 1966 to extend and strengthen that Act. The national sea grant program would be administered within NOAA by the new Office established by title I of S. 3165.

NASA is now and has, for some time, been involved in the expansion of man's knowledge of the marine environment. A good example of our ongoing activity in this area is our program of ocean dynamics monitoring and forecasting. With the satellites GEOS-3, launched in April 1975, and Seasat A, to be launched in mid-1978, we will monitor and forecast sea state, ocean currents and circulation, sea surface topography, and the air/sea boundary. Improvement in our knowledge of these oceanographic features can be related to better and more economical performance of a broad range of marine operations.

Currently, the remote sensing capabilities of this agency are being evaluated by several Federal agencies to determine whether they can be utilized to monitor ocean activity. For example, the National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey have recently developed computer processing techniques using Landsat data that assist in the identification of oil slicks on marine waters. In addition, NASA has cooperated with NOAA and the Environmental Protection Agency in their in-

vestigation of the ocean environment in the New York Bight—that offshore area between Cape May, New Jersey, and Montauk Point, Long Island. NASA is also engaged in a cooperative effort with the State of Florida to apply remote sensing technology to early identification and discrimination between toxic red tides and harmless algal blooms.

While NASA shares a great interest in applying its technology to the conservation and prudent development of our marine resources, S. 3165 would not appear to directly impact agency programs. Therefore, the National Aeronautics and Space Administration defers to the Department of Commerce, the National Oceanic and Atmospheric Administration, and such other Federal agencies as may be directly affected for comment on this bill.

The Office of Management and Budget has advised that, from the standpoint of the Administrations' program, there is no objection to the submission of this report to the Congress.

Sincerely,

JOSEPH P. ALLEN,
Assistant Administrator for Legislative Affairs.

Senator HOLLINGS. We will call as our first witnesses, Dr. White and Dr. Abel.

We welcome you both to the hearings this morning.

Dr. White, you can begin for us and present your statement, file it for the record and highlight it, or proceed in whatever manner you care to.

**STATEMENT OF DR. ROBERT M. WHITE, ADMINISTRATOR,
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION;
ACCOMPANIED BY DR. ROBERT ABEL, DIRECTOR, NATIONAL SEA
GRANT PROGRAM**

Dr. WHITE. Senator Pell and Senator Hollings, with your agreement, I would like to highlight my statement and submit the total statement for the record.

Senator HOLLINGS. That will be fine.

Dr. WHITE. Dr. Abel also has a statement which he would like to have submitted for the record in which he elaborates on many of the points I will make more generally.

It is a pleasure to appear before you to discuss the national sea grant program as it enters its 10th year. The Pell-Rogers Act was adopted in 1966, setting in motion a most creative and innovative effort to explore, develop, conserve and manage this Nation's ocean resources. No other oceanic program has the breadth and scope and the diversity of purpose commensurate with the important oceanic challenges facing us.

In a world of energy shortages, limited food supplies, and deteriorating environment, the sea grant college program has measured up to pressing needs.

As the Administrator of the NOAA, I can say that it has given our organization a dimension for action that has been unique and invaluable. It has given us the ability to involve America's academic institutions in the work of NOAA.

It is appropriate that we review the accomplishments of the sea grant program during its first decade, and explore what directions the program might take in the future.

It is difficult to describe the many accomplishments of the sea grant program during the past decade, and statistics only provide a one dimensional view, however impressive it may be.

For example, we have established eight sea grant colleges. Located in Rhode Island, Texas, California, Oregon, Washington, Hawaii, Wisconsin, and New York—

Senator PELL. That is eight now?

Dr. WHITE. Yes, sir.

These institutions have demonstrated excellence in the many fields of marine affairs. We support over 700 individual projects in approximately 160 educational institutions. Many of these projects are in partnership with industries and State agencies.

The act requires the establishment of efforts in applied research, education, and in the provision of advisory services. These purposes have been achieved. The NOAA Marine Advisory Service, operated by the Office of the Sea Grant on behalf of all NOAA, presently has 200 agents in 26 States. These agents work directly with the people who earn their living from the sea, advising them on how to be more efficient and more productive, and assisting in the development of new products and services.

One of the outstanding achievements of the sea grant program has been the stimulation of motivation within the States to build marine capabilities so that they can develop their individual marine resources.

The Sea Grant Act requires only one-third matching funds. At the present time, our sea grant institutions are putting up more than 40 percent of the funds. The sea grant program has clearly had a multiplier effect.

Congress directed that the sea grant program foster marine education. Our educational emphasis has been placed on engineering, technician training, law and economics. At this moment, over 700 graduate students and almost 400 undergraduate students receive partial or full support from the sea grant program. They are involved in marine problems associated with energy, food, minerals, and the environment.

The contributions made by the sea grant program are impressive. It is not possible in the time available to go into great detail, so I would like to examine briefly how it is contributing in the solving of our energy, fisheries, environmental, and coastal zone problems.

The sea grant institutions have been active in many aspects of our offshore energy exploration and development programs. Sea grant institutions were among the first to conduct studies of the onshore impact of offshore oil and gas development. Sea grant institutions are deeply involved in the conduct of environmental baseline studies for the Department of the Interior.

Senator HOLLINGS. Is it better that we wait until you complete your statement? Because right there, regarding the baseline studies with the Department of Interior—could you elaborate on that for us, Dr. White?

Dr. WHITE. I would be glad to, Mr. Chairman.

As you know, the Department of Interior has a program of the order of \$50 million each year, directed at acquiring the necessary

information about the environment to identify the impact of oil and gas developments on our Continental Shelf on marine ecosystems and other physical conditions of the ocean. These studies are carried out in all frontier areas in various ways by the Department of Interior. In Alaska, in particular, we are responsible for them.

Senator HOLLINGS. What proportion? There have been some misgivings about it, in that many say what they are studying out there has no relation to onshore impact. This comes from the governors, the States themselves, and those working with coastal zone management programs.

I don't want to exaggerate and say they have been studying plankton and other things like that while overlooking any kind of onshore impact, but they have yet to find the real value of those baseline studies. Is that an unfair criticism or have you heard that yourself, and what has been going on with those baseline studies other than the fact you say they are going on?

Dr. WHITE. I have heard the criticisms.

I think that if we are going to understand what the impact of oil and gas development on the Continental Shelf is, we certainly have to understand what the impact will be on, say marine ecosystems.

In order to understand the impact on marine ecosystems, you have to know what the nature of the marine ecosystem is today, so you can measure any changes. What is now going on is trying to find out what kinds of living things might be affected in the areas where they may develop oil and gas.

We have to know what might happen, for example, if there is a blowout or spill and hence, we have to know something about ocean currents. We have to know something about the nature of the winds that might affect the spills. So I have heard the criticism, but I think the information being generated would be necessary in any case.

Senator HOLLINGS. I am not talking about the necessity.

Let's jump to Alaska. Alaska has a May date, I think, for sale of 1.1 million acres—an April date, Senator Stevens says.

But what I am asking is how long will that be before you have the information that is needed about the offshore Alaskan waters to make the lease sale decision?

You don't have that information, it hasn't been provided. They are presently engaged in the baseline studies with no idea of being able to provide that information prior to the sale.

Dr. WHITE. I think the facts are that the full information that we need to make a complete environmental assessment will not be ready by that time.

On the other hand, there will be information available on which decisions can be made. It will be the best information that can be obtained within that time period. I don't think anybody proposes that all of the information that is necessary will be available.

But there will be information available on the basis of which the Department of Interior can make its decision.

Senator HOLLINGS. I am trying to get an idea of what kind of information and to what degree or what percentage of the baseline studies will have been completed by April.

Dr. WHITE. I can't give you a percentage now Mr. Chairman, but I can provide you with that information after I have looked into the details.¹

Senator HOLLINGS. Getting right to the thrust of this particular bill, why is Interior doing that rather than NOAA? Why has this baseline study been the responsibility of the Department of Interior rather than your agency?

Dr. WHITE. That is the way the law presently reads, Mr. Chairman. The agency responsible for taking the Federal action is also responsible for preparing the environmental impact statement, and hence responsible for seeing to it that the environmental assessment work is done, which has to go into an environmental impact statement.

Now, the Federal actions that require environmental impact statements are being taken by the Department of Interior, and hence the law requires them to go out and get that information.

Now, they have used many groups to get this information; along the east coast and the gulf they have used universities and other groups.

In the Alaskan area, because of its remoteness, and the kinds of vessels that are required, they have asked us to manage that.

Senator HOLLINGS. And you are managing it up in Alaska; is that right?

Dr. WHITE. Only in Alaska, sir.

Senator HOLLINGS. When will that be completed?

Dr. WHITE. I will have to give you the accurate information for the record, Mr. Chairman. But it is a program that will take at least several years.²

Senator HOLLINGS. At least several years.

Senator STEVENS. Mr. Chairman, I don't think it will be complete for many years. That is 70 percent of the Outer Continental Shelf. The real question is: How much of the work must be done to get a full and accurate picture on the proposed oil and gas development and get some benchmarks against which any detrimental developments might be measured?

Senator HOLLINGS. I will ask my colleague. I am really talking about that 1.1 million acre area, if it takes several years for the entire State of Alaska—but the particular area involved, will it be completed in time for the impact statement?

Dr. WHITE. Our responsibility, Mr. Chairman, is to feed into the preparation of the impact statement whatever environmental information we will have obtained by that date.

So we will provide whatever information we have and it will be as accurate as possible.

Senator STEVENS. As a result of the study, they deleted a substantial amount of the land from the proposal. They had—I forget how many million, but they have knocked it down to about 1.1 million acres.

¹ See p. 92.

² See p. 92.

We are most interested in continuing that work. The first thing would be exploration work. By the time we get to development, we want as much information as Dr. White can get because it is at the time, when development occurs, that meaningful stipulations to the development plans in terms of protection of the resources must be made.

Might I ask, how much money have you been provided in the last 2 years from Interior in connection with the proposed OCS leasing plan?

Dr. WHITE. Let me give you the accurate dollar amount for the record, but it is of the order of \$20 to \$24 million.¹

Senator HOLLINGS. \$20 to \$24 million.

Dr. WHITE. In that vicinity, sir.

Senator HOLLINGS. Of course, that is substantial.

I understand that you can only furnish the information you have on hand. That is not what bothers me. What bothers me is that when I called Interior, I couldn't find anybody in charge of this program—within the Government, and NOAA in particular.

It seems to me we could forego a lot of the lawsuits if we had the necessary information.

We have seen two lawsuits in California, and we are going to have them in Alaska. The Council on Environmental Quality and EPA have asked Interior to forestall on this particular lease sale.

The Department of Interior points out they have an advisory committee with representatives of the Governors and representatives of the citizens at large appointed by the secretary, and they asked them to forestall and they will not; they just barrel right ahead. We know from the Alaska pipeline case that any good lawyer or group of them can tie you up for 4 years—why? Because you don't know.

So my question is, Dr. White, not how much you will know in the sense that you are going to furnish how much you know—that is obvious to me—but will it be sufficient to classify and qualify for an environmental impact statement from your experience if you had to rule on the environmental impact statement?

Will these baseline studies be far along enough, not to be conclusive for the entire State of Alaska, but at least of a conclusive nature for the 1.1 million acres in order to formulate an environmental impact statement?

Dr. WHITE. I guess I can only answer you, Mr. Chairman, in a personal sense, assessing that as a scientist, because the Secretary of Interior is charged with making a very difficult decision; he has to examine all of the information in front of him.

My preferences are that we need more information than we presently have.

However, in making decisions, very frequently we don't have all of the information we need. In this case the Secretary has to balance environmental consequences against what he perceives to be the need for energy or oil and gas resources.

¹ See p. 92.

It is a very difficult decision, but I would feel personally more comfortable with more information about environmental impact than we presently have.

Senator HOLLINGS. Thank you very much.

You may proceed.

Dr. WHITE. I was trying to make the point, Mr. Chairman, that it is the institutional capability we set up in sea grant that has enabled many of the institutions to participate in programs such as the baseline study programs.

At the request of the Council on Environmental Quality, the network of sea grant institutions conducted the fine study of probable impact of installation and operation of deep water ports at 11 different sites along our coasts. Sea grant is currently funding 35 projects at 14 institutions related to oil and gas development on the Continental Shelf.

We are supporting work in ocean engineering, environmental effects, policy studies and regulation, and education.

Sea grant continues to make a major commitment to the development of fisheries resources, through its program in aquaculture and its support of improved fishery technology and utilization. This work is done in close collaboration with the National Marine Fisheries Service.

Over 20 projects at 14 institutions are supported which relate to problems of extended jurisdiction.

Sea grant is the only program with an explicit statutory charge to develop aquaculture. We are expanding \$3.7 million in fiscal year 1976, directed to the culture of shellfish, salmon and mixed species.

Sea grant's efforts in aquaculture are paying off. The most dramatic example has been the growth of a commercial pen-reared salmon industry in the Pacific Northwest.

Perhaps the broadest and most active thrust of the sea grant program has been directed at the coastal zone management problem. Sea grant has been able to contribute effectively to the development of State coastal zone management efforts because of its interdisciplinary nature. Sea grant institutions have brought to bear teams of scientists, engineers, lawyers, economists, and public administrators on coastal problems.

No other program has been so equipped to analyze the intersecting impacts of marine recreation, marine transportation, protection and management of fisheries, mining and dredging, processes of coastal erosion, and the impact of offshore oil and gas development.

Sea grant was the first among the Government marine programs to emphasize the need for wise management of our coastal zones on a multiple use basis. Today our sea grant institutions represent a widely used resource for the States in the development of their coastal zone management programs.

For example, under sea grant sponsorship, the Massachusetts Institute of Technology has examined the question of oil spill impacts along the coastal zone.

The Universities of Delaware and Rhode Island have explored the social and economic effects of projected Outer Continental Shelf developments upon coastal areas.

Economists at Cornell have evaluated alternative leasing strategies and schedules for Outer Continental Shelf development.

As to the balance in the sea grant program between research, education, and advisory services, we are, at the present time, devoting about 58 percent of our resources to applied research projects, 23 percent to advisory services, and about 8 percent to the field of education.

As a matter of conscious decision on our part, we have been fostering the rapid growth of the advisory service. We believe strongly in translating and transferring knowledge and technology to increase productivity and efficiency in our marine industries.

On a percentage basis, I believe we are at the right balance now. I expect that the percentages of funds we devote to these three classes of activity will vary in the future as we meet new requirements.

We have been examining the extent to which the program should be responsive to local and regional needs as contrasted to national needs. The sea grant institutions and the governmental entities that provide matching funds sometimes perceive priorities differently from the Federal Government.

In the past, through a process of negotiation, we have been able to arrive at a satisfactory arrangement in which local and regional needs as well as national needs are met.

However, I think conditions are changing and we need to develop improved ways of encouraging sea grant institutions to focus on national problems without detracting from efforts directed at local and regional problems.

The growth of the sea grant program in the last several years has been held back because of a need to hold the Federal budget in check.

In the light of this circumstance, the question naturally arises as to how the sea grant program is expected to develop in the future. I have always taken the view that the destiny of the sea grant program is to involve in a manner that will provide a national network of institutions which can assure that this Nation's marine industries and activities can be the most efficient and productive in the world.

Senator HOLLINGS. That is exactly the thrust of this bill, and you welcome that, don't you?

Dr. WHITE. Yes, I do indeed, sir.

Senator HOLLINGS. Go right ahead, sir.

Dr. WHITE. Sea grant colleges and institutions are needed in our coastal States so that they can act as repositories of the knowledge, talent, expertise and facilities needed by our States and our Nation for the development and conservation of valuable ocean resources.

I recognize that the overall Federal fiscal picture will determine the rate at which these sea grant objectives are obtained.

Senator PELL. I was just adding up those percentages and it comes to 79 percent. What is the other 11 percent used for?

Dr. WHITE. It takes a certain amount of money, Senator Pell, to manage the program, pay Bob Abel's salary and the advisory committee and things of that nature.

Senator HOLLINGS. You sunk the director of sea grant before he could even get afloat there.

Senator PELL. You sank 58 percent for applied research, 23 advisory services, 8 percent education, and 11 percent is the cost of administration; is that correct?

Dr. WHITE. Yes.

Dr. ABEL. May I add something to that remark, Senator?

What we call program management includes the costs attendant upon the sea grant directors in the field relating to their communications staffs, and what we call flexibility or discretionary funds, with which they can attack short-term problems given them by State and local governments perhaps on an overnight basis, without having to prepare proposals.

Senator PELL. That would be an advisory service, wouldn't it?

Dr. ABEL. It overlaps to some degree, sir.

Dr. WHITE. Mr. Chairman, I would like to comment now on some of the major features of S. 3165, the Ocean and Coastal Resources Act of 1976, and S. 709, the Marine Science, Engineering and Resources Development Act of 1975.

The thrust of these bills is to strengthen the Nation's marine science, engineering and resource programs by providing for improved policy formulation, planning, coordination and management of these efforts both within NOAA and in the Federal Government as a whole.

S. 3165 also seeks to improve the sea grant program and NOAA's marine advisory services. I strongly support these objectives.

The bills establish specific statutory mechanisms for carrying out these objectives. Policy formulation, planning and coordination, which involve the activities of many Federal agencies, are best carried out by an interagency body of top level policy officials representing the various agencies and departments of the Government.

S. 709 seeks to achieve this by establishing a Marine Council at the Cabinet level. I concur that such a policy body is needed at this level, but feel that the timing, composition and functions should be left to the decision of the President.

Senator HOLLINGS. Could you carry on, pending a decision by the President, that kind of coordination yourself? As the Administrator of NOAA, aren't you finding yourself with sea grant and all of these other problems in that particular capacity or role more and more each day?

Dr. WHITE. To the extent that such a function exists in the Federal Government today, I think it largely falls to me in my capacity as a chairman of the Interagency Committee for Marine Science and Engineering.

Senator HOLLINGS. And that is working, isn't it? It could work even more, I think, under Secretary Richardson, because he seems to be interested in it.

Dr. WHITE. I believe he is, indeed, sir.

I have good reason to believe, Mr. Chairman, that the administration will act quickly on this matter of a Cabinet level policy committee.

In the absence of such a policy and planning body, the provisions of S. 3165 to assign responsibility to NOAA for preparing a national plan with the assistance of other agencies could accomplish the national planning objectives but with greater difficulty.

S. 3165 also specifies a statutory framework to insure the necessary policy formulation, planning, coordination, review and implementation of the marine science, technology and resource efforts within the National Oceanic and Atmospheric Administration. It does this by the establishment of an Office of Marine Resources, Science, and Technology.

This concept conforms in many ways to our present arrangement for discharging these functions in NOAA and makes good sense from our point of view. The only concern I have is that by so precisely defining the organizational and functional details of this office in the statute, the latitude necessary to any administrator to organize to meet changing needs is unnecessarily constrained.

Senator HOLLINGS. Can you furnish for the record the proper language that you think would allow you that latitude?

Dr. WHITE. We would be glad to work with you in doing that, sir.

The new office proposed in S. 3165 should be principally concerned with the overall planning, coordination, monitoring, and policy formulation for all marine resource, science, and technology activities in NOAA, but not charged with the specific implementation of programs. Implementation should be left to the operating arms of NOAA.

In title II, S. 3165 would have the Director of the sea grant program report to the new Office of Marine Resources, Science, and Technology. I have always felt that the sea grant program was sufficiently important so that the Director should report directly to the Office of the Administrator. It can work as proposed in S. 3165.

In any case, it would be my intention to have the new Office of Marine Resources, Science, and Technology provide the policy guidance and review of the planning and operations of the sea grant effort on my behalf.

The present NOAA Marine Advisory Service is an integral part of the sea grant programs and its program manager reports to the Director. Some years ago, I took action to consolidate NOAA's advisory services in sea grant because I felt that this was the most effective way to draw upon the talents of the sea grant institutions and other arms of NOAA. I think it has worked well.

If the Congress decides to establish the new Ocean and Coastal Advisory Service as an entity separate from the sea grant program while still allowing for advisory services to be provided by sea grant institutions, we will exert every effort to make it work well.

I concur that overview for policy, planning, and coordination of the Ocean and Coastal Advisory Service should reside within the new Office of Marine Resources, Science, and Technology.

We would be pleased to work with the committee to work out modifications to the language of the act that would be more acceptable and would strengthen and advance the marine science, technology, and resource programs within NOAA.

I should note, however, that there are a number of other specific provisions which may be concern to the administration or to agencies which have an interest in marine programs or in improving management of existing Federal programs who will have some specific suggestions after they have had an opportunity to study the bills.

Lastly, I should like to bring to the attention of the committee the fact that the administration has submitted its proposal for re-authorizing the sea grant program. It provides for a funding authorization of \$25 million. This proposal is being made in line with the President's desire to continue to restrain the growth in Federal spending.

I will be glad to answer any questions you may have.

[The statements follow:]

STATEMENT OF DR. ROBERT M. WHITE, ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. Chairman, members of the Committee, it is a pleasure to appear before you to discuss the National Sea Grant Program as it enters its tenth year. The Pell-Rogers Act was adopted in 1966, setting in motion a most creative and innovative effort to explore, develop, conserve and manage this Nation's ocean resources. No other oceanic program has the breadth of scope and the diversity of purpose commensurate with the important oceanic challenges facing us. In a world of energy shortages, limited food supplies, and deteriorating environment, the Sea Grant College Program has measured up to pressing needs.

As the Administrator of the National Oceanic and Atmospheric Administration, I can say that it has given our organization a dimension for action that has been unique and invaluable. It has given us the ability to involve America's academic institutions in the work of NOAA.

It is appropriate that we review the accomplishments of the Sea Grant program during its first decade. It is appropriate, also, to explore what directions the program might take in the future. We are indeed entering a new oceanic era. Congress is close to passage of a bill to extend U.S. fisheries jurisdiction to 200 miles, and is considering new marine mining legislation, amendments to the Coastal Zone Management Act, and the Outer Continental Shelf Lands Act. All these actions take place against a background of international negotiation on a new Law-of-the-Sea. We cannot rest on our laurels. We should consider the role of the Sea Grant program in its second decade.

How does one describe the many accomplishments of the Sea Grant College Program during the past decade? Statistics can only provide a one-dimensional view, however impressive. For example, eight Sea Grant Colleges have been designated by the Secretary of Commerce under terms of the Act. Located in Rhode Island, Texas, California, Oregon, Washington, Hawaii, Wisconsin and New York, these institutions have demonstrated excellence in the many fields of marine affairs. We support over 700 individual projects in approximately 160 educational institutions. Many of these projects are in partnership with industries and state agencies.

The Act requires the establishment of efforts in applied research, education and in the provision of advisory services. These purposes have been achieved. The NOAA Marine Advisory Service, operated by the Office of Sea Grant on behalf of all NOAA, presently has 200 agents in 26 states. These agents work directly with the people who earn their living from the sea, advising them on how to be more efficient and more productive, and assisting in the development of new products and services. They work also with people who spend their leisure time on or near the ocean, boating, fishing, and bathing, and with the businesses that serve the growing public demand for marine recreation.

One of the outstanding achievements of the Sea Grant program has been the stimulation of motivation within the states to build marine capabilities so that they can develop their individual marine resources. The Sea Grant Act requires only one-third matching funds. At the present time, our Sea Grant institutions are putting up more than 40 percent of the funds. The Sea Grant program has clearly had a multiplier effect. Federal funds have generated a

sizable outpouring of state and local resources. Also, with a core of Sea Grant support, universities have been able to procure funding for research from other state and Federal agencies, industries and private organizations.

Congress directed that the Sea Grant program foster marine education. Our educational emphasis has been placed on engineering, technician training, law and economics. At this moment over 700 graduate students and almost 400 undergraduate students receive partial or full support from the Sea Grant program. They are involved in marine problems associated with energy, food, minerals, and the environment.

The contributions made by the Sea Grant program are impressive. It is not possible in the time available to go into great detail, so I would like to examine briefly how it is contributing in the solving of our energy, fisheries, environmental and coastal zone problems.

The Sea Grant institutions have been active in many aspects of our offshore energy exploration and development programs. Sea Grant institutions were among the first to conduct studies of the onshore impact of offshore oil and gas development. Sea Grant institutions are deeply involved in the conduct of environmental baseline studies for the Department of the Interior. The institutional capability enabling us to respond to this urgent need was developed in part through the Sea Grant support. At the request of the Council on Environmental Quality, the network of Sea Grant institutions conducted the fine study of probable impact of installation and operation of deep water ports at 11 different sites along our coasts. Sea Grant is currently funding 35 projects at 14 institutions related to oil and gas development on the Continental Shelf. We are supporting work in ocean engineering, environmental effects, policy studies, and regulation and education. Sea Grant institutions in Texas, Oregon, Hawaii and Massachusetts are working on new designs of offshore platforms and pipelines to make them more stable and less hazardous for workers. New techniques for underwater welding and cutting are being examined at MIT. At Woods Hole, under Sea Grant support, physical and biochemical effects of oil on selected species of fish are being studied. Similar studies of the impact of oil on living resources are being undertaken at the University of Alaska, and in Louisiana.

Sea Grant continues to make a major commitment to the development of fisheries resources, through its program in aquaculture and its support of improved fishery technology and utilization. This work is done in close collaboration with the National Marine Fisheries Service. Over 20 projects at 14 institutions are supported which relate to problems of extended jurisdiction.

Sea Grant is the only program with an explicit statutory charge to develop aquaculture. We are expending \$3.7 million in fiscal year 1976, directed to the culture of shellfish, salmon and mixed species. Sea Grant's efforts in aquaculture are paying off. The most dramatic example has been the growth of a commercial pen reared salmon industry in the Pacific Northwest. Commercial production of pen reared salmon in the States of Washington and Oregon has increased from zero in 1970 to a projected 1.7 million pounds in 1975. Substantial private investment is now moving into this industry.

Fisheries has been an area of some priority in our Marine Advisory Service. We are trying to increase the productivity, safety and economic payoff for the fisherman on the line. Sea Grant efforts to aid the fisherman have resulted in new techniques of preserving both fish and bait, improved mechanisms for hauling and maneuvering nets and trawls, methods of exclusion of unwanted organisms from fish hauls and new engineering for block and tackle.

Perhaps the broadest and most active thrust of the Sea Grant program has been directed at the coastal zone management problem. Sea Grant has been able to contribute effectively to the development of state coastal zone management efforts because of its interdisciplinary nature. Sea Grant institutions have brought to bear teams of scientists, engineers, lawyers, economists and public administrators on coastal problems. No other program has been so equipped to analyze the intersecting impacts of marine recreation, marine transportation, protection and management of fisheries, mining and dredging, processes of coastal erosion and the impact of offshore oil and gas development.

Sea Grant was the first among the Government marine programs to emphasize the need for wise management of our coastal zones on a multiple use basis. Today our Sea Grant institutions represent a widely used resource for the states in the development of their coastal zone management programs. For

example, under Sea Grant sponsorship, the Massachusetts Institute of Technology has examined the question of oil spill impacts along the coastal zone. The Universities of Delaware and Rhode Island have explored the social and economic effects of projected outer continental shelf developments upon coastal areas. Economists at Cornell have evaluated alternative leasing strategies and schedules for outer continental shelf development. The University of California and the University of North Carolina have successfully established means of combating certain kinds of erosion along coastal shorelines. Floating breakwaters for wave protection have been developed at the University of California and University of Rhode Island. And not the least of our impact has been upon the students who have graduated through Sea Grant programs and who are now being employed in the states and in the Federal Government on problems of coastal zone management.

I have described but the tip of the iceberg. Dr. Abel has prepared a detailed statement for the record, and is here to answer questions. We would be pleased to provide whatever additional documentation is required on these and other contributions of the program.

As to the balance in the Sea Grant program between research, education and advisory services, we are, at the present time, devoting about 58 percent of our resources to applied research projects, 23 percent to advisory services, and about 8 percent to the field of education. As a matter of conscious decision on our part, we have been fostering the rapid growth of the advisory service. We believe strongly in translating and transferring knowledge and technology to increase productivity and efficiency in our marine industries. On a percentage basis, I believe we are at the right balance now. I expect that the percentages of funds we devote to these three classes of activity will vary in the future as we meet new requirements.

We have been examining the extent to which the program should be responsive to local and regional needs as contrasted to national needs. The Sea Grant institutions and the Governmental entities that provide matching funds sometimes perceive priorities differently from the Federal Government. In the past, through a process of negotiation, we have been able to arrive at a satisfactory arrangement in which local and regional needs as well as national needs are met. We need to develop improved ways of encouraging Sea Grant institutions to focus on national problems without detracting from efforts at local and regional problems.

The growth of the Sea Grant program in the last several years has been held back because of a need to hold the Federal budget in check. In the light of this circumstance, the question naturally arises as to how the Sea Grant program is expected to develop in the future. I have always taken the view that the destiny of the Sea Grant program is to evolve in a manner that will provide a national network of institutions which can assure that this Nation's marine industries and activities can be the most efficient and productive in the world. Sea Grant colleges and institutions are needed in our coastal states so that they can act as repositories of the knowledge, talent, expertise and facilities needed by our states and our Nation for the development and conservation of valuable ocean resources. I recognize that the overall Federal fiscal picture will determine the rate at which these Sea Grant objectives are obtained.

I would like to reiterate that the Sea Grant College Program Act has resulted in the establishment of one of the most vigorous and diversified marine programs in the United States. It has taken advantage of the talents throughout our country, building institutions which can serve local, regional as well as national needs. These institutions can be the essence of a great ocean renaissance in this Nation.

Mr. Chairman, I would like to comment now on some of the major features of S. 3165, the Ocean and Coastal Resources Act of 1976 and S. 709, the Marine Science, Engineering, and Resources Development Act of 1975.

The thrust of these bills is to strengthen the Nation's marine science, engineering and resource programs by providing for improved policy formulation, planning, coordination and management of these efforts both within NOAA and in the Federal Government as a whole. S. 3165 also seeks to improve the Sea Grant program and NOAA's Marine Advisory Services. I strongly support these objectives.

The bills establish specific statutory mechanisms for carrying out these objectives. Policy formulation, planning and coordination, which involve the activities of many Federal agencies, are best carried out by an interagency body of top level policy officials representing the various agencies and departments of the Government. S. 709 seeks to achieve this by establishing a Marine Council at the Cabinet level. I concur that such a policy body is needed at this level, but feel that the timing, composition and functions should be left to the decision of the President. In the absence of such a policy and planning body the provisions of S. 3165 to assign responsibility to NOAA for preparing a National Plan with the assistance of other agencies could accomplish the national planning objectives but with greater difficulty.

S. 3165 also specifies a statutory framework to insure the necessary policy formulation, planning, coordination, review and implementation of the marine science, technology and resource efforts within the National Oceanic and Atmospheric Administration. It does this by the establishment of an Office of Marine Resources, Science and Technology. This concept conforms in many ways to our present arrangement for discharging these functions in NOAA and makes good sense from our point of view. The only concern I have is that by so precisely defining the organizational and functional details of this office, the latitude necessary to any Administrator to organize to meet changing needs is unnecessarily constrained. The new office proposed in S. 3165 should be principally concerned with the overall planning, coordination, monitoring and policy formulation for all marine resource, science and technology activities in NOAA, but not charged with the specific implementation of programs. Implementation should be left to the operating arms of NOAA.

In Title II, S. 3165 would have the Director of the Sea Grant program report to the new Office of Marine Resources, Science and Technology. I have always felt that the Sea Grant program was sufficiently important so that the Director should report directly to the Office of the Administrator. It can work as proposed in S. 3165. In any case, it would be my intention to have the new Office of Marine Resources, Science and Technology provide the policy guidance, and review of the planning and operations of the Sea Grant effort on my behalf.

The present NOAA Marine Advisory Service is an integral part of the Sea Grant programs and its program manager reports to the Director. Some years ago, I took action to consolidate NOAA's advisory services in Sea Grant because I felt that this was the most effective way to draw upon the talents of the Sea Grant institutions and other arms of NOAA. I think it has worked well.

If the Congress decides to establish the new Ocean and Coastal Advisory Service as an entity separate from the Sea Grant program, while still allowing for advisory services to be provided by Sea Grant institutions, we will exert every effort to make it work well. I concur that overview for policy, planning and coordination of the Ocean and Coastal Advisory Service should reside within the new Office of Marine Resources, Science and Technology. We would be pleased to work with the Committee to work out modifications to the language of the Act that would be more acceptable and would strengthen and advance the marine science, technology and resource programs within NOAA.

I should note, however, that there are a number of other specific provisions which may be of concern to the Administration or to agencies which have an interest in marine programs or in improving management of existing Federal programs who will have some specific suggestions after they have had an opportunity to study the bills.

Lastly, I should like to bring to the attention of the Committee the fact that the Administration has submitted its proposal for reauthorizing the Sea Grant program. It provides for a funding authorization of \$25 million. This proposal is being made in line with the President's desire to continue to restrain the growth in Federal spending.

STATEMENT OF DR. ROBERT B. ABEL, DIRECTOR, NATIONAL SEA GRANT PROGRAM
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Mr. Chairman, Members of the Committee: I am particularly pleased to return to this Subcommittee to discuss the National Sea Grant Program on the tenth anniversary of its enactment. The National Sea Grant Act, also known as

the Pell-Rogers Act, was signed into law as PL 89-688 on October 17, 1966. At that time, the Sea Grant Program was placed in the National Science Foundation. In 1970, the Sea Grant Program was transferred to the National Oceanic and Atmospheric Administration (NOAA). For the current fiscal year, the Sea Grant budget is \$23.1 million.

From its inception, the Sea Grant Program, in accordance with its legislative directive, has worked toward the development of the skilled manpower (including scientists, economists, lawyers, engineers, and technicians) and the equipment necessary for the exploitation of marine resources, and has supported research in Coastal Zone Management, ocean engineering, living and mineral resources (including aquaculture), and their affiliated technologies.

The Act also provided for the establishment of a program of Sea Grant Colleges and education, training, research, and advisory services in the fields of marine science, engineering, and related disciplines. At this point in time, the Secretary of Commerce has designated eight participating institutions (Texas A&M University, University of Rhode Island, University of Washington, Oregon State University, University of Hawaii, University of Wisconsin, University of California, and the State University of New York/Cornell University) as Sea Grant Colleges, and two others are currently under consideration. The intervening 10 years from the Program's beginning have seen increasing public response from industry, from state and local governments, from professional associations, from the universities themselves, from the other Federal agencies with whom we interact, and from users and beneficiaries of Sea Grant research and education programs within the public at large.

I would like to discuss the Program's growth and development from a number of viewpoints. First, as both the founding Act and subsequent Congressional reviews have made plain, Sea Grant's fundamental index of measurement is productivity. Accordingly, I would like to offer a few highlights of our activities since your previous examination of the program three years ago.

The focus of the Sea Grant Program is, of course, the development and wise use of marine resources. From the beginnings of the Program, however, it has been clear that the most pressing problems faced by the Nation concerning the use or management of marine resources occur in the coastal zone. Not only is it true that in this zone we find the most economic potential, but also we find multiple demands or the familiar multiple use conflicts.

It is characteristic of Sea Grant that most of the research and almost all of the advisory service efforts are related to use of coastal resources. This is not apparent from the category statistics, because we have found it useful to break down the classifications into much more detail. To give two very recent examples, the two most recent reports received from the Wisconsin Sea Grant are: *The Green Bay Watershed: Past/Present/Future* and *The Great Lakes Transportation System*. In both cases, the research work which was conducted over a period of several years was not classified under our "Coastal Zone Management" category, but is included under "Ecosystems Research," "Pollution Studies," "Environmental Models," and "Transportation Systems." The products, however, are presented as analyses of the management of specific coastal resources.

This dedication to better decision making and better use of coastal resources can be noticed also in what might be called "spin-off" effects of Sea Grant support. An example of this is the recent study by the University of Rhode Island, Coastal Resource Center for the New England Regional Commission entitled *Fishing and Petroleum Interactions on Georges Bank*. This was not a Sea Grant project. However, the Coastal Resource Center was started by Sea Grant and its capability is maintained by Sea Grant support of other related studies.

Ocean engineers at Texas A&M University, Oregon State University, the Universities of California, Rhode Island, Hawaii, and MIT, are developing new designs for offshore platforms, pipelines, and breakwaters—designs which will make these structures more stable under wind and wave attack and less hazardous for workers. Engineers at MIT are developing improved techniques for underwater welding and cutting. These techniques should extend the lives of underwater structures and reduce maintenance costs, with less risk to workers.

In 1973, a flexibility technique inherent in a Sea Grant institutional program was utilized by the Massachusetts Institute of Technology to explore a novel concept of using high energy electron irradiation to purify waste water and sludge. In all, Sea Grant has invested \$19,300 in the work. The early results were sufficiently encouraging that a grant of \$113,000 was obtained from the National Science Foundation RANN program to complete the laboratory work. This has been followed by a \$198,000 grant for building, in cooperation with the Boston Metropolitan District Commission, a full pilot scale plant at the Commission's Deer Island sewage treatment facility.

Food has always received high priority in the Sea Grant Program. Sea Grant continues in its commitment to development of improved fishery technology and utilization of fish stocks, development of more efficient sea-food processing techniques, and development of economically viable methods for the culture of marine organisms.

Notable among Sea Grant's efforts in waste utilization has been our chitin-chitosan project. Chitosan is a marine polymer derived from chitin, the structural material in the shells of crustaceans. Through a purchase agreement with Food, Chemical and Research Laboratories, Inc., in Seattle, Sea Grant made pilot plant production of chitin-chitosan available to literally hundreds of researchers in universities, industries, and other research institutions throughout the world. Scientists at Washington, Delaware, Georgia, and MIT have found that chitin-chitosan has considerable potential as a strength and bonding additive in specialty paper products, as a flocculant and coagulant for purification of various types of industrial wastes, and as a binding agent in non-woven fabrics. The continuing worldwide interest and the growing demand for the product promises a bright future for chitin-chitosan. Two companies have already begun production on a commercial basis.

In examining the area of ocean engineering, it became apparent that a number of university teams possessed expertise in beach protection that complemented that of the Army Engineers. Sea Grant is supporting research to study and implement methods to minimize shoreline and estuary erosion. These methods are being utilized successfully on all of our coastlines and as well in a number of foreign countries.

In Oregon, the cost of replacing a wood pile exceeds \$500. Oregon State University scientists have found that the life of a wooden pile can be extended indefinitely utilizing a combination of fumigant treatment (to destroy fungi and insects) and standard creosote preservation techniques. Potential savings from reduction in pile replacement alone are estimated at \$50 million annually.

Sea Grant's programs in education and training continue to provide specialized course and curricular opportunities in various marine fields. Of at least equal importance to the number of students now enrolled in these programs, is the aggregate record students have already compiled since graduation. To the purpose, I would like to provide such a listing for the record¹ and simply describe a few highlights.

Sea Grant sponsored the development of a Master of Marine Affairs Program at the University of Rhode Island. This program provides a one-year interdisciplinary graduate curriculum in oceanography, ocean engineering, marine resource economics, geography, and law. Particular emphasis is placed on the decision-making process involved in the formulation of national oceanic policy.

Typical students in this program at Rhode Island are people on leave of absence from government or private institutions to obtain a broader background in marine activities. Officers from the Naval War College in Newport are also enrolled. One of the more prominent graduates from this program is Mr. Robert Knecht, NOAA's Assistant Administrator for Coastal Zone Management.

The Sea Grant sponsored technical training programs specialize, among other things, in diving technology, shipboard operations, undersea welding and construction, data processing, fisheries technology, boat handling, etc.

Santa Barbara City College initiated its Marine Technology Training Program with Sea Grant support in 1968. Approximately 50 students are admitted to the program each year, receiving classroom training in marine science, in addition to technical diving instruction. The objectives of this particular

¹ The material is in the committee files.

curriculum are to give students a basic understanding of the marine environment in which they will work and to prepare qualified diving technicians to meet the needs of offshore industries.

The principal measure of success of a technician training program is the employability of its graduates. In this regard, Santa Barbara City College has placed over 80 percent of its diving technician graduates in positions in the diving industry, and a number of them have already moved into responsible supervisory positions.

Closing the loop between research and user application, is the Marine Advisory Service. As discussed in previous hearings, this part of the Sea Grant Program, dealing with extension education and technology and information transfer, originally had a somewhat slower beginning. It had to struggle for recognition, especially in the universities which accommodated easily to applied marine research and education but which had lacked extension service programs previously encompassed only by Land Grant Colleges. The service acquired momentum as Sea Grant moved into NOAA and, in late 1972, the NOAA Administrator, Dr. White, provided added stimulus by creating the NOAA Marine Advisory Service and having it administered by the Sea Grant Office. Under the direction of the first Program Manager, Howard H. Eckles, until mid-1975, and since then under Robert J. Shephard, the Advisory Services have been flourishing.

There are now 37 marine advisory programs in coastal and Great Lakes States, plus Guam and American Samoa. There are also two regional advisory programs developed to provide services of a regional nature versus a strictly local nature by fostering interstate cooperation among programs and by sharing unique resources. The Pacific Sea Grant Advisory Program (PASGAP) has a membership of 5 States, Guam, the National Marine Fisheries Service, and one Canadian Province. The New England Marine Advisory Service (NEMAS) is composed of 6 States. Programs in other geographic areas, having observed the achievements of these two regional organizations, are now discussing the possibility of forming similar associations to better serve the people of their respective areas.

It is the Marine Advisory Service which distinctly marks the Sea Grant Program as a unique granting enterprise because it provides a mechanism for getting the results of the research programs out to those people and organizations who will use it. Through this service, the massive store of knowledge and expertise housed within our universities and colleges is being made available on a real-time basis to the actual users and developers of our marine resources. Operating through such extension techniques as town hall meetings, workshops, bulletins, pamphlets, and radio announcements and, most importantly, through person-to-person contacts, the advisory service agents have been able to educate the public and chalk up some rather impressive achievements.

As the Marine Advisory Service has grown in size and productivity over the past few years, it has become apparent that this program which is so locally oriented is, in a sense, a national program of unified direction, even though composed of many diverse projects. A problem common in nature to our several coasts may require different solutions tailored to specific local needs. Thus, although advisory agents in Georgia and Washington both provide service to recreational fishermen, they must do so in diverse ways because the needs and aspirations of a recreational fisherman in the warm marshes of coastal Georgia may be vastly different from those of someone fishing the cold waters of the north Pacific. Nonetheless, they are working toward the same goals, the transfer of knowledge to those people who will use it to more effectively develop and utilize our marine resources.

The excellent progress made by the Marine Advisory Service since the program's transfer to NOAA has enabled the Sea Grant Program, in Dr. White's words, to achieve a close circuit state. This refers to the program's capability, unique in government, to sponsor productive marine research and development, accomplished by persons trained under the program's auspices and to convey the goods and services produced therefrom to the user community. Equally significant, the Marine Advisory Service, in conjunction with the other elements of the Sea Grant network, offers these groups the opportunity to provide feedback to the Sea Grant Program by commenting on the quantity and quality of Sea Grant Services, and even more important, on their local needs and opportunities. This feedback forms an important segment

of the body of counsel by which the Sea Grant Program has been guided. For these reasons, the Marine Advisory Service is regarded as integral and crucially important to the Sea Grant Program.

For the past year, the Sea Grant Staff, Advisory Panel, and Sea Grant Directors have been revising our statement of goals to aid the Sea Grant Program's basic planning process. It is a comprehensive statement of the way we expect the Program to continue to meet new demands in fulfilling the basic objectives of the Act.

This statement of goals tackles the issue of priorities. This is not a simple problem. In the first place, national priorities are ephemeral, to say the least. In Sea Grant's short life time, food, environmental protection, energy, and law of the sea have paraded kaleidoscopically across the public horizon. To complicate matters, local needs do not always parallel national priorities in relative importance to one another.

Sea Grant has ordered its relative emphases based on its founding Act, elaborated by hearings and committee reports; national priorities as recognized by the NOAA Administrator and the Sea Grant Advisory Panel; and local needs and opportunities as expressed by the Sea Grant Directors and their local advisory boards.

Under these circumstances, we have allocated our resources this year among research, education, and advisory services as already explained by Dr. White. Further, our research funds are subdivided as follows:

	<i>Percent</i>
Aquaculture -----	23
Coastal zone management -----	24
Fisheries -----	12
Engineering -----	21
Socio-economic and legal issues -----	12

I would like to submit this statement of goals for the record.¹

While most of our effort takes place in the multi-project (coherent, institutional, or Sea Grant College) programs, about 10 percent of our funding goes to individual projects. My colleagues and I believe that between 10 and 15 percent of Sea Grant funds should continue to support individual projects.

The planning process of the Sea Grant Program has to take into account the multiplicity of relationships with and attraction for marine and marine-related interests. In its first 10 years, the Program has attracted the attention of an increasing number of interests; e.g., the National Advisory Committee on Oceans and Atmosphere, the National Security Industrial Association, the National Chamber of Commerce, the National Academy of Science, the National Academy of Engineering, several Congressional committees and staffs, state and local governmental bodies, and a large number of fisheries organizations. Some of these are advisory to the United States Government. I would like to submit for the record¹ a recently compiled listing of Sea Grant information user groups, including state and local governmental units and private industry. This listing is not an exhaustive listing of Sea Grant user groups of this type, but it illustrates the extent to which Sea Grant information is used.

In several instances, programs initiated through the Sea Grant Program have been of such interest to other Federal agencies that they have since been adopted for sponsorship by these agencies, including assumption of the funding responsibility when the financial requirements exceeded Sea Grant's resources. In other instances, the teams assembled and information compiled by these Sea Grant programs have continued to function as major sources of technical advice for these other agencies. I would like to give a few examples at this point.

In 1971, interest in the establishment of facilities to accommodate Super-tankers (Superports) was such that the Sea Grant institutional program at Louisiana State University began a study of legal, environmental, economic, and engineering aspects of such developments. Major support came from the Louisiana Superport Task Force as well as Sea Grant. A first report was delivered in August 1972. The investigators were well positioned to con-

¹ The material is in the committee files.

tribute to an inter-institutional study of environmental vulnerability for CEQ in 1972. Subsequently, the environmental problems of pipelining through the marshes to Baton Rouge was recognized. A major study was funded by an industrial consortium interested in developing and operating a superport. Personnel who had been involved, over several years, in a Sea Grant study of the systems ecology of the marshes were major contributors and could draw upon the results of that study. The LSU team continues to function as a major source of technical advice to industry and government agencies without a requirement for Sea Grant support.

An early project given continuing support by Sea Grant was an imaginative scheme by investigators from Columbia University. Working from the Island of St. Croix, they would bring cold water up from deep in the Caribbean Sea and use it for a number of purposes. The temperature differential between deep and surface waters would be used to generate electricity. The cold water would be used to air condition buildings and to condense fresh water from the warm, moisture laden, trade winds. Finally, because of its high nutrient content, the deep water would be useful for culture of marine plants and animals for food. Although careful engineering studies were done on all aspects, it was only with the aquaculture option that funding was provided for a successful field demonstration. The Energy Research and Development Administration is capitalizing on the experience, employing the Sea Grant Columbia investigators to look into open ocean aquaculture as an important part of Ocean Thermal Energy Conversion development.

The University of Washington's Sea Grant College program has, over the years, prosecuted the development of acoustic methods for assessment of stocks of fishes. This built naturally on expertise developed in the University's Applied Physics Laboratory with Navy support. The fundamental physics was already well understood but careful equipment selection and intricate signal processing are required to obtain useable quantitative information. The work is continuing but already their equipment and techniques are being used by NOAA's National Marine Fisheries Service, by the State of Washington's Department of Fisheries, and by others for stock assessment necessary for regulation and research.

If I might insert a philosophical note here, while we are of course proud of the records of those projects which have been adopted for advanced development and utilization by other agencies, and while we recognize this graduation to be a significant criterion for success, my colleagues and I do not envision Sea Grant's role as limited to the provision of "seed money." Realistically, our Program's advance will occur as a result of what we have obviously sponsored to a point of clearly measurable utility rather than what we've handed off to others when its potential had been demonstrated.

To exemplify local satisfaction with, and support of, the Sea Grant Program, matching funds (prescribed in the Act at a minimum of one-third of any program's total cost) are, in actuality, closer to 50 percent. In other words, the Federal Government is close to being outmatched. This is fortunate because it partially alleviates a recurring problem: the demand for our services has far outrun the supply. We certainly wish we could satisfy the expanding groups of users who have begun to make their needs known clearly and unmistakably.

Additional approbation for the Sea Grant technique has emerged for a reason not contemplated in our planning. Apparently, as a result of government granting and contracting techniques for federally funded research, which had their birth during World War II, granting arrangements are normally consummated between Federal agency and individual investigator, who thus possesses a large degree of autonomy in his university. It has thus been difficult for the typical university to maintain any controls on the system. The Sea Grant Program changed this relationship drastically by unearthing an unusual manager-coordinator, the "Sea Grant Director." He is the person who formulates the universities' programs; recruits the scientist and engineer participants; puts the pieces into a coherent mosaic; sells the program to outside reviewers and the Washington office; and executes and controls the program on the campuses where it's carried out.

Through the establishment of the "Sea Grant Director," his eminent position in the university, and his coordinative, managerial, and financial controls (in effect, delegated him by NOAA), the university has recovered a large

share of its original authority through its Sea Grant Program. Needless to say, this has even further enhanced the climate under which the Sea Grant directors maintain the communications and coordination among one another.

Finally, Mr. Chairman, since all of the research, education, and advisory service in the world would be useless without the informational products to convey, it might be in order to mention our various informational services and techniques. The Sea Grant Program now produces about 50 informational products each month; the aggregate total is something over 3,000. They include, but are hardly limited to, such subjects as: techniques for revegetating denuded coasts and beaches; advice to aquaculturists and fishermen; new recipes for preserving and preparing fish; advances in extracting biomedicinals from marine organisms; and engineering advances in shore protection. I would like to submit a list of Sea Grant publications issued to date, for the record.¹ It is indexed by category and by institutions, and is produced by NOAA's Environmental Science Information Center (ESIC).

ESIC is not, however, the sole source of tabulations of Sea Grant publications. One copy of each document produced under Sea Grant auspices is forwarded to the National Sea Grant Depository at the University of Rhode Island, and the depository issues a composite listing semiannually. Finally, *Sea Grant 70's*, in its fifth year of operation at Texas A&M University, publishes both monthly and annual listings of Sea Grant publications. Samples of each of these journals will be provided for the record,¹ as an example of our philosophy of the broadest possible dissemination of Sea Grant products and services. There exist a number of other mechanisms by which potential users can examine the Sea Grant output and request products. Our office has tabulated these and is in process of publishing the listing which will be submitted for the record.¹

The final issue I should like to discuss concerns interrelationships between the universities' Sea Grant organizations and the state agencies to whom they often relate. In most cases, the relationships are those of natural affinity and collaboration is harmonious. In a few instances, this evolutionary process has not proceeded as quickly as we would like and we are taking special pains in these areas to promote cooperation. This, of course, requires, in turn, a close working relationship among the Office of Coastal Zone Management, the National Marine Fisheries Service and Sea Grant.

There remains much to do, both in improving and extending the Sea Grant Program's operation and in conveying its products and services to the public. However, I feel that the unique network of marine-oriented people which encompass the Sea Grant Program is a valuable resource and will continue to be an asset to the Nation as we become increasingly aware of the potential of the oceans to the well-being of its citizens.

Senator HOLLINGS. When you were talking about a national plan being prepared by NOAA, how would NOAA be better able to do this 6-year plan, in your opinion, Dr. White? What problems would confront you?

Dr. WHITE. You are dealing with an interagency problem. A national plan must involve the activities of many different agencies, all of which have certain statutory responsibilities.

To bring such a national plan together, then you must have the full participation of all of the agencies and departments involved.

Now given the manner in which you have drafted the bill which directs the various agencies to cooperate with NOAA in the preparation of such a plan, I think that scheme is workable.

I think the question that the committee should address is whether it wouldn't be better if a Cabinet-level committee such as is proposed either in Mr. Humphrey's bill or has been previously proposed is not a better mechanism. A committee at a Cabinet level can oversee the activities in the individual agencies. It may be a

¹The material is in the committee files.

better mechanism for doing that kind of thing, since then you would have the necessary lines of authority and direction coming out of the senior individuals in each of the departments.

Senator HOLLINGS. To come right down to it, it just depends on the personnel involved.

Dr. Wenk will be testifying tomorrow, and we had the right Cabinet level there, but Vice President Agnew at that time, only attended one meeting. That was the end of it.

Excuse me. Do you have some questions?

Senator PELL. I remember that. I think Senator Humphrey was so interested in it when he was Vice President, that may be why he introduced this bill.

I have a couple of questions.

In connection with the creation of the slot of associate administrator and putting sea grant under that, removing sea grant one echelon in the bureaucracy down the table of organization, what is your reaction to this move?

Do you think it would help, hinder, or have any effect upon the ability of sea grant to function?

Dr. WHITE. As I indicated in my testimony, Senator Pell, my preference would be to have the sea grant program report to me. My present practice, and the proposal in the bill are reasonably close in the following sense: I would certainly want the Associate Administrator for this new Office of Marine Resources, Science, and Technology to have the overview, not only of the sea grant program, but also what goes on in the Fisheries Service, the Ocean Survey, and other marine efforts.

The overview would provide policy formulation, monitoring the programs, reviewing the programs, making budgetary recommendations. A lot of those things are in the bill.

It is at the point where the bill says the Director of the sea grants program will report to the Associate Administrator, where I would prefer to have him continue to report to me.

What is the meaning of his reporting to me versus reporting to the Associate Administrator? If there is, for example, a difference of view between the Associate Administrator and the Director of the sea grant program, then if the Director of the sea grant program reports to me, he can come to me for a judgment between his views and those of the Associate Administrator.

If the Director of the sea grant program reports to the Associate Administrator, I would rarely get involved in a decision made by that Associate Administrator that would affect the sea grant program.

I would only get involved to the extent that the Associate Administrator would bring the problem to my attention, because the reporting chain is to him. In order to have the organization work well, it should work that way. That is the basic difference.

I should emphasize that this would still have that Associate Administrator discharge a whole range of review, policymaking, budgetary, advisory functions on my behalf if the sea grant Director reports to me.

Senator PELL. In other words, it might be best, as you move ahead from the administrative viewpoint, to keep the idea of the Associate Administrator, which I think is an excellent thought, and the responsibilities he will be given, or she will be given, and then have the sea grant program report directly to you, with a dotted-line relationship to the Associate Administrator? Is that your suggestion?

Dr. WHITE. I have no problems with the proposal in the bill in regard to the policy overview, policy formulation, the review function, the monitoring function, the assessment function of the sea grant program, and the recommendation to review the budgetary proposals of the sea grant program. I have no problems with the bill as drawn to that point.

The only problem I do have is with the direct reporting chain into my office. Now we can make it work in whatever way the Congress decides, and in accordance with whatever preferences Congress has for having the sea grant program managed. We can make it work and I want to assure the committee, we will make it work whichever way you decide.

I am just giving you my views based on my experience.

Senator PELL. I am very appreciative of your frank reaction. My hope is that sea grant will grow like the land grant program has grown, and then it could well be the tail that would wag the substantial bureaucracy. Therefore, the higher it is placed in that bureaucracy, the better off it might be from the viewpoint of the future.

What has been the result of the study that was called for in the legislation concerning an international sea grant program? What advisory service, what results have come from that study?

Dr. WHITE. Perhaps I ought to ask Dr. Abel, who has followed it more closely than I have, and can give more details than I.

Dr. ABEL. The responsibility for coordinating that particular project was assigned to Massachusetts Institute of Technology which utilized in the process colleagues from, I believe, nearly a dozen other universities and industrial organizations.

The project was completed, and the reports sent to the Department of Commerce. They have been informally furnished your office. The formal transfer, I believe, is in process from the Secretary of Commerce now.

Overall, if I might be permitted to give you a very fast summary of their conclusions, was that there are two methods in which the sea grant technique could be employed usefully on an international basis:

First, working with industrial nations on a "quid pro quo" basis, sharing technologies; and second, used to help the developing countries which in turn would accrue in a sort of enlightened self-interest to this country, because, for instance, it would offer us perhaps leverage for freedom of scientific research.

The suggestion in the study was that there was a place for an international sea grant type of activity, and most logically it ought to be placed in NOAA with the added suggestion that the sea grant office probably could serve as a useful vehicle for its implementation.

The consensus, for instance, on the part of our advisory groups, is that such action really ought to involve additional—clearly identified as such—funding, because there is the fear that funds to carry out this kind of activity, as meritorious as it might be, would alternatively have to be siphoned from the domestic funds, which are very constricted now.

Senator PELL. In other words, what would be needed is an additional authorization or financial underpinning for such a program?

Dr. ABEL. Yes, sir.

Senator PELL. Another question in connection with the advisory council, the Sea Grant Advisory Council, how often do the personnel change in that? Do you try to have a policy of rotating membership?

Dr. ABEL. Not by formula, no, sir. In fact, there are still 3 of the original members out of the 18 persons on the advisory board. The average turnover we compute to be between 2 and 4 years.

Senator PELL. That is your benchmark, to keep that turnover at that rate,

Dr. ABEL. Yes, sir. It is natural.

As I say, we don't have any formal formula.

Senator PELL. One is not needed statutorily, do you think? You are happy with the present turnover?

Dr. ABEL. Frankly I don't think the act would hurt in that respect. I don't see any way in which the advisory panel system could be harmed by declaring a formula for automatic turnover.

Senator PELL. Would you prefer to have that formula put in?

Dr. ABEL. It wouldn't hurt us and it could be helpful.

Senator PELL. Dr. White, earlier you noted that sea grant is the only program with an explicit statutory charge to develop aquaculture. The present bill does not include that term aquaculture. I was wondering what your view was, if you think that term should be brought back?

Dr. WHITE. First, I am bullish on the whole field of aquaculture. I think it is an area with great potential for the United States.

Senator PELL. I share your bullishness.

Dr. WHITE. And I would like to see somewhere explicit statutory authority dealing with the problems of aquaculture.

Now the present Sea Grant Act is the only one that really has that explicit authority and hence I would like to see it in the new bill.

Now S. 3165, while it has taken out that specific word, I think is broad enough so one could carry out all of the aquaculture activities that are presently being carried out.

Senator PELL. But the simplest thing might be to pop it back in again, I think.

Dr. WHITE. The versions of the bill have been changing rapidly.

Senator PELL. Coming fast and furious.

Dr. WHITE. Yes. And I haven't seen the latest version. It may well be it has it back in there.

Senator HOLLINGS. It is in S. 3165.

I feel the same as you, I have an enthusiasm for aquaculture.

Have we made any cost-benefit studies to show that it is a noteworthy program financially to satisfy the concerns of OMB?

Dr. WHITE. We have made some studies and we have some demonstrated accomplishments.

For example, we can give you information on the number of dollars of private investment capital that have gone into the pen-rearing of salmon in the Pacific Northwest. And we know the amount of money that has gone into the research under the sea grant program and fisheries service for this.

We have prepared a plan which goes to the question of what should be done first, second, and third, and why it is important to do those things.

Perhaps Dr. Abel might want to comment on this specifically.

Senator HOLLINGS. What we need is a better sales program.

Go ahead, Doctor.

Dr. ABEL. If there is one thing that is clear about aquaculture is, it is not a "today" research.

That is, we would not in candor try to say that the output from research is going to exceed input today. There are simply too many unknowns that relate to aquaculture activity for us to be able to forecast immediate payoffs in most of the systems that we are sponsoring today.

For instance, the perils of aquaculture that have to be studied are not limited as laymen seem to believe, simply to genetic preference.

They include very prominently predator control, environmental control, food control, and a host of economic and technological features that are not superficially apparent.

When you add them all together, it is quite easy to see that aquacultural research is a terribly complicated kind of activity, and it is not one for which we can simply lay down a hard, fast formula for output.

Senator PELL. I think it will be a breakthrough, it will be shown it is a great advantage.

In the meantime, it is basic research. I remember at the University of Rhode Island, they have big tanks with 8 pounds of salmon to a square foot, and you see them growing in plain water with salt and nutrients added, the fish enlarging, only diminished when some adventurous students go in with nets at night to catch a few fish, I understand.

But when you see a thing like that, you realize it is very expensive to produce, and the cost-benefit ratio would be disadvantageous.

But I hope within a year or two there will be a breakthrough and then it will be a fantastic advantage. Isn't this what you are driving at here?

Dr. ABEL. Yes, sir. I agree it is easy to get criticized on this, because in the opening phase, this kind of research cannot demonstrate present payoffs. I am personally convinced ultimately it must, and it is to this end we are striving now.

Senator HOLLINGS. Another criticism, if it is basic research, should sea grant be doing it?

Dr. ABEL. That is a perceptive question. This is research which is clearly designed for a food payoff. And in this nebulous spectrum from basic research to engineering developments, my personal preference is to put aquaculture somewhere in the middle, in the applied research sector, because none of the activities of the five dozen projects that we sponsor now is anything but objective-oriented.

In other words, they all tell us what it is they are looking for in terms of payoff.

Senator STEVENS. I have a bill in, Dr. White, on aquaculture. I would be happy to have your response to it one of these days. I hope we will have hearings on it. I think I share the comments of my colleague here when I think that there are some very successful applied aquaculture projects, and that there are some applied projects underway now.

The Cordova fishermen with their collective aquaculture project, which will restore runs that are now barren in the salmon area, for instance. And others are ready to go without being research projects.

Have you got the ability now to finance those?

Dr. ABEL. No, we don't finance industrial projects, sir.

Senator STEVENS. I hope we can talk the chairman into broadening his bill a little bit as we go along, because I would think that aquaculture ought to be here.

While we are at that, it seems there is a little dispute here about the present organization of NOAA.

I may be naive about it, but I thought we had a director, we had a deputy director, we had a series of people on an organizational chart that would occupy a functional program use, each of them having someone who reported to someone else through you.

I have just been informed that is wrong. Is that wrong? Do all of these people report directly to you now?

Dr. WHITE. No.

Senator STEVENS. I think we ought to have, if the chairman will agree, a little chart to put in the record showing what you think the organization is now.

There is apparently a problem that you just articulated.

You would rather have these people do what is suggested in this bill, report directly to you.

I am sure you know there is no criticism implied, but there are too many people reporting directly to you.

Is that a valid criticism?

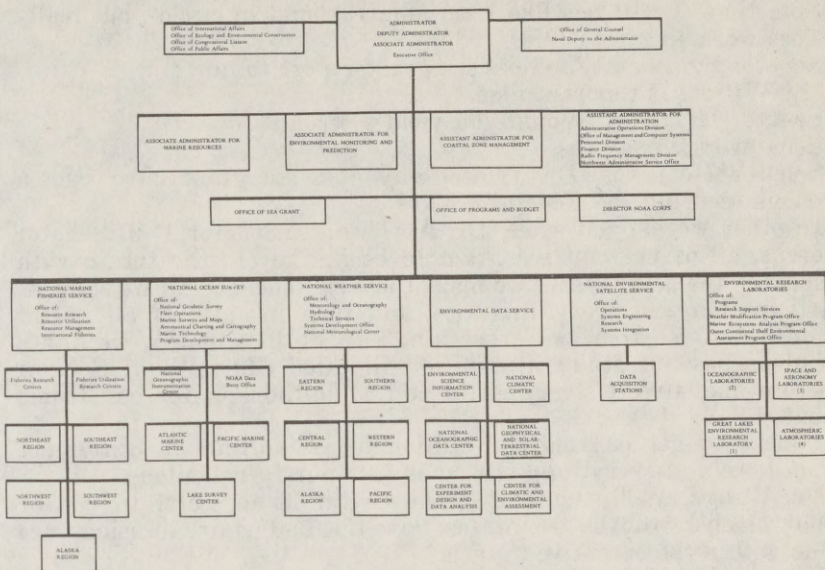
Dr. WHITE. I have heard the comment, Senator Stevens, but I don't think it is valid.

I will be glad to supply the committee with an organizational chart so that you can see who does report to me.

We are a very complex organization. I feel that certain parts of it ought to report to me. I think the Director of the Fisheries Service, the Director of the Weather Service, are important enough to report to me.

[The following information was subsequently received for the record:]

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



Senator STEVENS. You are sort of a Cabinet officer within a Cabinet officer's department, aren't you?

At one time we thought you would be independent. You were housed in Commerce, but aren't you in fact independent?

Dr. WHITE. No, Senator Stevens, we are not independent. We are a large part of the Department of Commerce. But we follow all departmental policies, act and operate within the department as a part of the Department of Commerce, and—

Senator STEVENS. Could we split NOAA off today from Commerce and have it function, without changing any of your present delegations of authority? Could you stand alone with the management you have?

Dr. WHITE. Yes, I think it is true that the NOAA organizational structure can stand alone. It doesn't stand alone.

Senator STEVENS. I mean if everybody is reporting to you, you can't; can you?

I asked for an organizational chart just now and I got one for NOAA that looks like a wheel, with a bunch of people out here, all of whom are reporting into the director, rather than a traditional organizational chart which shows you as the policymaker and a series of people there to implement your policies.

Dr. WHITE. I would be glad, Senator, to supply you with our organizational chart which resembles a rather standard governmental organization.

Senator STEVENS. Do you follow it if these people report directly to you?

Dr. WHITE. I follow the organizational chart we have, and we have a limited number of people reporting to me as administrator. Sometimes I will feel like I am going around in circles, but really it does work.

Senator STEVENS. Who does sea grant report to now?

Dr. WHITE. It reports to me.

Senator HOLLINGS. Would you yield a second?

Senator STEVENS. Yes.

Senator HOLLINGS. Dr. White, why does sea grant have such a problem securing the Federal dollar?

In other words, you want, Dr. Abel wants, Senator Pell, Senator Stevens, all of us want sea grant to be the key to the future with respect to the oceans. And we make these statements, and we show its participation and everything else, and then in spite of all of the acumen and research and everything else we have going, we find a nebulous baseline study in Interior allocated \$40 million; Senator Pastore and myself struggled to add \$1 million on for our friend Senator Pell.

I mean to get it from \$22 million to \$23 million in conference committees and everything else, it is just purely ridiculous.

Dr. WHITE. Well, Senator, I am sure it is no secret to you or other members of the committee how the budgetary decisions are made within the executive branch.

I do go forward each year, I do make my proposal to the Secretary and the Secretary makes his proposals to the OMB.

I can assure you and this committee, and we would be glad to supply the data for the record, that our requests with regard to our programs are realistic, they are more substantial than those that finally come out, they do go from the Department of Commerce to the OMB that way also and then a key decision has to be made.

Somebody has got to balance the various claims on the Federal dollar and that unhappy task falls to the OMB, and a large number of difficult decisions are made there. I think it is no secret that many of our requests are turned down at this point.

Senator STEVENS. I am happy to be on the other side. I feel the more buckets you dip into the more money you will ultimately get for the proposals you want to fund right now. And this has been one of our disagreements, but I think we have more than doubled the amount of money you have had by keeping some of the responsibility in Interior and having them turn the money over to you.

Senator HOLLINGS. My distinguished colleague is the ranking member—

Senator STEVENS. He is the ranking member on the Appropriations Subcommittee and I am ranking member on Interior. And I think you seem to be getting more money that way.

Let me ask you this question: Do you find you are getting the funding from the other agencies which do have the environmental reports to prepare that affect the coastal zone? And not just Interior. There are other agencies, the Corps of Engineers and others. Are they duplicating your activity, for instance?

Dr. WHITE. Senator, we do have programs supported by other agencies, the EPA, Department of Interior, and other groups, and we do undertake environmental and other kinds of tasks for these other agencies.

Senator STEVENS. How much of your money came from that source last year, do you remember?

Dr. WHITE. Again I will give you the exact number for the record, but—

Senator STEVENS. It was substantial, wasn't it?

Dr. WHITE. It is indeed, of the order of \$60 million, all things considered.

These are not all environmental—

Senator STEVENS. How does that compare with your own budget?

Dr. WHITE. It represents about 10 percent or so of our total budget. But I think on the other side, Senator, you have got to examine some of the problems that arise from that kind of funding.

Senator STEVENS. Your budget goes to atmosphere and other matters. I mean when you look at your oceans budget compared to what you are getting, how does it compare?

Dr. WHITE. I expect it might be a little bit higher on the ocean side, simply because of the present great emphasis on the OCS environmental assessments.

I think that particular project would dominate the other agency funding that we receive. And that would be for the period of time during which you need to get environmental data.

Senator HOLLINGS. At this point I would like to include in the record the sea grant budget history outline since its initiation in 1966, the authorization request to the Department, the request to OMB, the amount requested of Congress and the approval budget level.

For example, the amount requested of OMB in 1975 budget was 24.3, and the approved level was \$23.3 million.

[The following information was subsequently received for the record:]

SEA GRANT BUDGET HISTORY

[In millions of dollars]

Fiscal year	Authorization	Request to department	Request to OMB	Request to Congress	Approved budget level	Obligations
1967	5.0		1.0	1.0		
1968	15.0	5.0	5.0	5.0	5.0	5.0
1969	6.0	9.0	6.0	6.0	6.0	6.0
1970	15.0	10.0	6.0	6.0	10.0	9.0
1971	20.0	18.0	13.5	13.5	13.5	13.5
1972	25.0	28.1	22.0	15.2	17.7	17.7
1973	30.0	30.0	30.0	21.2	21.2	19.5
1974	30.0	30.0	28.3	19.8	19.8	19.8
1975	40.0	24.9	24.3	24.3	23.3	22.7
1976	50.0	31.5	25.7	21.1	23.1	

Note.—In some cases, obligations do not match appropriations because of reprogramming and/or impoundment actions.

Senator HOLLINGS. OMB has always looked at sea grant as a process and not a program, and we have to try to sell them and educate them.

It is a program on one hand, and on the other hand sea grant is a healthy forward-looking parent. And I think that is the motivation behind this legislation.

We are not trying to confuse or cause problems. What we are trying to do is beef it up, both financially and legislatively, so they look on Dr. Abel not just as an auditor or one who gives money, grants, and attends lunches and so forth, but rather as the Director of an ongoing, viable, vibrant program, with NOAA coordinating everything and everyone participating in leading in the oceans field.

Senator PELL. Time is pressing on us, but I have a couple more rather specific questions which maybe you could answer in as specific terms as possible.

Dr. White, do you think the relative amounts listed in this bill, 15 for National, 35 for State, regional, and local, as being the authorizations, is appropriate, or too large, or do you think the amount should be also inserted to cover international needs, international sea grant.

Dr. WHITE. If the Congress is going to ask us to get involved in an international program of any kind, then my suggestion would be that it be clearly separate, because I agree with Dr. Abel that at the present state of financing of our sea grant program, I would not want to see us in the position where we have to take funds from our domestic program for the international program.

Senator PELL. In other words, like the House bill, which has, I think, \$3 million for international sea grant.

Dr. WHITE. That would be a preferable way to do it.

Senator PELL. As far as the 35 and 15 we have in the bill, obviously, it is double the present appropriations. But do you feel we are aiming too high there, or that those figures are appropriate?

Dr. WHITE. I can only answer that in the following terms, Senator Pell: if one plans out, as we have done, the growth of a sea grant program which would cover all of our coastal areas, then it would require funding of the kind that you are suggesting be authorized. Having said that, I think it is important that I emphasize the fact that the administration has submitted a bill for re-authorizing the sea grant program, which essentially maintains the present funding level. I know this doesn't satisfy the members of the committee, and, obviously, it also doesn't satisfy me in terms of my aspirations for the growth of the sea grant program.

But I think the committee ought to seriously recognize what the President is trying to do in holding the authorizations down.

Senator PELL. You do agree there should be a differentiation between the authorizations for National needs and for the State, regional, and local?

Dr. WHITE. Again, my preference, Senator Pell, would be if the Congress decides that it wishes to specify programs of a national character, which it wants handled a little differently than the other programs, then again I would urge that this be done in a way which does not detract from the funds that are presently going into the program, directed principally at regional and local needs.

I am not saying that we haven't, in the past, attacked national problems with our present matching fund system. We have done so, and we have done so successfully. It doesn't mean we couldn't attack national problems in the future with the matching fund system, because we could.

But I think that if it is decided we want to move more broadly into making sure that there are national programs in which we want the sea grant institutions to participate, largely determined at the national level, then I think the kind of arrangement you are talking about would be best.

Senator PELL. Do you think the 5-percent figure of the appropriated funds to be used for sea grant college fellowships is about right, or should it be more, or should it be less?

Dr. WHITE. I really have no feel, Senator, as to what the exact amount should be. We do presently have fellowships within the sea grants program, and this would be specifying it more explicitly.

I would have to ask Dr. Abel as to what the implications of that would be for the fellowships.

Dr. ABEL. It is certainly an adequate figure, Senator. At the moment we prosecute all of the fellowships as joint efforts, for instance, with the National Fisheries Institute, and with the Association of Naval Architects and Marine Engineers.

This enables us to utilize the expertise in other organizations, so we don't have to hire additional people ourselves to design fellowships, to evaluate the candidates, and to followup careers.

We think it is an optimal way to do business, and we'd like to continue the fellowship program.

Senator PELL. But do you think 5 percent is about right?

Dr. ABEL. Yes, I think it is about right.

Senator PELL. Thank you.

What, Dr. White, would you think of as being the program's principal shortcomings, and its principal strengths?

Dr. WHITE. Well, I think its shortcomings derive principally from the lack of its availability throughout the country.

In other words, if you go into an area like your State, where you have a very vigorous sea grant program, I think it functions quite well. Now, there are parts of our coast where we don't have a program of that size or funded to that extent. They can use the existence of a sea grant institution in much the way the Rhode Island area does.

So I think the principal deficiencies of the program today result from the lack of realizing the growth of the program to provide all of the coastal States with sea grant services.

I think there is a need to integrate the activities of sea grant more closely with other NOAA activities. We have had some criticism on this point, and I think there perhaps is some validity to that kind of criticism, but we are taking some steps to try to rectify that situation. So those are the areas I think of.

Senator HOLLINGS. Dr. Abel, we have your statement, and we want to include it in the record.

Is there any part of it you would like to emphasize or highlight?

Dr. ABEL. No, sir, I am satisfied with submitting it for the record.

Senator STEVENS. I would like to have answers to three questions. One, you mention, briefly, the extended jurisdiction concept, which will soon become law. I would like to have a statement for the record here as to how that extended jurisdiction is going to impact the activities of NOAA, and have you quantify to the best of your ability an estimate of your increased budgetary impact resulting from this increased jurisdiction. Would you also give us a statement as to what, if any, new authority you might need to coordinate your activities in extended areas.

Second, in terms of education, we have not dealt too deeply with this, but again I have had a proposal in for several years now in the area of education at the secondary level for fisheries education.

If we are going to start talking about reorganizing your area, I would like to see what we can do to get greater emphasis from the sea grant program in the secondary level.

I would like to have your suggestions, if you have any, as to what we might do along that line.

I am very concerned that as we go into the 200-mile jurisdiction, we just don't have enough trained people to man the vessels to expand our domestic efforts at a time when it would be a most prodigious action, if we could do so.

And third, the aquaculture was mentioned. I have the bill, S. 1117, and I think there again that the aquaculture concept ought to be coordinated through you, even if other agencies, such as AG, now with the new amendment, will have the authority to make loans for impoundments, to use abandoned lakes and others in aquaculture activities directly related to food production. But I think you ought to be involved in those to make certain such proposals would have no conflict with your role in regard to the coastal zone and in regard to the total ocean jurisdiction you have in NOAA. Would you give us comments on those three summations, and see if you can assist us with regard to the role of the 200-mile bill, the educational problem at the secondary level and the aquaculture proposals, we have, as they relate to these bills we have here.

Senator HOLLINGS. Is it just a budgetary overview, or to what extent are you really engaged in comprehensive long-range planning in marine science and technology. Concerning the self-evaluation of the sea grants themselves, how do you measure the effectiveness, or how in turn can Congress measure the effectiveness as to one sea grant program working and another one really not showing any real payoff or result, one that we should fund more, and perhaps a little less on another.

Senator PELL. I have one further question that would be of help to us, and that is, I notice in your statement you mentioned that the sea grant advisory services should be centralized in sea grant.

Now we create the new administrator's office, that maybe gets fragmented. Why should that be? Why can't the advisory services continue to be under sea grant, even if sea grant is put under the administrator?

Dr. WHITE. That is a workable solution, Senator. As my testimony has indicated, we think the advisory service has worked well under sea grants, we are prepared to organize and operate it any way Congress wants.

Senator PELL. Thank you.

[The following information was subsequently received for the record:]

Although Sea Grant has not made a practice of supporting education or training programs below the college of post-high school level, several of the projects supported have had an impact at the secondary school level. These projects were developed for high school teachers and have included summer short courses, symposia, and teaching packages. The subjects addressed have ranged from fisheries technology to coastal zone management. In addition, the University of Alaska has initiated a series of lectures at the high schools by university marine scientists. If our authorizing legislation were changed to indicate an increased emphasis on secondary education, the initial focus of the emphasis would be an increase in the number and magnitude of projects for the secondary school teachers similar to those which have been, or are being, supported.

The Office of Sea Grant will be re-evaluating the fishermen training needs of the nation under extended jurisdiction. This type of an evaluation is an on-going process in Sea Grant which looks at the manpower requirement and training capabilities in each state or region for each career speciality. We attempt to match the two in order to produce the needed specialists without providing an unemployable excess which would represent a waste of time, funds and facilities. In some areas, new management approaches and declining fish productions have indicated a need for fewer fishermen and vessels, rather than more. However, since this is a very dynamic field, continuous evaluations are required. If it appears that additional fishermen are needed to man increasing number of vessels or to replace older fishermen leaving the fleets—and that educational programs at the secondary level are the best way to provide the desired training, we will work with local officials in the various regions to develop the programs.

NOAA's Office of Sea Grant and National Marine Fisheries Service have already taken steps to improve coordination of Federally-funded aquaculture programs. In November, NOAA invited representatives of all agencies known or thought to be involved in any aspect of aquaculture to meet to discuss programs in this area and lay the ground/work for an Interagency Committee on Aquaculture. A Letter of Agreement to establish this Committee is being circulated for signature.

Several bills have been introduced in the House and Senate which would formally assign responsibility for a new and expanded aquaculture program. Passage of one of these bills undoubtedly would result in the type of coordination suggested by Senator Stevens irrespective of the agency designated to perform that function. The Office of Sea Grant and the National Marine Fisheries Service would expect to participate in both the coordination and conduct aquaculture programs so as to meet our presently assigned responsibilities.

The legislation on extended fisheries jurisdiction will have substantial impact on NOAA. The National Marine Fisheries Service (NMFS) will be the most affected but other NOAA agencies also will be involved to varying degrees.

Under this Act, the Secretary of Commerce is responsible for carrying out the necessary research including stock assessment; data on economics and statistics related to both commercial and recreational fishing operations; administration, including support of the regional councils. Together with the Secretary of State, the Secretary of Commerce is responsible for the issuance of permits to foreign fishing vessels as prescribed by the Act and, together with the Commandant of the Coast Guard, is responsible for surveillance and enforcement of the provisions of the Act and any regulation promulgated to carry out fishery management plans.

Implementation of the Act will require additional resources for the necessary administration; enforcement and surveillance; international negotiations; stock assessment and research, including research on the environment necessary to support fish stocks; and economics and statistics activities. We may need to expand our fleet capabilities to support the additional assessment and research activities and for boundary surveys. We will be publishing charts showing the new boundaries out to 200 miles.

At the present time, the proposed legislation provides the needed authority. We will be examining prior legislation as to their relationships with the Fishery Conservation and Management Act.

We expect that other elements of NOAA will be working with the National Marine Fisheries Service in implementation of the Act. The Office of Sea Grant, the Environmental Data Service, and the Office of Coastal Zone Management will be involved in developing programs.

[The following information was referred to on pp. 64-65:]

QUESTIONS RE ALASKA ENVIRONMENTAL STUDIES PROGRAM

Question 1. What does it include, what percentage is done, and what kind of information is being collected?

Answer. a. The focus on the environmental studies in the Northeast Gulf of Alaska (NEGOA) which is the regional study that is the furthest along, was placed on describing the following environmental characteristics:

Water circulation and transport.

Baseline levels of contaminants.

Geologic hazards.

Baseline biological surveys.

In addition, laboratory toxicity studies were initiated to assess effects of petroleum-related pollutants.

b. It is difficult to establish percentage completion; however, the information acquired has been adequate to provide the necessary data for preliminary environmental impact analysis. Further studies will be required in order to establish final stipulations on development and siting of pipeline corridors and onshore support facilities. To provide additional information on program status, we will provide you a copy of a NOAA submission to CEQ concerning our status as of December 1975 and our expected status as of December 1976.

c. Prior to the lease sale in NEGOA (April 1976) the studies had provided the following information:

(1) A general understanding of the circulation in the region. Particular attention was given to the environmentally sensitive area west of Kayak Island and, as a result of this emphasis, BLM withdrew 16 additional lease tracts west of Kayak Island, thereby eliminating all lease tracts offered for sale in that critical area.

(2) Baseline contaminant levels were established for the region. These studies indicated that the NEGOA area is presently in a nearly pristine state.

(3) Geologic hazards to development were identified which resulted in withdrawal of 10 tracts from the sale as well as establishment of special stipulations being placed on the development of 25 additional tracts.

(4) General benchmark distribution and abundance levels were established for regional populations of marine mammals, marine birds, commercial fish, benthos, plankton and littoral biota. These studies indicate the most sensitive area to be that of the Copper River delta, and all proposed lease sales in that area were withdrawn by BLM as described above.

(5) Laboratory toxicity studies were initiated with emphasis on acute effects of petroleum-related contaminants on the early life stages of fish and shellfish.

Question 2. When will the Alaskan studies be completed?

Answer. It is anticipated that the major field investigations of the Alaskan Environmental Studies Program to establish baseline information will be completed in 1978. However, studies directed toward effects of petroleum-related pollutants on the marine environment and the conduct of the monitoring program for measuring changes in the environmental baselines will continue beyond 1978.

Question 3. How much has the Department of the Interior given to NOAA in the last two years to carry out baseline studies in Alaska?

Answer. NOAA has received the following reimbursable transfers from the Department of the Interior:

FY 75—\$7.66 million.

FY 76—16.50 million.

In addition, we anticipate an additional transfer of \$5.2 million of FY 76 funds and \$6.2 million of FY 76 transition quarter funds in the near future.

U.S. DEPARTMENT OF COMMERCE,
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,
Rockville, Md., January 13, 1976.

Mr. STEVEN JELLINEK,
Council on Environmental Quality,
Washington, D.C.

DEAR MR. JELLINEK: As requested of Frank Hebard at your January 5, 1976, meeting between the Council on Environmental Quality, Department of Interior and the Environmental Protection Agency, I am herewith forwarding for your information a summary of our current knowledge of the environmental conditions in the Northeast Gulf of Alaska and a forecast of what improvements in the information base can be expected by December 1976. These summaries have been developed by the staff of our Outer Continental Shelf Environmental Assessment Program (OCSEAP) and therefore are summarized by program study elements.

I hope this information will be useful to you in your deliberations. Should you have further questions, please feel free to contact me or Dr. Frank Hebard (Phone: (301) 443-8963) of my staff.

Sincerely,

DAVID H. WALLACE,
Associate Administrator for Marine Resources.

Enclosures.

PHYSICAL OCEANOGRAPHY

A. Current Status of Knowledge

The mean or general long term average circulation within the NE Gulf of Alaska is dominated by the larger flow associated with the entire Gulf of Alaska and North Pacific Ocean. Average flow characteristics are fairly well understood. Flow movement along the continental shelf break and interactions with the large scale bathymetry are documented by a number of oceanographic cruises. Typical advective patterns for time scales on the order of a week have been obtained at a number of locations for various seasons. The flow east of Kayak appears to be more steady and thus better defined by available data than the more variable flow observed west of Kayak Island.

The general seasonal shift of the dominant currents in response to changing wind patterns is understood and has been documented semiquantitatively for selected sites and qualitatively for the entire region. The seasonal character of the vertical shear in the horizontal currents has been qualitatively described so that variations between near bottom and near surface flows can be estimated.

The shorter period day-to-day variations in the current have been described for a number of sites; for selected seasons at some sites and for an entire year at one location off Yakutat/Icey Bay. Trajectories can be estimated, from these potential variances in flow. In a few cases the current response to individual storms has been described. Typical atmospheric and wind stress forcing has been described including significant local processes and their potential for modifying the currents.

B. Status of Knowledge—December 1976

During 1976, correlation studies between sea surface elevation and currents may make it possible to describe more details of the current patterns and relate them to easily obtainable coastal tidal data. Data from Lagrangian

drouges tracked by satellite will yield better long period estimates of surface water trajectories throughout the region. Localized studies will improve the documentation of the region's response to individual events so that typical and average storm conditions can be estimated. Surface current mapping techniques will concentrate on the definition of crucial nearshore current regimes. Coordinated meteorological studies will increase the understanding of coastal region weather and thus improve the definition of nearshore wind forecasting and ocean surface trajectories. Improved documentation and understanding of vertical shears within the water column will be obtained for direct current measurements and model studies. These in turn will contribute to an increased ability to correlate the surface and deeper currents. Continuing studies of temperature and salinity distributions will yield better definition of large scale advection and lead to a more precise understanding of the relationship between the general circulation of the Gulf of Alaska and local variations nearshore. We still have a need for:

Better understanding of nearshore processes.

Better resolution of circulation patterns west of Kayak Island.

Increased documentation of the relationship between local and synoptic scale weather.

FISH

A. Current Status of Knowledge

Current knowledge of fish populations in the NEGOA, their distribution, relative abundance, habitat association and dynamics, is based primarily on 19th century scientific expeditions, historic and current commercial catch statistics, and recent trawl surveys. Present knowledge consists of a fairly comprehensive species inventory of fishes in the NEGOA. Limited information on distribution and relative abundance for most demersal fishes (flatfish, rockfish, sablefish and the gaddis) is available for the NEGOA. Information on demersal fishes is based on a comprehensive survey conducted by the International Pacific Halibut Commission during 1961-1963. Sketchy information is also available from other, more limited trawl surveys and foreign fishery statistics. Information is available for other categories of fishes including pelagic and forage fishes, ichthyoplankton and juvenile fishes and their ecosystem relationships but it is fragmentary and unorganized.

B. Status of Knowledge—December 1976

By December 1976 results of the comprehensive trawl survey conducted in NEGOA during 1975 will be available. In addition, an analysis of historical and current trawl survey data and commercial catch statistics will also be made available. Information contained in these reports will define areal and depth distribution, length frequency (age class), and relative abundance of most species. Age class distribution, growth rates and standing stock estimates will also be included. These data will be compared with available historic information to ascertain present status of commercially harvested stocks in NEGOA and to define annual catch trends in these stocks from past to present.

In addition, what little data is available concerning pelagic and forage fishes in NEGOA will be drawn together from a multiplicity of sources and will be available by December 1976. Emphasis will be on an inventory and analysis of species composition, distribution, relative abundance, and size composition and identification of the primary gaps in the data base.

CHEMISTRY

A. Current Status of Knowledge

Prior to the beginning of BLM-NOAA's environmental studies in the NEGOA, no data were available on the existing concentrations of petroleum hydrocarbons and heavy metals in seawater, sediments and marine organisms from this region. The first year's study indicated that concentrations of petroleum hydrocarbons and metals are as low or lower in sediments and water from the Gulf of Alaska as from other uncontaminated open ocean areas. Selected species of biota were sampled and archived during the first year of the program. Analyses of metals in biota were initiated in the first year; the concentration found to date appear typical of uncontaminated marine environments. Analysis of petroleum hydrocarbons in biota is under-

way. Estimates of general concentration levels of petroleum hydrocarbons in selected biota will be available by December, 1976.

B. Status of Knowledge—December 1976

More detailed analyses of the spatial, temporal and sampling variability of contaminant concentrations in sediments, water and biota will be performed in subsequent years of the program. A minimum of two additional years will be required to establish reliable estimates of variability for petroleum hydrocarbons and metals in sample matrices from Gulf of Alaska sites to be designated as monitoring locations.

The horizontal and vertical distribution and concentrations of light hydrocarbons (C1-C4) in the water column are also being analyzed during the second year of the program to determine how these light hydrocarbons behave in cold waters and whether they may be utilized for detection of natural seeps or other petroleum sources in this region. Data and preliminary interpretations from the first field season will be available by April 1976. The second year's effort will provide corroboration for the patterns of horizontal and vertical variation observed in the first year and will attempt to elaborate the mechanisms responsible for these patterns.

MICROBIOLOGY

A. Current Status of Knowledge

Field studies began in the summer of 1975 on the composition of microbial communities, metabolic activity, and capacity for petroleum degradation. No data are available at present.

B. Status of Knowledge—December 1976

Preliminary data will be available by December 1976 on heterotrophic microorganisms, fungal spores, temperature dependent bacteria, and microbial community components, from water and sediment samples in the NEG.O.A. Preliminary data on human pathogens from shellfish and crabs will also be available. There will be some data on the presence of hydrocarbon-degrading microorganisms in sediments and surface waters. There will be no data from the littoral zone on either hydrocarbon degradation potential or presence of hydrocarbon degrading organisms before December 1976.

EFFECTS OF CONTAMINANTS

A. Current Status of Knowledge

Prior to initiation of the BLM-NOAA Alaskan Environmental program, only limited information was available on: (1) the acute toxicity of water-soluble petroleum components to selected marine organisms (mostly adult crustacea and juvenile fish), and (2) the effects of direct petroleum coating of seabirds. Little or no information has been available (with respect to Alaskan organisms) on chronic toxicity of petroleum components to marine organisms, sub-lethal disruption of physiological or behavioral activities, effects of petroleum coating in marine mammals, transfer and accumulation of hydrocarbons in food webs, or changes in ecological habitats exposed to petroleum. No effects research was included in the first year of the NOAA-BLM effort.

B. Status on Knowledge—December 1976

Studies on acute and chronic toxicity and sublethal physiological effects of petroleum exposure on subarctic marine organisms began in the second year of the program. By October, 1976, a thorough review and evaluation of all available information and ongoing research on the effects of petroleum exposure in arctic and subarctic marine organisms will be available. By December 1976, we will have completed studies on the acute toxicity of water-soluble fractions of petroleum to several as yet untested Alaskan organisms, including euphausiid and mysid shrimp, scallops, sandlance, sculpins, saffron cod, and eggs and larval stages of herring, dungeness and tanner crabs. Research will also be completed on the effects of temperature on petroleum toxicity.

By December 1976, we will have information of the following types on the sublethal effects of petroleum and metals exposure in Alaskan species:

1. Effects of total water-soluble oil components, and selected aromatic hydrocarbon fractions on (a) structure and ultrastructure of flatfish and salmonid skin and gill epithelium, and crustacean chemi-receptors; (b) sperm and egg viability, hatching time, metamorphosis, settling success, and uptake in selected larval and adult invertebrates; (c) chemosensory-related behavior modification in crustacea, and neurophysiological changes in olfactory responses of salmonids.

2. Effects from ingestion of whole crude oil and selected fractions thereof on: (a) structure and ultrastructure of internal tissues of salmonids; (b) feeding rates, growth and uptake in selected juvenile and adult invertebrates.

3. Effects from surface coating of fresh and weathered whole crude oil on: (a) sperm and egg viability, hatching time, and metamorphosis of selected invertebrates; (b) structural and ultrastructural changes of epithelial tissues of selected molluscs and crustacea.

4. Effects of selected heavy metals (b) uptake and accumulation of metals into body and gill mucus of salmon and flatfish; (b) changes in chemical and physical-chemical properties of mucus; (c) structural, ultrastructural, and histochemical changes of skin and gill epithelium; and (d) chemosensory impairment in crustacea and salmonids.

5. The effects of toluene, naphthalene and dodecane on photosynthesis, and the metabolism of these compounds, in *Zostera*.

6. The effects of petroleum exposure on regulation of serum viscosity and freezing point in arctic and subarctic fishes.

7. The uptake, turnover, and metabolism of metals and hydrocarbons in several species of Alaskan marine organisms including salmon and flatfish in addition to those mentioned above.

8. The effects of petroleum coating on thermoregulatory mechanisms, feeding behavior and ingestion of petroleum hydrocarbons in fur seals.

9. The effects of petroleum coating on thermal conductance of pelts of fur seals and other pinnipeds.

COASTAL PROCESSES AND MORPHOLOGY

A. Current Status of Knowledge

Preliminary topographic and bathymetric maps and profiles are available from the Icy Bay and Yakutat Bay areas. Reconnaissance data on temperature, salinity, suspended sediment load, wind field, and ice movements in Icy Bay are available from 1975 field efforts.

The barrier islands of the Copper River have undergone major changes in morphology and sedimentation patterns since the Good Friday Earthquake of 1964. Several meters of seafloor uplift, coupled with the high sediment yield of the Copper River, have brought about shoreline progradation and reorientation measure in 100's of meters.

The shoreline along the foreland of the Malaspina Glacier is actively eroding. Prograding spits are building into deeper waters of Icy Bay and Yakutat Bay to the west and east of the Malaspina foreland.

Preliminary side-looking airborne radar data are now available for preparation of geomorphic maps of the coastal plain between Yakutat and Cape Yakataga. LANDSAT (ERTS) imagery for the Icy Bay/Yakutat Bay coastline has been compiled for the period 1972-1975.

B. Status on Knowledge—December, 1976

More extensive information on ice movements, type and distribution of bottom sediments, and bathymetry will allow initial evaluation of potential harbor areas and shore facility sites in the Icy Bay area in 1976. The potential risks of development to the environment as well as the risks of natural hazards to development sites will be evaluated.

New bathymetric, beach profile, sedimentological, aerial photographic and wave train field data, in conjunction with wind and wave hindcast data, wave energy flux calculations, and historical aerial photo and chart interpretations, will be used to make preliminary: (1) computations of volumetric longshore transport and dispersal rates; (2) forecasts of changes in coastal morphology; and (3) evaluations of the potential suitability of coastal areas between Yakutat and the Copper River for petroleum shore facilities.

HAZARDS

A. Current Status of Knowledge

Maps showing preliminary locations of epicenters for low magnitude seismic events on the NEGOA OCS are now available. Preliminary maps showing bottom sediment distribution, sediment thickness, surface and shallow subsurface faults, shallow geologic structure and areas of slumping and potential sea floor instability are now available based on 1975 field data.

Data on deeper geologic structures and fault surfaces are held on a proprietary basis by petroleum companies and the Conservation Division of United States Geological Survey (USGS). Epicenter plots of Alaskan earthquakes are available but the accuracy of the location of these events varies considerably and is particularly poor for low magnitude events beneath the continental shelf.

B. Status on Knowledge—December 1976

A historical summary of Gulf of Alaska seismicity will be available in 1976 and will include epicenter plots based on computer relocated historical earthquake data and an indication of earthquake intensity recurrence rates.

Epicenter data for low magnitude earthquakes from 1975 and relocated historical events will be correlated with fault location data from the NEGOA continental shelf in an attempt to identify areas of active faulting. Further evaluation of the probability of future major earthquakes in the Kayak Island/Cross Sound transient "seismic gap" area will be attempted based on new and relocated epicenter data.

Data indicating more precise locations of shallow fault traces and relative or absolute ages of last displacement, particularly along faults identified as potentially active, are planned to be available by the end of 1976.

Further definition of potentially unstable sediment masses will be attempted in 1976 based on additional high resolution seismic reflection data and preliminary data on some engineering properties of the sea floor. Evaluation of the ages of some historical slumps and slides will be attempted.

SEDIMENT TRANSPORT

A. Current Status of Knowledge

The presence of suspended particulate matter on the NEGOA OCS has been demonstrated by the presence of turbid plumes on ERTS imagery and a limited field sampling program. Data on type and concentration of suspended matter in the water column is very limited. Knowledge of sediment transport along the sea floor on the open shelf is virtually non-existent.

B. Status on Knowledge—December 1976

A substantial increase in suspended particulate matter data is expected by the end of 1976. Evaluation of all usable ERTS imagery coupled with an extensive ocean and major-river water-sampling program should yield good preliminary data on seasonal patterns of transport and particulate concentrations. Preliminary data will be available on the composition of inorganic and organic fractions of suspended particulates.

ICHTHYOPLANKTON

A. Current Status of Knowledge

No data are available at present. Sorting and identification of ichthyoplankton samples collected during the 1974-75 field season are underway.

B. Status on Knowledge—December 1976

A report on the 1974-75 seasonal distribution of selected ichthyoplankton species will be available by December 1976 for both Prince William Sound and the inshore Gulf of Alaska. These data will be characteristic, but not necessarily typical, of ichthyoplankton distribution and abundance in NEGOA.

ZOOPLANKTON

A. Current Status of Knowledge

During 1975 the general distribution of selected zooplankton in the NEGOA area has been described and compared with results from more southerly coastal areas.

B. Status on Knowledge—1976

There are preliminary data on seasonal and spatial variability and no data on production processes. By December 1976, the seasonal data for 1974-75 will be available. There will be some data on vertical migration of principal species in Prince William Sound and directly offshore.

PHYTOPLANKTON

A. Current Status of Knowledge

Limited taxonomic data are available from the Russian literature for the NEGOA area.

B. Status on Knowledge—December 1976

By December 1976, the general distribution of chlorophyll *a* and phytoplankton species will be available from a spring cruise and a midsummer cruise in the area. Limited data on productivity will be available; no information on production processes, nutrient cycling, or limiting factors will be available.

LITTORAL ZONE

A. Current Status of Knowledge

With the exception of seagrass distribution in the NEGOA area, baseline information on the distribution, abundance, and dynamics of the plants and invertebrate animals in the intertidal and subtidal zones is lacking. We have data for several rocky intertidal sites, but processing of these data has not been completed.

B. Status of Knowledge—December 1976

Significant improvements are expected in our knowledge of the baseline parameters related to the plants and invertebrates of the intertidal and subtidal zones by December 1976. We expect to complete the establishment of baselines for intertidal organisms that live on hard surfaces (e.g., barnacles and mussels) during 1976, however, we do not expect completion of baselines for those organisms (e.g., clams and polychaete worms) associated with soft substrates such as sand and mud.

Our studies of the shallow inshore zone were initiated in 1975 in limited areas. However, baseline data will not be achieved until after December 1976. In addition, no significant increment of knowledge is expected in two further areas that are especially important to environmental assessments: (1) distribution and abundance of inshore meroplankton (planktonic stages of intertidal and benthic invertebrates); (2) the dynamic aspects of the littoral biota (e.g., growth rates, trophic dependencies, environmental requirements, or natural mortality rates).

BENTHOS

A. Current Status of Knowledge

Current knowledge on the benthic populations in the Northeast Gulf of Alaska is based on fragmentary studies in confined locations or as secondary results from other investigations. Results from these studies are quite general thus our understanding of the species composition, distribution, abundance, and dynamics of epi- or infauna is limited, particularly with regard to species abundance.

B. Status of Knowledge—December 1976

A systematic survey of the epi- and infauna populations which occur in the NEGOA area was conducted during 1975 to develop preliminary information needed for design of future more definitive surveys. Analysis of samples collected during 1975 is currently underway and will be reported by December, 1976. Results from this study will provide information on the reconnaissance level for selected species of detrital (e.g., polychaete worms), filter (e.g., tube worms, scavenger (e.g., crabs and shrimp), and carnivorous (e.g., starfish) feeding organisms from the epi- and infauna. However, information is not sufficient to provide a baseline. Initial comparisons between the distributions of selected species and the substrate will be available in December, 1976. These will develop an understanding of requirements for particular substrates and will help identify how vulnerable these species may be to petroleum pollution.

BIRDS AND MAMMALS

A. Current Status of Knowledge

At present, the general distribution of birds and mammals are known in the NEGOA. This includes the distribution of haul-out areas and nesting colonies. There is a considerable backlog of data on the use of the Copper River Delta by swans and geese, but not all of the data have analyzed and published.

B. Status of Knowledge—December 1976

One year's data on seasonal bird distribution and abundance are available; analyses will be completed by December 1976. Statistical data on seasonal and annual variations will not be available for four to five years.

Incidental observations are being made on whales during bird surveys. Due to scarcity of observations, analyzed data will not be available by December 1976.

General data on bird feeding areas will be available by December 1976, but data on nesting success, mortality and annual production rates will not be available for several more years.

Senator HOLLINGS. We will next hear from Dr. John A. Knauss.

Dr. Knauss, we welcome you again to the committee. You have been a guidepost not only in sea grant and NOAA, but also in marine science and technology outside of Rhode Island.

Senator PELL. And speaking for Rhode Island I can remember how so much of what we are discussing today was but a thought in the back of Dr. Knauss' mind some years ago. He is a great expert in dealing with the Government, in always letting the people with whom he is dealing have his view. That is a good way to achieve results.

Senator HOLLINGS. We will be pleased to hear from you. You may proceed.

STATEMENT OF DR. JOHN A. KNAUSS, PROVOST FOR MARINE AFFAIRS, UNIVERSITY OF RHODE ISLAND, NARRAGANSETT, R.I.

Dr. KNAUSS. I have a brief statement that I would like to read for the record, Senator.

Although I have been in oceanography for nearly 30 years, I became involved in matter of ocean policy only about 10 years ago. I worked closely with Senator Pell in the establishment of the sea grant program and I was fortunate to be a member of the Stratton Commission which recommended the formation of NOAA. As a member of that Commission I was chairman of the panel that made the recommendations that led to the establishment of the Office of Coastal Zone Management.

Marine affairs has come a long way in the last 10 years. Sea grant has reached a certain level of maturity. The concept of coastal zone management is becoming accepted. Ocean science has made significant progress, particularly through NSF sponsorship of certain IDOE programs and the deep sea drilling program, and it is a much more exciting field of science today than it was a decade ago.

The State Department has been reorganized to give more prominence to marine affairs, and one way or another, we will soon have control over our coastal fisheries.

Senator PELL. I would interrupt and say it is a real effort to get them to do that. It was 6 years before we got them to do it legis-

lately, somewhat the same as Senator Hollings thought, you make suggestions, and then finally you legislate an administrative re-organization that should be dealt with.

Dr. KNAUSS. Whether or not we can successfully manage our coastal fisheries is still an open question in my mind, but if we fail, it will be our fault and not because of foreign fishing vessels. Off-shore oil technology has made tremendous strides and deep sea mining of manganese nodules probably will begin on a commercial basis before the end of this decade.

Yet with all of this activity to point to, and there are many more examples which could be given, many of my colleagues feel frustrated.

Somehow the development of marine affairs has not lived up to the expectations of that period of congressional activity that led to the marine council, the Stratton Commission, sea grant, and the International Decade of Ocean Exploration.

I can only assume that this sense of frustration is shared by Congress and this is why Senator Humphrey is seeking to reestablish the Council on Marine Science, Engineering, and Resource Development which he so effectively chaired when he was Vice President.

I assume it is a sense of frustration that has led to title I of the proposed Ocean and Coastal Resources Act of 1976. After reading title I, I went back and read some of the material of 7 years ago. I find it difficult to believe there is anything in title I that was not implicit in the Executive order which established NOAA after strong congressional pressure.

What S. 709 and title I of S. 3165 tell me is that the Senate is dissatisfied with the present administration's leadership in marine affairs. I share this view, and if either reestablishing the marine council or setting up a new Office of Marine Resources, Science and Technology will help, then I am in favor of doing one or both. As to the usefulness of the marine council, I would note that it was a great success under Mr. Humphrey who was interested and who actively supported it. It died under Mr. Agnew who was not interested in the oceans. I would feel more sanguine about the chances of success of a new marine council if I could be assured that it would be an area in which the new Vice President, whoever he might be, would show an active interest.

I am not sufficiently familiar with the internal workings of NOAA and its relationship to the administration of the Department of Commerce and the OMB to know whether a more explicit rewriting of a part of its mandate, and the addition of another associate administrator will resolve the frustrations that many of us feel about that agency. From my vantage point it would appear that it might do considerable good.

I have had little opportunity to study S. 3165 and there are a number of matters about which I am unclear; for example, does section 102-e-1 mean that grants for research in marine science can only be given in the form of a RFP—request for proposal—or will the new office be able to establish a program of support for marine science similar to that pioneered by the Office of Naval Research. I hope it is the latter.

Does section 204-d-1 mean that URI can rent Woods Hole's coastal vessel and Woods Hole can lease ours, but neither of us can use sea grant funds to support our own coastal research vessels? I am a bit concerned about the apparent redefinition of a sea grant college in section 203-11 and am uneasy about how I manage my university resources with a program that may suddenly require a one-third matching support if someone in Washington decides that last year's national project is this year's local project.

I would hope to discuss these and a number of other points with your staff, and perhaps later submit a number of suggestions for the record if necessary. In general, however, I am impressed with both title I and title II. There appear to be a number of useful improvements in the original sea grant bill and tying sea grant to a new Office of Marine Science and Technology within NOAA may give sea grant wider scope and opportunity than it presently enjoys, as well as provide the ocean half of NOAA with a stronger leadership role in marine affairs.

Subject to further study and interpretation I see only one major problem with the present bill and that is the decoupling of the advisory service function from sea grant and putting it under a new Director of the National Ocean and Coastal Advisory Service. I realize that S. 3165 is better than the earlier draft in this respect, but I am still very much concerned that the real authority for the sea grant advisory service will no longer be in the sea grant office.

Without going into great detail, let me note: (a) that the track record in federally controlled advisory services is not very good; (b) that the best advisory services are those run by the Department of Agriculture through the land grant college system, and we in sea grant have learned much from them; and (c) some of the present sea grant marine advisory services are excellent and some are good and getting better each year.

I am not certain why NOAA's previous attempts at advisory services have not worked well. It is not a lack of talent or the dedication of those involved. I think it has more to do with the rigidity of the Federal system, and in some cases the perceived remoteness—real or imaginary—of the Federal bureaucracy from the user groups.

I strongly urge you to leave the sea grant advisory funds in sea grant for the present. Let the relationship of the Director of the National Ocean and Coastal Advisory Service to sea grant be similar to that given in section 102-f-3-B. If at the end of 3 years, when new authorization is required, it is clear that the new National Ocean and Coastal Advisory Service is indeed a first-class, effective organization, then the question of the relationship between it and sea grant can be reconsidered.

In the meantime, I think Congress would be taking an unnecessary risk in changing a relationship that has taken many years to develop in the land grant system and is working with increasing effectiveness in the sea grant system.

Finally, let me note that although there is much in the proposed new legislation which I find exciting and useful, it is proposing some complex new relationships which need careful examination

and it may be that there is not sufficient time to do this. Thus a simple 1 year extension of the present Sea Grant Act may be useful at this time.

Senator HOLLINGS. What we are trying to do on the sea grant advisory service is to take its acumen and success and extend it to other programs of NOAA—coastal zone and everything else. We are also concerned about the sea grant advisory council. They come to town, and rather than taking the advice from the eminent members as to procedures and to needs and thoughts, they immediately lobby to be sure to go along with the administration's program. I mean, the administration is advising them rather than their advising the Department or the Agency. I have seen it work that way.

Senator PELL. Your testimony is very helpful. It is short, specific, explicit, and I notice where you say you will be working with us in the coming weeks in order to see how many of these ideas can be put into legislative language. I don't understand one thought here, though, and that is in connection with the advisory services. Is it your thought that the advisory services of the whole of NOAA should be placed under sea grant, or should sea grant retain control of its advisory services?

Dr. KNAUSS. I think just the sea grant's advisory services should be under sea grant. NOAA can have additional advisory services under a separate director, as proposed in S. 3165. The director of the sea grant advisory services under sea grant should have the same relationship to that new director as it has been suggested that other advisory services would have to the new director. I am very much concerned that even though the bill as presently written suggests a passthrough of funds from the new Director of the National Ocean and Coastal Advisory Services to sea grant, my view is that whoever controls the funds controls the program, and I really would feel much more comfortable if the funds came directly to the Director of the sea grant programs, and not use this passthrough technique.

Senator PELL. In connection with the sea grant fellowships, which you did not mention in your testimony, do you think that 5 percent is a good benchmark for the amount to be spent on that?

Dr. KNAUSS. Senator, I really would have to think about it. I heard the question you asked Bob Abel. At this point I really have no view on that matter.

Senator PELL. From your own viewpoint, having played an immense role in the creation of this program, what do you see as the main shortcoming of it? What would be your answer as to why we have so far failed to get the funding we would like for it?

Dr. KNAUSS. I have asked myself that question many times and I am not sure that I understand it. I think that perhaps at times in the early days of sea grant, we tried to make ourselves more important than we actually were. If anything, we oversold ourselves in the early days. I think in some sense that has come back to haunt us. Sea grant is a good program. It is a good program that is getting better year after year. And I think that we should get much more support than we have had in the past.

Senator PELL. Being very specific, regarding the program you are working on with salmon, would you be willing to hazard a guess when that would be cost effective?

Dr. KNAUSS. Anybody who has ever been involved in what is essentially high technology R. & D. programs usually underestimate how long it takes to make things cost effective. That program, as you know, Senator, produces salmon very well today. On the other hand I am not sure we can yet produce them at a price that makes them competitive in the marketplace. We are hopeful we can do this, but we haven't done it yet.

On the other hand, I would say that some of our work we have done with salmon at the University of Rhode Island has led directly or almost directly to some of the success one has seen on the west coast and also in other parts of the country. So our salmon work in Rhode Island has had some effect on other parts of the United States.

Senator PELL. Thank you. We will work with you on each of your specific suggestions, most of which to me make considerably good sense. Thank you very much for being with us.

Senator HOLLINGS. Yes, Dr. Knauss, we are always indebted to you. I think perhaps you are right, we don't want to mess up a good advisory service that sea grant now has in order to try to extend its success to NOAA generally. Maybe in increments. As you say, maybe we should try it out and see how the other advisory service works, and then consider it at that time. But we will be working closely with you as the legislation develops and before we actually report it out from our subcommittee here to Commerce and Labor and Public Welfare.

Thank you very much for being with us this morning.

Dr. McAlister?

STATEMENT OF DR. JOHN McALISTER, DEPARTMENT OF ENGINEERING-ECONOMIC SYSTEMS, STANFORD UNIVERSITY, STANFORD, CALIF.

Dr. McALISTER. Senator, I would like to apologize to the Committee. I have only a draft of my testimony. The most recent draft of the legislation being considered today reached me on the west coast just last Thursday, and I was able only to prepare testimony in draft form and if I might be permitted, I would like to take that draft and put it into final form and present it for the record.

Senator HOLLINGS. Very well. That will be included in the record at that time.

You can proceed now and speak from the draft.

Dr. McALISTER. Thank you, sir. The subject of the testimony that I would like to provide is that of the imperatives of resource scarcity of the American society on one side, and the imperatives of democracy in the development of a national resource management program of which an ocean and coastal resource management program must necessarily be an important part, on the other.

The purpose of my testimony is to put into the larger context the challenges of national resource management, the legislation that is being considered here today.

In particular, I wish to suggest a set of criteria for evaluating the legislation. While this may appear to be a lofty purpose, it is a purpose that I feel is one that needs to be served.

I would like to state that I come to this testimony as the director for the Center of Technology Assessment and Resource Policy at Stanford University and in the activities I have been pursuing on the campus, I believe I have something to contribute to the committee's deliberations.

I serve as a member of the Advisory Council to the Technology Assessment Board, which was established by the Technology Assessment Act of 1972.

I have established a program of congressional fellowships in technology assessment, funded by the Ford Foundation, and also direct a sea grant supportive program in marine resource management and policy analysis, which last year produced the only study conducted by other than parties of interest on the lease-sale off the southern California coast of tracts in the Outer Continental Shelf for oil and gas development and its impact on the coastal zone of California.

In presenting the testimony, I am very much aware, Mr. Chairman, that the national ocean policy study is the only group within Government that is presently charged with a clearcut mandate for stimulating the development of a national oceans policy.

In this connection, the committee is to be commended for its past record of achievement and in particular one historic achievement among others of the passage of the Coastal Zone Management Act which for the first time in the history of the Nation established a mechanism for resource management within the Federal structure of the Government.

The other legislation that has been considered and has been passed by the national ocean policy study has inevitably created something of a tension, however, between the goals that had been sought on the one hand, and the executive branch administration to implement those goals on the other.

The focus of the remarks which I wish to make, and I wish to keep them brief, will be fourfold.

First, to focus on the imperatives of resource scarcity in the American society. Second, the institutional response that has arisen to that scarcity as related to ocean and coastal resources.

Third, the mechanism for developing and implementing a national policy towards oceans and coastal resources, and fourth, the importance of NOAA as a lead agency in the development and implementation of a national oceans policy.

On the first point, it seems to me last week's announcement that the United States has now for the first time begun to import more oil than it produces domestically, gives us a strong reminder that we have entered an era of resource scarcity that has been unprecedented. American democracy has developed in an atmosphere of abundance. Our democratic institutions have depended upon in-

creasing economic welfare as a means of guaranteeing democratic liberties and the financing of the democratic process.

Resource scarcity in a real measure represents a major challenge to freedom and democracy, as severe as that developed in the 1950's and 1960's with the civil rights crises.

The gas lines of the oil embargo during 1973-74 brought to the attention of the Nation that possibilities for regimentation, rationing, and administrative control were real possibilities with the advent of resource scarcity.

Turning to the second point, the institutional response to resource scarcity, has necessarily been incremental. The legislative process itself is an incremental process. The crises that have developed as a result of resource scarcity have developed incrementally.

It is understandable that an entity such as the national ocean policy study in dealing with the crises as they have developed has always been anxious to deal with a more comprehensive response so that management capabilities within our Government do not find themselves outrun by the challenges that are established by the goals of specific legislation.

To be specific, when it was established in 1970, it was not necessarily anticipated that NOAA would receive as many of the policy functions as it has received, subsequently, as a result of legislation.

Instead, what we have seen is an agency conceived initially as a technical, scientific and information agency being more and more required to play a role as a resource management and policy agency.

In the institutional responses that have occurred through legislation to date, there has been a great emphasis on the need for anticipation of problems, not just the solution of them after they have arisen to crisis proportions.

It seems to me this trend, both with respect to the legislation here and also in other legislation, such as the Technology Assessment Act, are not to be seen as ends in themselves.

If our democratic system is to function effectively, our citizenry requires, in an era of both scarcity and technological complexity, more information on the tradeoffs between alternatives of resource utilization.

There is an abundance of examples of the kind of crisis proportions that have arisen within our democratic system on the management of resources.

They come, for example, in the initiative in California, which would effectively ban the use of nuclear power.

They come in the litigation that exists daily in the courts over resource management questions stemming from aerosol sprays to the utilization of pesticides and chemicals, throughout our society, oceans included to the confrontation over the uses of technology.

The third area is that there has necessarily developed a certain tension between the incremental legislation as it relates to oceans policy and the need for comprehensive implementation and administration.

The Coastal Zone Management Act, in my judgment, has establishment of a democratic process for resource management.

It seems to me, the implementation of the Coastal Zone Management Act provides precedents that could be utilized in other areas for the development and implementation of oceans policy.

So the requirements for a system to work effectively are, No. 1, identification of priorities of issues that would be a part of a comprehensive oceans policy.

Two: The communication between interested parties to the development of an oceans policy.

Three: The development of a greater analytical capability to analyze oceans policy questions.

Four: A mechanism for the resolution within the public of controversies over ocean and coastal resource policy questions.

Finally, the fourth major area of my testimony, that of NOAA as a lead agency for the development and implementation of a national oceans policy.

Currently, NOAA does not have a clear-cut mandate in this area, although it is charged with responsibility in a variety of ocean policy and resource management areas.

The legislation before the committee, which I endorse and support, seeks to provide NOAA with greater resource management capability, a greater capability for analyzing policy questions, and a mechanism for establishing an outreach through the advisory services and working with the institutions of State and local government to provide the kind of structure through which programs of national ocean policy can be developed comprehensively.

In conclusion, Mr. Chairman, the responsibilities of the national ocean policy study, obviously cannot be fulfilled by single pieces of legislation.

A greater policy analytical capability seems to be clearly required.

It seems to be required, not only within colleges and institutions that are part of the sea grant program, but also within NOAA itself.

The legislation here, marks another step forward towards the important comprehensive development and implementation of the national ocean policy study.

I am certain it will not be the last piece of legislation addressed to that goal.

Thank you very much for the opportunity to testify before the committee this morning.

Senator HOLLINGS. That is an excellent statement, Dr. McAlister.

Let me ask, isn't it sort of naive to presume that NOAA can take the lead in a national ocean policy, with ERDA, Interior, and everyone else seeming to move ahead faster? What is your opinion?

Dr. McALISTER. Obviously, the ability of any agency to respond to resource scarcity today, and particularly to respond to an area not of scarcity, but abundance, and that area of abundance is the passage of legislation, requires a capability of resource management which literally has not existed as part of the occupational structure of the Nation.

We are asking people who were trained in scientific and technical skills to assume skills in policy analysis. There is very little prepa-

ration at any level of government for the challenges that are being placed upon agencies of Government due to this understanding of what the trade-offs are.

NOAA's ability to become the lead agency in the development and implementation of a national oceans policy does not seem to me to be naive.

It can really be measured by its ability to develop that kind of policy capability. There is, just semantically, the question that national ocean policy suggests an agency having a policy analysis and implementation capability, which is distinct from scientific, technical and informational capability.

Senator HOLLINGS. You think the legislation would help NOAA organize in this direction?

Dr. McALISTER. It certainly would be a major step in that direction.

Senator HOLLINGS. What kind of managerial skills would be needed?

Dr. McALISTER. Managerial skills with respect to resource policy, first of all, start with the ability to identify emerging issues before they reach crisis proportions.

Second, to have an analytical capability for laying forth, both to the Congress and to other areas of Government, the alternatives and the costs and benefits, both with respect to their economic impacts and their broader societal impacts.

Third, would be a mechanism for linking together decisionmaking and technical analyses, policy analysis at the Federal level with implementation at the State and local level.

Senator HOLLINGS. What is your comment with respect to sea grant—you are not in any special position, but from working on that OTA study and the association you have had with sea grant, why hasn't sea grant obtained more money?

Dr. McALISTER. Perhaps the perspective that I can comment on would be that from having sought as an academic administrator, funds for academic programs from a variety of sources, both private foundations and governmental institutions.

I have found program managers, people who support programs, always most concerned on the programmatic consequences of their allocation of funds.

In other words, the Nation is pressed constantly by a number of issues of concern, the ultimate resolution of which is either by legislation or by initiatives.

Therefore, the allocation of funds a program manager would make is an indication of his ability to provide the information base, if you will, the influence with which these decisions get made.

To the extent that a program manager is supporting institutions to do what they wish to do on the basis of their own decisions, then the program managers have seen that to be more of an academic purpose, purely academic purpose, than a policy purpose.

And perhaps to the extent that sea grant might be more explicitly serving the policy purposes that are reaching national crisis proportions, like the 200-mile economic zone, like the questions of

the Continental Shelf oil and gas programs, to the extent it could be identified as supporting policy analytic roles here, it could be that greater support would be forthcoming.

Naturally, there is not an easy answer to the question of the sort you propose and, therefore, any person that would speculate on an answer would speculate on the basis of his or her own experience.

Senator PELL. In connection with the sea grant college fellowships, do you think the 5 percent is a pretty good benchmark or should it be more or should it be less?

Dr. McALISTER. It seems to me in answering any question of the sort that you pose, Senator, you get right back to the question that Senator Hollings just posed, and that is on what basis would you be making such an evaluation of a percentage. And it seems to me that the heart of all of the discussion that will take place on this legislation is "Can a national ocean policy be developed, and if so, how, and what function will sea grant and the other offices of NOAA play in such developments?"

Without that larger framework, and without that larger perspective, it seems to me that there is a great risk that 5 percent, 10 percent, whatever it might be, run the risk of being arbitrary decisions. In addition it seems to me there may be within OMB the feeling that these kinds of arbitrary decisions are ones for which they do not wish to provide larger amounts of resources. I don't mean arbitrary in the sense that there is a stubbornness and arbitrariness on the part of the administration involved at all. I mean that the larger purpose to which the 5 or 10 or whatever percent it might be would serve, is not clear. And it can't be clear until there is a more explicit national ocean policy existent.

Therefore, it is in the interest of sea grant on its own to stimulate that kind of policy debate, the information and resource debate to provide the evolution of such a policy.

I am not suggesting that sea grant hasn't provided that kind of debate. It has done a tremendous job in many respects, as has already been testified to, and will, I am sure, be testified to in the days ahead.

But there is, I think, a great benefit in candor that has been brought to the testimony thus far that sea grant is not receiving the kind of support it should, and, therefore, I am suggesting that one avenue to explore in considering this legislation, might be how sea grant is linked in more explicitly to the development of a national ocean policy.

Senator PELL. Thank you.

Senator HOLLINGS. Thank you very much, Dr. McAlister.

[The statement follows:]

STATEMENT OF DR. JOHN T. McALISTER, JR., DIRECTOR, CENTER FOR TECHNOLOGY ASSESSMENT AND RESOURCE POLICY, DEPARTMENT OF ENGINEERING-ECONOMIC SYSTEMS, STANFORD UNIVERSITY

Mr. Chairman, my name is John T. McAlister, Jr. I am the Director of the Center for Technology Assessment and Resource Policy, Department of Engineering-Economic Systems, Stanford University. I also serve as a member of the Technology Assessment Advisory Council to the Technology Assess-

ment Board which was established by the Technology Assessment Act of 1972. In addition, I was responsible for initiating with financial support from the Ford Foundation the Congressional Fellowship Program in Technology Assessment in 1974. I direct a program funded by the SEA GRANT to develop professional capabilities in marine resource management and policy analysis. Students participating in programs under my direction serve on Capitol Hill as staff to members of the Technology Assessment Board and as staff to the Administrator and the Assistant Administrator for Coastal Zone Management of the National Oceanic and Atmospheric Administration. Our Center, produced last year with support of Sea Grant, the only study by other than parties at interest on the impact on the California Coastal Zone from the lease sale off Southern California of tracts in the outer continental shelf for oil and gas development. Currently, we are at work on a technology assessment of proposals for the transport of natural gas from the Alaskan north slope and its potential impact on the coastal zone of California.

The testimony which I will present will be an analysis of the institutional requirements for developing and implementing a national resource management program as it relates to ocean and coastal resources. The purposes of this testimony is to provide a perspective from an academic based research and training program on technology assessment and resource policy of the important institutional changes that would be provided by the legislation being considered by this committee.

This committee has established several important legislative precedents in providing institutional responses to pressing resource management problems—as, for example, in the passage of the Coastal Zone Management Act of 1972 and in the passage of amendments to that act to provide national policy for the siting of energy facilities within the coastal zone. The legislation now under consideration marks another important step in the evolution of a National Ocean Policy. A major concern for this committee and the nation as a whole is whether a truly effective National Ocean Policy can be developed on an incremental basis or whether more comprehensive efforts are required. The very nature of this legislative process dictates that an incremental effort be maintained and sustained in the absence of comprehensive policy initiatives in this important area from the Executive Branch.

My testimony urges this Committee, the Senate, and the Congress to act favorably on the legislation being considered. Its prompt passage and enactment into law will provide a major step forward in building a formidable edifice of National Ocean Policy.

This Committee is the only entity of government which currently has the mandate for establishing a National Ocean Policy. Because of the legislative responsibilities that result from this mandate, this Committee must necessarily propose legislation which stimulates both the Federal, state, and local levels of our National Government to act in close coordination to formulate and implement a National Ocean Policy. Enactment of the legislation under consideration by this Committee would not only respond to this mandate, but would require other elements of the national government to respond to legislative leadership.

The testimony which I will present will be set forth in four parts:

1. The imperatives of resource scarcity for American society.
2. Institutional response to scarcity as related to ocean and coastal resources.
3. Mechanisms for National policy development toward ocean and coastal resources.
4. The National Oceanic and Atmospheric Administration (NOAA) as a lead agency for National Ocean Policy formulation and implementation.

TESTIMONY

1. The Imperatives of Resource Scarcity for American Society

A. Unprecedented demand on resources

The announcement last week that the United States had for the first time in its history imported more oil than it had produced domestically was a turning point in our national life. Those Americans concerned enough to recognize that this depletion of our national resources posed an increasing

dependence upon foreign resources must also have been aware of the consequences upon existing patterns of life. Waste and scarcity have, therefore, become two complementary elements of national existence. Waste does not exist exclusively in the consumption of oil. However, the most dramatic change in American perception of resource scarcity has occurred since October 1973 when the Arab oil embargo occurred. But the embargo has been less significant than the fact that America's oil production has been declining sharply while consumption has continued to increase at a rate unchecked from its past pattern of growth.

The national demand for oil resources has fallen more conspicuously upon the outer continental shelf and the support of the coastal zone than any other area of the nation. Similarly, the depletion of fisheries within coastal waters has also placed a greater dependence upon foreign supplies due to the lack of preparation by the American fisheries industry.

America's increasing demand on resources has resulted from a doubling of the national population and more than twenty-six times increase in national economic output since the depths of the depression. Such demands and the depletion of onshore resources have inevitably caused a turn towards ocean and coastal resources as a potential supply for food, energy, and minerals. They consequently have brought a substantial impact on the coastal zone in the United States through the location of onshore facilities to support offshore activities. Such a trend seems likely to continue because of the relationship between the need for offshore resources in food, energy, and minerals and their demands upon the nation to support the development of such coastal and ocean resources for national well being.

B. The demands upon the nation's ocean and coastal resources calls forth four closely interrelated policy efforts:

1. Resource management.
2. Conservation.
3. Technology assessment.
4. Long range planning.

These four complementary and interdependent policy tasks are essential aspects of the imperative of resource scarcity. The logic of this assertion is: (1) Resource management is a mandatory task if new sources of supply are to be identified, developed, and made available in response to a national policy for meeting the needs of a growing population and an economy dependent upon consumption of natural resources. (2) Conservation is a policy which recognizes that a growing population and economy cannot indefinitely impose its demands at a continually increasing rate upon a limited resource base of American society. (3) Technology assessment is a technique of policy analysis which makes available alternatives to impacts upon environmental and societal resources from the utilization of technology in the exploitation of resources. (4) Long range planning can utilize all the means of policy analysis suggested above. The purpose of long range planning is to make available to American society alternatives which can give an ability to make choices about the future based upon careful evaluation of the impacts of technology upon both demand and the imperatives of conservation.

2. Institutional Response to Scarcity as Related to Ocean and Coastal Resources

A. Resource scarcity has been a predominant aspect of legislative activities during the first half of the 1970's. Legislation has understandably responded to specific topical issues due to crises which have developed within the nation's resource base. Obviously, resource crises have not developed comprehensively because the societal process of demand and supply occur randomly rather than comprehensively. Legislation, however, must deal with societal resource problems as they arise. For this reason, statutes such as the Coastal Zone Management Act, the Marine Mammal Protection Act, and the Ocean Dumping Act—to mention just a few, have preceded comprehensive executive branch administrative reform for resource management.

In other words, the sum of the parts of the many legislative initiatives in National Ocean Policy has not resulted in a comprehensive policy itself. Nor should it have been expected to, since there has been no analogue in the Executive Branch to the National Ocean Policy study. Understandably, legislation should seek an analogue of the organization that exists within the

National Ocean Policy Study of the Senate. The fact that this committee is constrained by the reauthorization of terminating legislation and by legislations suggested by national resource crises is appropriate indication that while suggestions for more comprehensive approaches might be forthcoming, few initiatives legislatively would have greater effect than those directed towards specific resource management goals.

3. Mechanisms for National Policy Development toward Ocean and Coastal Resources

A. Institutional responses to resource crisis have now resulted in a set of national goals. These goals have been embodied in legislation which has called forth priorities from action which has not been convenient to implement. In many cases, the legislation has given responsibility to existing executive branch offices, within departments. These have been necessary assignments because of the concern on the part of the Congress not to establish major reorganizations of the executive branch.

Inevitably, a tension has developed in which the institutional response to resource management problems on the one hand, and executive branch organizational difficulties on the other, have made new initiatives unlikely.

B. This Committee has pioneered in responding to resource policy crisis by establishing new institutions within the federal structure. On more than one occasion the Committee has identified the need for outreach mechanisms to stimulate democratic participation and the creation of a network within the federal structure to develop a comprehensive national policy with respect to ocean and coastal resources. The Committee has through this process established a clear-cut precedent in recognizing that the nation cannot be governed through a centralized administrative process. Moreover, the Committee has challenged those agencies of government which have heretofore existed as scientific and informational organizations by requiring them by statute to become resource management oriented.

C. These agencies have not made that transformation into resource management responsibilities for a variety of understandable reasons. These reasons can be conveniently identified because of the fact that resource management tasks require an explicit analysis of alternatives which can be utilized in the democratic process of decision-making. Typically, resource agencies have been providing data on the nation's resources without providing the analysis on the consequences of a more intense demand and resulting shortages of supply of these existing resources. And they have not been supplying such an analysis for reasons that are addressed in the legislation proposed by this Committee.

D. A new phenomenon has been identified by this Committee in advance of the other committees of the Congress both because of its previous legislation and the legislation under consideration now. An appropriate way of identifying this legislation is to state that it requires the nation to establish processes of democratic resource management. Such management requirements have been clearly identified in the Coastal Zone Management Act and its amendments as well as other resource management acts which have given NOAA authority since its organization by the executive order in 1969.

E. Resource scarcity has occurred simultaneously with a crisis in democratic institutions. Neither of these challenges has arisen from common sources. However, both of them have demanded a common response. That response must necessarily be to facilitate a substantial amount of public participation in decisions on resource utilization and management. If such decisions were made administratively and implemented in the same manner, then the imperatives of resource scarcity might result in a loss of democratic freedoms. Such a sense of loss was felt by many Americans during the Arab Oil Embargo of 1973-1974.

The question of democratic participation in national resource management has not arisen as a major issue heretofore because scarcity has never been an issue in the mid 20th century until now. Given the nation's great dependency upon resources for its economic welfare, scarcity becomes therefore as severe a challenge to democratic institutions as was the Civil Rights crises of the 1950's and 1960's.

F. Just as there are imperatives resulting from resource scarcity, there are also imperatives with respect to resource management consistent with

democratic ideals and democratic institutions. These imperatives are implicit in the minds of most Americans. However, they have not been made explicit as a set of requirements by statute or by administrative regulations within the executive branch. This oversight has not been due to neglect. Instead, there has been neither the necessity nor the mandate for making resource management a high priority national issue. Clearly, however, times have changed and the necessity for effective resource management has become as critical a factor in the continuation of the economic well being of the American society as it has become critical to the preservation of democratic institutions of ideals. For this reason, a set of requisite needs should be identified for discussion if a commonly accepted set of principles is to be established. It seems clear that the legislation under consideration has, in fact, addressed such an agenda of requirements. These requirements seem all the more important in this legislation because of their general applicability beyond the very important and critical questions of ocean and coastal resource management. These requirements are:

1. Identification of national priorities.

2. Communication between nationally recognized experts on one hand and citizens and public officials at the state and local level on the other.

3. Development of techniques for resource management and policy analysis so that alternative courses of action can be made explicit to the public at large. These alternatives as they are analyzed cannot be the typical trade-offs between technical considerations. Instead, they must include thorough technology assessments of the social, environmental, and economic as well as technical alternatives. Only through such an analytical base can the full range of issues be presented for public participation in decision making on the application of science and technology to ocean and coastal resource management. For example, a set of controversies is raging in California over the use of the coastal zone and the waters of the outer continental shelf for energy facility siting, industrial utilization, and residential construction. The techniques for policy analysis and resource management to provide citizens of California with a basis for making judgments has not, however, been available on such issues. Since an informed citizenry is an essential prerequisite for democracy, there is a necessity for analyzing resource management questions in such a form so as to make a broad spectrum of alternatives available for public consideration.

4. There must also be the creation of a structured forum for discussion and decision making by involved constituencies concerned with resource management questions. Issues that are now being fought out in the courts and through ballot initiatives in election referendums might otherwise be resolved more effectively and efficiently through a structured forum that would link together federal executive agencies, state governments, and public interest groups at the local level. Such a linkage seems to be both appropriate and feasible within the legislation being considered before this Committee.

4. *The National Oceanic and Atmospheric Administration (NOAA) as a Lead Agency for National Ocean Policy Formation and Implementation*

A. The Ocean and Coastal Resources Act and the Marine Science, Engineering, and Resource Development Act represent substantial efforts to provide the comprehensive institutional reform that is required to transform an existing agency from a scientific and institutional support agency into a resource management agency. As national circumstances change, so should the institutions serving our society change. But such changes in institutions cannot be accomplished effectively unless there is an assessment of the changes that have occurred and unless a democratic society can bring under effective popular control the new institution.

B. The reorganizational aspects addressed in the legislation being considered by this Committee provide a framework in which a substantial number of resource management issues related to oceans and coastal resources can be managed more effectively. Within the years immediately ahead, new pressures will be made on the nation's seafloor as the two hundred mile limit of the sea is implemented on March 1, 1977 and as further pressures are made upon the outer continental shelf for oil, gas, and mineral resources. With these demands in mind, it is clearly indispensable

that the National Oceanic and Atmospheric Administration (NOAA) be prepared to coordinate the increasing responsibilities which it must discharge by having greater authority within the executive branch in relation to other complementary resource management agencies having partial jurisdiction in these areas.

C. There would seem to be little question among those concerned with marine resource policy that NOAA must become a strong lead agency with respect to oceans and coastal resources. Moreover, it would also seem to those concerned with marine resource policy that NOAA and in particular SEA GRANT be especially equipped to mobilize the resources of the academic institutions of the nation to address the pressing policy questions that are likely to confront not only the agency itself, but American society as a whole. Without this lead agency capability, NOAA may run the risk of becoming overburdened by statutory responsibilities which go beyond its institutional capability to fulfill. Legislation related to the ocean and coastal resource base of the nation is now emerging with great rapidity. This pace is unlikely to abate in the near future. While the statutes that have been enacted have given NOAA significant additional responsibility, there has been little attention to the overall integration of these responsibilities into a broader authority for resource management and policy analysis. As presented, the legislation under consideration by this Committee would move forward to close this void and to provide not only NOAA but under the terms of S.709 a coordination function for the executive branch.

D. Under the provisions of the Oceans and Coastal Resources Act, the Sea Grant program would be authorized to play a national role in identifying key policy areas and implementing programs of analysis and training to prepare the nation to meet such policy changes. For example, the legislation under consideration would enable the Sea Grant program to assume a major responsibility within NOAA for the preparation of the agency and the executive branch as a whole for the implementation of the two hundred mile extended jurisdiction of the sea, undertake research and policy analysis for the implementation of the coastal energy facilities amendments to the Coastal Zone Management Act, and to undertake extensive research for such existing statutes as the Marine Mammal Protection Act and the Oceans Dumping Act. While NOAA has conducted research and institutional support in these areas, the current legislation would provide the Sea Grant program with a responsibility to NOAA as well as responsibility to main institutional support. In other words, this legislation would make Sea Grant a focal point in the development of policy analysis for the utilization of NOAA's mainline components in the implementation of existing and future statutes that related to oceans and coastal resources management.

E. The National Ocean and Coastal Advisory Service provides a stronger instrument for NOAA to discharge its responsibilities under the statutes now existent and those certain to be enacted in the near future. In particular, the legislation authorizing the two hundred mile extended jurisdiction of the sea will establish eight commissions for the regional management of this responsibility. The National Ocean and Coastal Advisory Service is certain to be called upon to play a major role in the establishment of these commissions and the implementation of their responsibilities. Moreover, the National Ocean and Coastal Advisory Service is likely to be in a position to play a much stronger role in the assistance to state coastal zone management programs within the states as well as to prepare the nation for the exploitation of minerals within the sea beds.

Mr. Chairman, this concludes my testimony. I wish to thank you and the Committee for the opportunity to present my views on the legislation that the Committee is considering. I regard this legislation as a major departure in the nation's history with respect to the more effective management of the ocean and coastal resources of America. I'm sure that the Committee does not regard the pending legislation as the final answer to the development of a National Ocean Policy. However, I am sure that this legislation will mark a major step towards such a goal. In the passage of this legislation and its implementation by NOAA, all Americans concerned with the future of resource management within our society must be heartened by the legislative leadership demonstrated by the Committee and the prospects for a stronger authority for policy analysis and resource management within NOAA.

Senator HOLLINGS. We will now hear from Mr. Dubs, and then we will go to lunch and reconvene at 2 o'clock.

STATEMENT OF MARNE DUBS, DIRECTOR, OCEAN RESOURCES DEPARTMENT, KENNECOTT COPPER CORP., NEW YORK, N.Y.

Mr. DUBS. Thank you sir.

Mr. Chairman and members of the committee:

I am Marne A. Dubs, director of the Ocean Resources Department of Kennecott Copper Corp. I am also a member of the National Advisory Committee on Oceans and Atmosphere, chairman of the Undersea Minerals Committee of the American Mining Congress, a member of the U.S. delegation at the Law of the Sea Conference, and participate in numerous other organizations dealing with marine affairs.

My principal interest has been in developing the mineral resources of the deep ocean, and I manage Kennecott Copper's activities on the mining of manganese nodules.

However, today I testify in my personal capacity and my views should not be construed as representing the official positions of any of the organizations I have cited above.

Mr. Chairman, I appreciate the opportunity to testify on these two important and—perhaps more accurately stated—vital pieces of legislation: S. 3165, The Ocean and Coastal Resources Act of 1976, and S. 709, the Marine Science, Engineering, and Resource Development Act of 1975.

I characterize this legislation as vital because it proposes solutions to what I consider some of the critical problems which have been barriers to achieving the effective utilization of the resources of the ocean and to insuring the conservation of resources and protection of the environment.

There is a temptation before getting down to problem areas to extoll the potential benefits of the ocean and seabed. However, Mr. Chairman, you, this committee and its staff need no convincing on this point, and the records of other hearings are replete with both the hard facts of today and the glowing promises of tomorrow.

Our task is to take action so that the hard facts of today are translated into success and the promises of tomorrow are made reality.

I might characterize the whole problem that the glowing promises of tomorrow seem to have receded into the distance.

Mr. Chairman, first on my critical problem list is the lack of focus on ocean matters at the very highest levels of the executive branch. By lack of focus, I mean to say the consideration of ocean affairs and policy seems to me to be fragmented, insufficiently planned, not well coordinated, and at too low a level.

I realize this to be a somewhat extreme statement and that within present frameworks many men and organizations are valiantly trying to get around this problem.

An example is the Intergovernmental Commission on Marine Science.

Furthermore, it is to their credit that they sometimes succeed in spite of the difficulties.

There are basically two reasons why this focus is necessary. The first is that the oceans are so important to us that they require very top level attention.

The second is that the oceans are so intertwined with other functional goals that there are, and I believe must continue to be, programs in almost all departments of Government that will relate to and depend on ocean technology.

The solution is not to bring everything that is wet together in one place. This would be improper, unworkable, and counterproductive. A better solution is to provide a high level focus for the oceans.

The lack of this integrated high level attention has resulted in ocean development receiving less emphasis in our national priorities than it should.

It has often fostered duplication and friction between the major departments in Government. It has resulted in national opportunities and problems in ocean affairs not being attacked in the most expeditious and effective manner.

In my opinion, S. 709 is a proper response to the above situation. The level of participation is proper. I believe it is most important that the council be chaired by the Vice President of the United States since several major departments of Government are significantly involved in matters directly or indirectly related to the oceans.

The policies enunciated in the bill are proper and necessary, and the responsibilities outlined are generally sufficient to the task.

Mr. Chairman, second on my list of critical problems is the lack of an integrated long-range planning capability and coordination mechanism in marine science and technology.

More specifically, NOAA set up as our central operating ocean agency, has not been nearly so effective as it might be because of the lack of a central planning, evaluating, and coordinating organization.

In many respects NOAA now is a collection of ocean activities inherited from previous organizations and with marginal influence over other ocean activities.

S. 3165, The Ocean and Coastal Resources Act of 1976, proposes such an organization in title I of the bill. It does not seem necessary for me to repeat the purposes and policies enunciated in sections 2 and 101 of this bill.

I can only endorse them. The duties enumerated in section 102(c) directly speak to my second critical problem, particularly the planning function.

The provision for the preparation of a 6-year plan is good—better said excellent.

However, I would prefer to see a 10-year plan developed so that all the implications of the plan can be understood. Six years into the future is not very far.

It is very difficult to plan that far in the future. Therefore, I would propose a system where the plan for the next year or two would be very firm. Between then and year 5 it would be a forecast.

Beyond 5 years it would be considered a preliminary look into the future.

Specific major projects—aquaculture might be such a project—when they are sufficiently developed to be able to predict the future with reasonable clarity, should have a 10-year plan of forecast quality.

I want to emphasize the particular point that S. 3165 is quite compatible with S. 709. This represents planning and coordination at two levels, both of which are necessary. S. 709 treats the broadest policy implications of the oceans. S. 3165 gets down to the working nuts and bolts.

I want to be certain that I have made clear to the committee that I do not favor the oceans disappearing from other departments of Government.

I believe that the oceans should be a tool for all to use.

For example, where the primary goal is mineral resource development, I believe such development should be under the lead of the department that has overall responsibility for mineral development. at the moment the Interior Department.

However, there is a supply of ocean technology required where ocean minerals are involved and the provisions of title I should facilitate its being available when needed.

The title I approach would assure that development proceeds in response to need, or hopefully anticipates some needs, avoids duplication and waste, and provides necessary coordination.

Title I also creates a National Ocean and Coastal Advisory Service. I endorse this idea. It is very difficult today for even the largest organizations to obtain data and information on specific ocean questions on a national basis. For smaller organizations it is impossible.

I want to be certain that it is understood that I in no way want this Advisory Service to diminish or replace local and regional service under sea grant. This latter service is valuable, generally works well, and must be associated with the region, with sea grant research, and with sea grant education and training.

However, this local sea grant service cannot satisfy the requirements of the user of information which must come from many organizations and cover wide areas of expertise.

In addition, the location of an advisory service in juxtaposition to the planning-coordinating function helps insure that the planners are kept in touch with user needs and with the real world.

Finally, the level of effort proposed in title I appears to me to be appropriate.

With respect to sea grant, title II of S. 3165, I state at the outset that I am a warm supporter of the sea grant concept. I also feel that its promise has not been realized—and it needs to be strengthened.

There are several provisions in S. 3165 which I consider to be particularly helpful. One of these is the Marine Science and Technology policy function.

I believe this will give sea grant a framework in the form of the 6-year plan of needs and planning to respond to on a national basis. I don't think the existence of such a plan should in any way be considered a strait jacket with respect to sea grant. I believe sea grant would respond to the needs and priorities such a plan would show.

Again, I do want to make clear that the local and regional aspects of sea grant should not be diluted. In earlier statements the question of the reporting of the Director of sea grant, and his relationship

with the policy function was discussed. I think there are two edges to that sword.

If sea grant reaches the importance that many of us would like to see it achieve, as a major operating division, I can see the possibility of such a large operating group interfering with the planning function and the coordinating function. I think there is great value to having the policy function kept separate, where it can analyze and operate in the most objective fashion.

The second point is the inclusion of a provision, section 204(c), to make 100 percent funded grants and contracts in accordance with specifically identified national needs and problems.

I believe this can greatly strengthen sea grant and provide a powerful tool to get things moving in the ocean and get them going in the right direction.

The proposed funding is relatively modest, but tying it to specific goals should make the expenditures very effective.

I would hope that these expenditures would not be committed to any project which did not meet the test of national need and that was not identified in the plans developed under title I.

I note that the National Advisory Committee on Oceans and Atmosphere is in the midst of a study of sea grant. The present views of NACOA were given in statements on March 3, 1976, before the Subcommittee on Oceanography of the Committee on Merchant Marine and Fisheries of the House of Representatives by Dr. William J. Hargis, chairman of NACOA, and William C. Ackerman, member of NACOA. It is expected that the NACOA study will be helpful in providing guidance to sea grant.

Mr. Chairman, there are many details in S. 3165 which I am not in a position to comment on. I would hope, and I see they have already started, that NOAA, sea grant colleges, and others would do so. It would depend on them to straighten out those details which seem reasonable to me, but which might cause mischief that I don't see.

In summary, my position on both S. 709 and S. 3165 is that I support them. They are going in the right direction.

I find the bills basically compatible. I believe that sea grant will be strengthened by the proposals in this legislation, and that our national goals in the oceans will be clarified and programs implemented to achieve them.

Thank you, Mr. Chairman.

Senator HOLLINGS. Well, Mr. Dubs, your statement is outstanding. I appreciate it, particularly coming from industry, and from someone such as yourself who has participated as a member of the National Advisory Committee on Oceans and Atmosphere, and who has such broad experience in this field.

I wanted to get it clear in my mind with respect to the sea grant Director. Should he be a part of this new office, as is provided in the bill?

Mr. DUBS. I think that in the final analysis, I would vote against that. I think he should be independent. It is really for the reason that I think the whole policy function area needs to be kept free of operating problems.

Senator HOLLINGS. We do keep that policy function separate.

In regard to the need for coordination, a similar problem seems to exist with the energy area. While I am not trying to be critical, right

now I can run a contest with the press table to see if they can find out who the energy czar is:

I happen to know, because he told me last Friday, but they wouldn't know. You can't find a person in Interior at a policy level who is in charge of offshore drilling.

The leases and everything else are spread out between the Bureau of Land Management and the Geological Survey.

Now what we are attempting to do is to try to get some high level coordination in the oceans program. If you ask me, working in it, where it is, we are not quite sure of ourselves. If we get the right Vice President and bring him in at that level—for example, Vice President Humphrey really took a tremendous interest as Senator Pell pointed out—we would be off and running. We would have to play catchup football to keep up with that fellow. He would be coordinating everything about the oceans.

Excuse me, Senator Pell. Did you have any questions?

Senator PELL. I think that is the key to it. If you put a statutory provision in as to the Vice President being the chairman of a council, and if you have a Vice President who is not interested in or turned on by the oceans, that council will die on the vine.

On the other hand, if you have one like Humphrey with us, it will succeed. Perhaps we should give some thought in the bill, as we move along, to not mandating it to be the Vice President. Maybe that Cabinet member who is most interested in it should be designated by the President or something of that sort.

Mr. DUBS. May I respond to that, please, Senator?

Senator PELL. Yes.

Mr. DUBS. I think I am concerned that any one of the Cabinet members be made chairman of such a policy group. The reason is that I see a deep involvement in the oceans of the various departments, and I think having a man chairing the council who would have the mantle of total objectivity would be a very great asset and would insure the smooth functioning of the council.

If it is a Cabinet member, I think the condition still exists for fostering the kinds of problems that we see arising today. The Court of last appeal would remain the same way as it does now. I could be wrong, but certainly the ideal in my mind would be to have the Chair be the Vice President and have the Vice President be an oceans-minded man.

Senator PELL. But I remember discussing this with Vice President Agnew, and the oceans did not turn him on at all. I am wondering what you would suggest when we have a case like that, not that we will have Vice President Agnew again.

Mr. DUBS. One thing we might consider doing is trying to get sufficient accountability into the bill so that a competent, albeit a lukewarm, Vice President is in fact held accountable for this work.

Senator PELL. And he would pick somebody then who would represent him on it, and run with the ball?

Mr. DUBS. There is also no question that a good, a very good executive secretary is a necessary part of the smooth functioning of such an organization. But, of course, that does not solve the political problem.

Senator PELL. I remember what an excellent job that Dr. Abel used to do—what was that board called?

Dr. ABEL. The Interagency Committee on Oceanography.

Senator PELL. Yes.

If that had more statutory authority, very much the same thing could be accomplished.

One question I have is, do you believe that there should be a separation between the funding programs for meeting regional and local needs, as opposed to national needs.

In your testimony you mentioned the idea of 100 percent financing for the national needs.

Mr. DUBS. I am sorry, with respect to —

Senator PELL. You like the idea of the division between the two?

Mr. DUBS. I like that very much, yes. I certainly would in no way dilute the local/regional. I would have the national 100 percent funding be separate. I would want the national program arranged in such a way that it would respond to specific needs and not become simply a mechanism to channel money into pet projects, i.e., this program be made part of the plan.

Senator PELL. This is local, regional, and national. Then there should be probably some small international funding.

What is your view on that?

Mr. DUBS. With respect to international, I feel the following: presently we have enough problems to get sea grant going and handling our own national problems. However, I think we have to look toward the future when we may willfully be involved in international programs in training.

We certainly see it as an important aspect of the whole law of the sea negotiation. It could well be that we would at some point enter into a treaty where such international training is involved. This could be a very good and strong function for sea grant.

However, I think such international programs should be over and above the present programs.

Senator PELL. A separate section with a relatively small amount. The House provides, I think, \$3 million for that, something of that sort.

Mr. DUBS. It certainly should be a small amount now.

Senator PELL. Right, I agree.

Senator HOLLINGS. Mr. Dubs, from your leadership role in industry, what is your view of these cooperative programs between government and industry to develop science and technology?

Mr. DUBS. Well, I haven't seen them work very well in the broad area that I have been involved in most deeply. I think there may be several reasons for this:

One of them is that when you go into deep ocean technology, you get into very expensive technology. The kind of sea grant college that could respond to such programs, and to the ocean engineering problems involved, is a sea grant college that is undoubtedly better funded than those of today.

The massive scale of efforts in these large projects prevents their being able to fulfill a significant role. Thus, their role tends to be a subsidiary one. They are more apt to enter a relationship with, say, an instrument manufacturer, who would hope ultimately to develop instrumentation that might be used in an industry such as ourselves.

I think the lack of deep involvement is directly related to the present scale of sea grant. In that respect, I think the present funding level is part of the problem of sea grant being effective in large problems and in fact being as effective overall as we would like it to be.

On the other hand, I must say that if there were a proposal before me to increase sea grant funding, without the kind of management structure that is being proposed in S. 3165, I would probably say that funding will not be effective.

I believe it is the combination of the kind of management structure that you want to build in, plus increased funding, that will make sea grant more effective in broad national problems, as well as increase its effectiveness in local and regional problems.

Senator HOLLINGS. Very good, sir. Thank you very much for your appearance here today.

The committee will be in recess until 2 o'clock.

AFTERNOON SESSION

Senator PELL. The committees will come to order. The Committee on Commerce and the Committee on Labor and Public Welfare are holding this joint session in connection with S. 3165, Ocean and Coastal Resources Act of 1976, and S. 709, the Marine Science, Engineering, and Resource Development Act of 1975, and the Sea Grant College Act.

Our first witness this afternoon, out of courtesy because the Senator from New Hampshire is here, is Dr. Robert Corell, University of New Hampshire, who will be introduced by my colleague from New Hampshire.

Senator DURKIN. Thank you, Mr. Chairman, for your courtesy.

I think the committees are in for a treat this afternoon. As you know, New Hampshire is a small State, which caused enough notoriety last year, but as a general rule we don't make the headlines except in contested elections, the Presidential primaries, what-have-you. We don't have a lot of problems; we don't have violent crime, pollution and poverty as major problems. But in a few areas, New Hampshire is a leader and one of those areas is marine biology and oceanographic research.

Dr. Robert Corell is Mr. Marine Research in New Hampshire and I am delighted to introduce him to the committees today.

In New Hampshire we go back to 1927 in marine research. That was the year that the University of New Hampshire founded one of the first academic marine field stations in the country just off the New Hampshire coast.

In 1968 the Jackson Estuarine Laboratory was completed and 2 years later the Engineering Design and Analysis Laboratory was finished. All had the effect of producing a vibrant and well-renowned program, combining both student and faculty research in the areas of coastal science and engineering.

Dr. Corell now heads those combined efforts, plus a new cooperative program which just last week received the grant of some \$860,000 from the National Oceanic and Atmospheric Administration. The money will be used by UNH and the University of Maine to support studies in aquaculture, ocean engineering, marine resource development and marine education.

Matching funds from the two States raise the total program to approximately \$1.4 million.

They plan to do some important studies with that money, Mr. Chairman. They will look into ways of growing mussels in the waters off New Hampshire and Maine as just one way of providing a new food for the American diet. They will be looking for ways to bring the Coho salmon back to the New England waters; oysters, seaweed, and the infamous red tide also will come under their scrutiny.

New Hampshire is kind of nuts about the sea, Mr. Chairman.

Part of it is that the fishing industry has been a mainstay of our economy. Our traditions with respect to the sea go back many, many years. Part of it is that it only has 18 miles of coastline, unlike Connecticut and South Carolina and Rhode Island. Every inch of our coastline is precious, and the late Aristotle Onassis found that out soon enough a few years ago.

But just as important, Mr. Chairman, is the public support and pride taken in these kinds of marine research projects, which have been conducted for decades at the facilities now under Dr. Corell's direction.

The environmentalists are for them as well as industry. Republicans and Democrats are quick to recognize their importance to our students, our economy, and to the academic world.

In short, field support of marine research is working extremely well in New Hampshire, and it can work well in all coastal States if they create the same kind of public support as we enjoy in New Hampshire.

That is why the Ocean and Coastal Resources Act is so important. We know that we have got to look to the sea as an important untapped source of food for the 21st century and beyond. As we know, in the meantime serious and concerted efforts have to be made by the Federal Government to protect those resources now while there is something to protect.

Dr. Corell is here to assist you in translating those goals into meaningful legislation. I appreciate the opportunity to introduce him to you today and to reaffirm that there is a swelling tide of public support for those twin goals of resource development and resource protection.

I thank you very much, Mr. Chairman.

Senator PELL. Do you want to proceed then, Dr. Corell?

STATEMENT OF DR. ROBERT CORELL, DIRECTOR, UNIVERSITY OF NEW HAMPSHIRE MARINE PROGRAM, AND ASSOCIATE DIRECTOR, COOPERATIVE UNIVERSITY INSTITUTIONAL SEA GRANT PROGRAM, UNIVERSITY OF MAINE AT ORONO AND THE UNIVERSITY OF NEW HAMPSHIRE

Dr. CORELL. Senator Pell, Senator Hollings, and members of the Committees on Commerce and Labor and Public Welfare, it is a deeply appreciated honor to testify today at the joint hearings concerning the sea grant program and other related bills dealing with marine science and technology policy.

My comments today are related to S. 3165, and S. 709. In my prepared remarks I have discussed several points, including some of which are suggestions in detail. Therefore, I will limit my comments this afternoon to three major points with some slight amplification on each.

First, Federal legislation and most of the resulting programs concerned with marine science, engineering and ocean and coastal resources have had a substantial and positive impact upon marine programs and activities of institutions of higher education in the United States. With respect to the national sea grants program and its contribution, Dr. White and others have discussed this at some length. It is our belief that the national sea grant program has made positive and substantial contributions to our Nation, and to mankind. During the 10 years since the establishment of the sea grant program, many institutions of higher education have increased their commitment to long-range coordinated programs of education, research and public service in the marine field. It is our belief that the sea grant program itself was a major stimulant to those expanded activities.

The sea grant program is unique among Federal programs in its relationship with institutions of higher education. The Sea Grant College and Program Act of 1966 stimulated programs at our institutions which not only responded to national needs directed toward development and conservation of ocean and coastal resources, but it did so within the context of the basic objectives of academic communities, and within the framework of local, State and regional programs and needs. The collaborative concept inherent in the original sea grant legislation has been created and is functioning, we believe, to our collective benefit. Put simply, we think the sea grant program provides a vehicle for utilizing the substantial and varied talents and skills of the Nation's national, regional, and local problems and programs.

Let me give you a specific which Senator Durkin from New Hampshire mentioned; the sea grant program has supported, for the past 2 years, a project in Maine and New Hampshire to develop a new fishery, an underdeveloped fishery in the blue mussel, with aquacultural potential. Since the inception of that project, the number of dealers handling this species in Maine alone has increased by a factor of 20, and landings have increased by a factor of about 5. Blue mussels are increasingly available in the supermarkets of our region. Further, several new aquaculture companies have invested their capital in initiating aquacultural programs with the blue mussel, and we anticipate others to follow.

The second point I would like to discuss relates to two specific points with respect to S. 3165, one related to research, and the other on the question of organization.

These remarks relate to the second draft of S. 3165. I believe that the second draft of the bill is fundamentally a sound piece of legislation as it strengthens the charter and responsibility of NOAA with respect to marine resources, science, and technology programs, and it expands and improves, I think, the national sea grant program. I believe this is a desirable and healthy addition to the legislation related to NOAA and to the sea grant program. With effective man-

agement and administration within NOAA sea grant can continue to function as a major contributor to NOAA's role as the lead Federal agency responsible for development and conservation of ocean and coastal resources.

With respect to the research question, title I of the bill clarifies the importance to our Nation of a balanced emphasis on basic research, applied research, and technology developments. However, in title II, particularly in the content section, the goals of research within sea grant are not so clearly identified. We believe one of the outstanding characteristics of the 1966 sea grant legislation is that it promoted problem-oriented research and development. I hope that this emphasis on objective-oriented research will continue. In fact, I hope it can be expanded.

However, basic research is a critical precursor to successful applied research and development. Therefore, I hope that the sea grant research responsibilities are more clearly identified to include the full spectrum of research as outlined in the national principle section of title I. I hope that this can be clarified in title II.

With respect to the organization question in S. 3165, the creation of the Office of Marine Resources, Science and Technology is a desirable addition to NOAA's organization, but sea grant should be the central component of it.

The National Sea Grant Program Office has over the past 10 years developed procedures and policies for working effectively with the academic community. It is a rare Federal agency in my opinion that has this ability. The creation of this new office should not detract from this important asset. The changes from draft 1 to draft 2, particularly with respect to the National Ocean and Coastal Advisory Services, suggests that the intent of the authors is to strengthen sea grant and to enhance sea grant's relationship with institutions of higher education, particularly those with commitments to marine science, engineering and resources. Sea grant should continue to be the NOAA component concerned with research, education, and advisory services in institutions of higher education.

It has taken about 10 years in our universities to carefully evolve coordinated programs in marine education, research, and advisory services. Parenthetically, I might add that that is a difficult process for many institutions of higher education to undertake. I think sea grant is to be commended for helping this happen in a number of institutions throughout the United States.

The new Office and the National Ocean and Coastal Advisory Service should function so that sea grant can continue to serve as a coordinated program at the national level, with all three components of research, education, and advisory service.

The final point I want to make refers to Senator Humphrey's bill. This bill complements in many ways the Ocean and Coastal Resources Act of 1976. The planning and policy aspects of S. 3165, I believe, could be strengthened by enactment of this bill. Coordination with Federal agencies outside NOAA also could be strengthened by the concepts inherent in this piece of legislation. Without attempting to be too presumptuous, I suggest the authors of the two bills consider combining them into one piece of legislation. The major components

of Senator Humphrey's bill could possibly become title I, and the two titles of S. 3165 could become titles II and III of a combined bill. What I have in mind is that the Council proposed in Senator Humphrey's bill could become the vehicle of the executive branch for contributing to and integrating the planning activity now contained in S. 3165 with plans, programs, and resources of virtually all Government agencies concerned with marine science, engineering, and resource development. In principle, the advisory panel suggested in Senator Humphrey's bill could be a means by which Congress and NACOA could advise both the Council and NOAA. The combining of these two bills will require careful effort by the several authors to assure consistency and to maintain the integrity of the concepts of each bill. I believe it is in the national interest to consider combining these two bills into one piece of legislation, that more comprehensively covers our Nation's ocean and coastal resources policies and programs.

With those three points, Mr. Chairman and members of the committees, I want to say I appreciate the opportunity to place these thoughts before you. If there any questions, I would be more than pleased to answer them.

[The attachment referred to follows:]

UNH SEA GRANT PROGRAM AND
UNH MARINE PROGRAM,
March 1, 1976.

Senator ERNEST F. HOLLINGS,
U.S. SENATE,
Washington, D.C.

DEAR SENATOR HOLLINGS: I deeply appreciate your letter of February 17 concerning your draft bill on the National Sea Grant Program. My initial comments follow. These are not complete, but they give you my initial thoughts.

TITLE I—MARINE SCIENCE AND TECHNOLOGY SECTION

The concept is a new idea with considerable merit. I think part 2, A through II (page 4 & 5) is particularly cogent. The emphasis on both Basic and Applied research is excellent, although I would recommend adding in line 3, page 6 between the words "support" and "of" the words "by the Federal Government". The Office of Marine Science and Technology, by virtual of Associate Administration status should improve ocean affairs in NOAA. The bill implies both programs internal and external to the Federal Government. I feel the distinction between these should be more clearly stated. My preference is to place heavy reliance on well planned programs external to the government than on the development of new Federal laboratories. The existing resources within government, universities, and industry need to be more fully utilized and further developed. I hope the bill will not be used to develop and expand a Federal laboratory system for civilian marine science and technology.

The National Ocean and Coastal Advisory Service, as amplified by the memorandum of 2/20/76, should improve advisory services. There may be problems between the Sea Grant education and research program approval mechanisms and the approval by the Service. We in Sea Grant are reviewed by too many constituents now, one more will make it that much more difficult. Please create a mechanism so that a coordinated review by NOAA of all three parts of our programs can be done without serving a NOAA Education and Research Program (which you will now call Sea Grant) and a NOAA Advisory Program (which you will now call NOCAS). Please recall that we have worked for 10 years in our universities to create a highly planned and integrated education, research and advisory service program. Serving two

NOAA components may destroy the integration that we have finally achieved with much work. Recall that Sea Grant at each institution is a coordinated program not a series of unrelated projects. Please redraft the bill to assure a similar integration of program activities within NOAA.

The change from 33% to 20% is not a necessary one. The 33% match has assured a marriage with local and regional needs. I would rather see two classes of matching funds. One at 33% for those efforts which have local, regional or state implications and one at 5% or 10% for those efforts which have clear national implications and for which it would be difficult to justify the 33% match by any one state or university.

Finally, the introduction of OMSAT between Sea Grant and the NOAA Administration serves to reduce the accessibility of Sea Grant to NOAA proper. This may weaken Sea Grant unless OMSAT is given sufficient clout to prohibit that from happening.

TITLE II—NATIONAL SEA GRANT PROGRAM AMENDMENTS

Several concerns. First, Sea Grant has a major thrust in research, with related and attached efforts in education and advisory services. The strengthening of advisory functions and education should not mean a diminution of research. The acts general purposes cannot be fulfilled without a substantial applied research program with an attendant basic research effort. Please do not reduce the research strength that Sea Grant now has.

The 50% limitation on grants and contracts is too restrictive.

Many other aspects of the Bill are enlightening and should be seriously considered. Please keep us informed about developments. The few comments above are prepared with only a few days available to consider a substantial bill. I will continue to review the bill and submit ideas as they develop.

Thank you for consulting us.

Most sincerely,

ROBERT W. CORELL,
Director.

Senator PELL. I have just one request, and that is if you would outline for us a little bit of the relationship you have with sea grant and the impact of the sea grant program on you. As I understand it, you have a regional arrangement with the University of Maine?

Dr. CORELL. Yes, sir.

Senator PELL. How does that work, how is the money divided, what kind of programs are being pursued under sea grant funding?

Dr. CORELL. This year, effective January 1, the University of Maine and the University of New Hampshire sea grant programs were combined together into one institutional sea grants effort, with careful coordination of program between the two institutions. There is one director, who at this time is Dr. Fred Hutchinson from the University of Maine. The directorship alternates every 2 years to assure that we have a cooperative relationship in which neither university dominates the other.

Senator PELL. How far apart are the two universities?

Dr. CORELL. The University of Maine is about a 4-hour drive from us, but there are many projects at the Darling center of the University of Maine which is in Walpole. Many of their advisory functions are up and down the coast of Maine. It turns out we meet in Portland quite frequently to manage this program and to see that it runs effectively.

Senator PELL. You are about 1 hour by car apart then?

Dr. CORELL. Yes, when we get together, it is about 1 hour by car. It is about 1 hour from their laboratory down to Portland.

You asked about the areas of coverage. There are a number of aquaculture efforts. The coho salmon, the European oyster are being introduced into the New England region as an aquaculture industry. The blue mussel as I mentioned before is also being developed. We have had some efforts to work with flounder as a potential aquaculture industry in our region.

We have programs in ocean engineering. We work quite closely with the coastal zone management activity in New Hampshire and also in Maine.

We have, we think, a unique relationship in New Hampshire, where we undertake research efforts, the definition of which are worked out together with the coastal zone management office in the state. We have some educational activities, and of course we have the advisory services.

We have a number of other projects that deal with such things as the red tide problem that has evolved in New England as a major problem for the fisheries industry. I should mention there is a good bit of environmental effort to provide fundamental information as well as management tools on such things as our Great Bay estuary.

I think that gives you the spectrum of the kinds of things we do.

Senator HOLLINGS. Dr. Corell, once again we thank you for your wonderful help here with our national ocean policy study and particularly on these pieces of legislation, and we are pleased to have your distinguished Senator Durkin on our Commerce Committee working actively and giving leadership in this particular area.

With respect to the two bills, I think we can get them together without too much difficulty. You are exactly on target. The idea is to take the salutary features of sea grant and put them in NOAA, in a leadership role, but not diminish the experience we have had over the 10-year period in the sea grant program.

And we can make sure that the clarification in title II is made as you suggest. I don't see why we can't. We haven't sat down and talked it out yet, but I can see very easily how we can get Senator Humphrey's and our bill together so they are compatible, because I believe they are.

Senator PELL. I would agree with Senator Hollings on that. I just don't want to see too much loaded piggy-back onto the sea grant extension. I think the objectives of the Humphrey bill are exactly the same that Senator Hollings and I have. If we could get that through it would be marvelous, but I wouldn't want to see just a 1-year extension of the sea grant and have it encumbered.

Senator HOLLINGS. No, I agree with you on that. We must keep sea grant going and beef it up.

Senator DURKIN. Maybe as I say, it is because we only have 18 miles of coast that we realize the importance of it.

Senator PELL. If the Senator from New Hampshire will yield for a moment, it is of interest that our small State has 400 miles of coastline.

Senator HOLLINGS. Thank Heavens the Senator from Alaska is not with us. He would make a 30-minute speech.

Senator DURKIN. We have more coastline in Winnepesaukee than on the ocean. I want to underscore our commitment to this and I

am glad to be on the Commerce Committee. But I think we have to develop the ocean as a source of protein for our tables or we are going to be in serious difficulty. So I want to thank Dr. Corell again for his leadership efforts.

Senator HOLLINGS. With the New England area having 17 percent of the world's fishing grounds and the new 200-mile zone now coming into being, this area is going to flourish with its developing fishing industry. In my opinion we will finally be able to get our total supply, rather than through importation, from our own waters, and then begin to feed the hungry of the world.

I think there is a tremendous turnaround now in the economic outlook on this score. We want to make sure that sea grant and NOAA lead the way. Isn't that right, Dr. Able?

Dr. ABLE. Yes, sir, I am all for it, Senator.

Senator HOLLINGS. Thank you very much for your appearance here, Dr. Corell.

Next we will hear from Mr. Jay Thomas, Coastal States Organization.

STATEMENT OF JAY THOMAS, ON BEHALF OF THE COASTAL STATES ORGANIZATION, AUSTIN, TEX.

Mr. THOMAS. The secretary of the Coastal States Organization is the executive officer of this council—

Senator HOLLINGS. Let me identify the Texas Coastal and Marine Council. Was it involved in the offshore deep water ports issue with Mr. Albritton serving on that? Or was that a different Texas council?

Mr. THOMAS. I think not.

Mr. THOMAS. Yes, sir; I think it was.

Senator HOLLINGS. It was not then the Texas Coastal and Marine Council.

Mr. THOMAS. I think not.

Senator HOLLINGS. All right, sir, please proceed.

Mr. THOMAS. Mr. Chairman, I am Jay E. Thomas, director of the Mississippi Marine Resources Council and am here representing the Coastal States Organization.

The organization chairman, Texas State Senator A. R. "Babe" Schwartz, was to have been here, but a conflict, called a primary campaign, precluded his appearance, and he asked me to appear.

Senator HOLLINGS. Good. Your home is where?

Mr. THOMAS. I am the Mississippi delegate to the Coastal States Organization.

Senator HOLLINGS. Very good.

Mr. THOMAS. The Coastal States Organization is an alliance of coastal States formed under the auspices of the National Governors Conference, to help provide the States a larger voice in the formulation and execution of the Nation's legislation and policies concerning coastal marine resources.

Thus these comments reflect the views of State officials who have the responsibility to develop State coastal zone management programs and who must work with a wide variety of interests, both technical and political.

My remarks today will be excerpts from the formal document which has been submitted for the record.

Before addressing particular questions raised by the legislation being considered, I would like to summarize a few general matters.

First of all, sea grant has been of value to the States in one or more of the following ways: By providing technical assistance and scientific support, by developing through educational processes a reservoir of trained manpower and by increasing through education efforts and the Marine Advisory Service an increased public knowledge of it and appreciation of marine and coastal affairs.

The present concept of sea grant providing block grants through educational institutions is sound and should be continued. There is, however, room for improvement if sea grant is intended to be more responsive to the States' needs in coastal management. The present process of program proposal and site visits tends to orient a program not toward the States' needs, as they may be articulated by the State officials, but rather as to how such needs are perceived by Washington-based bureaucrats who happen to monitor the program.

We will return to this topic later in the comments.

On some of the particular issues involved in the legislation, first of all the Office of Marine Science and Technology, there is no strong State feeling either way concerning the creation of OMST.

However, there is a belief that if an effective reorganization could be accomplished, it would be beneficial and therefore would be endorsed by the States.

We do have some views on what role and powers should be assigned to OMST, if indeed it is created.

We suggest that a prime duty of OMST is to create a substantive relationship with NOAA's many science programs. And in order to do this, OMST must have some real clout. This means some sort of budgetary control.

Onsite cooperation of various NOAA funded programs would be helpful to the States. For instance, there are approximately four agencies dealing with wetlands and research in them, and the establishment of boundaries. We suggest that there might be required, similar to the A-95 process of OMB, mutual review of grant proposals arising within the States seeking grants from the various NOAA agencies.

On the topic of a national plan, the States are concerned by the use of the word "plan." While it may be a matter of semantics, we would suggest that the word "strategy" might have a better sound. It has a meaning to us of less rigidity.

In the case of S. 709, if indeed this organization should be created, that is the National Council as well as the advisory panel, we suggest that on the advisory panel there should be representation from both State government and from private industry.

Some specific issues as they relate to sea grant and the Marine Advisory Services.

At the time these remarks were being prepared, we had to circulate to the Coastal States Organization only working draft No. 1, so some of these comments may not reflect comments on the present language.

The States, first of all, support the concept of sea grant. As mentioned earlier in the summary, the Coastal States Organization members are all drawing strongly upon the technical assistance that is in place because of the sea grant having been in place. We are using the pool of manpower that has been produced by sea grant educational programs.

We are utilizing the increased public awareness of coastal and marine affairs that has come as a result of sea grant.

In what areas would we suggest that there might be need for improvement?

We suggest that the largest need from the standpoint of the states is an apparent lack of responsiveness of the sea grant program to State needs, both in terms of reaction time and flexibility.

Sea grant has been considered by Congress as a State program, but frequently as a result of their reduced funding, we have not developed a program, but a package of individual projects that, more frequently than we like, reflect the views of a group of people from out of the State, who function as a site visit team, rather than reflecting in many cases some of the local needs.

We believe if this is to be considered a State program, then it could be more nearly administered as one.

So much for the problem. What about the solutions? We believe that most of the difficulties could be eliminated, this lack of responsiveness and flexibility, if NOAA could follow the agriculture grant model more closely.

This process, as I am sure you are aware, provides block grants to the States with very little discussion of the individual projects within the program, and then review in great detail of the results. This would reduce the present considerable lag time between the production of a proposal and the time that it is funded. This normally takes about 12 months in the present scheme of things. And if it is a single year project, then from the time the proposal is originally considered until the time it is completed, approximately 24 months have elapsed.

One result of this has been that many competent and brilliant research people have left and are abandoning sea grant.

To turn to the matter of the Marine Advisory Service, should it be separated from sea grant? The States' opinion here is a very strong NO. There are several reasons.

The Marine Advisory Services has been one of the most successful of the sea grant efforts. We believe that the splitting would restrict communication between researchers and users. The States don't want this and we urge Congress not to set up a system where it would be likely to develop. We believe it could cause some splits within universities. We are confident that those of us in coastal zone management would have greater difficulty coordinating with two agencies than we do with one at the present time.

Is a National Sea Grant Advisory Council valuable and should it be made a statutory entity?

Yes, in both cases. We suggest that it be structured so that the members could be rotated by serving longer terms and be permitted to serve only a single term.

If made statutory, the Advisory Council should be given a specific directive to establish and update semiannually broad priorities in categories of research.

How do the States feel about the national needs research section, with its 100-percent funding?

We support it. Some problems fall within this category and should be directly addressed by the Federal Government but we do believe that this national needs element should be a separate appropriation and not expressed as a percentage of the sea grant funds.

The question has been raised about the relationship in sea grant of applied and basic research.

This is a tough question, because there is no universally accepted definition of either applied or basic.

Most of the sea grant efforts should be applied research, but the States unanimously agree that there is a need for some basic research. We are continually drawing upon our basic knowledge and there is a need to "put something in the bank."

Do the States have an opinion on the national fellowships awards?

Yes, we think they are valuable. We suggest that they be more closely related to State sea grant programs.

Mr. Chairman, this completes my remarks before this committee on behalf of the Coastal States Organization.

Again let me stress that the States sincerely appreciate what sea grant has done for them. We strongly urge Congress to continue the program and offer our criticisms only in a manner so that they will improve the program in the future.

As State officials involved in coastal management, we are appreciative of sea grant. We are vitally interested in seeing that it is made more responsive to the State needs. It will become increasingly critical to achieve better cooperation to maximize the return the return on the public dollars we are spending.

Even with this increased emphasis on technical support to State coastal zone management efforts, the States recognize that the basic role of the university is education and research. Believe me, for myself and quite a few others of the Coastal States Organization people, speaking ill of sea grant is not unlike correcting an errant child. We only want to change things for the better.

Thank you for allowing me to appear here today.

Senator PELL. Thank you very much indeed. Several of your points have been covered in the new draft. Point 5 is being put on a statutory basis. And also I think the question about the national fellowships, point 8, is being put in along the lines of your suggestion in the draft bill before us.

The essential thrust of your testimony is a very real one, I recognize, and that is whether sea grant should be primarily responsible for meeting State needs or for responding to the national people who control the grants.

Mr. THOMAS. Yes, sir.

Senator PELL. Well, there is an old motto or adage that he who pays the piper calls the tune. And whether we like it or not, when it is Federal funding, they do have the say-so. There is nothing to keep the States from putting more funds into it. And the criticism from OMB is that there is not enough Federal direction, that too much leeway is being given to the States. Obviously that is not a view shared by you; it is just the opposite. But for the time being I

don't see any way of meeting your objection, except as I said, if you think the State needs are not fitting with the national needs, it is then up to the State to come forth with funds to meet those needs. It would be wrong for us to just pump money in and turn it over to the local States to spend without Federal input. One must bear in mind that it is the Federal tax dollars that are going in. There is nothing wrong with it being spent for local needs, it is probably better, but it should be done with dollars raised locally.

In this regard, would you submit for the record a list of the States which are members of your organization?

Mr. THOMAS. Yes, sir, there are 30 of them, all of the States that border on the coast and all of the Great Lakes States.

Senator PELL. Is my own State of Rhode Island a member?

Mr. THOMAS. Yes, sir, I can't give you the delegate's name at the moment, but I will furnish it.

Senator PELL. Thank you.

Senator HOLLINGS. Your organization has made a tremendous contribution, we would still be debating the Coastal Zone Management Act had it not been for the leadership of yourself, Senator Schwartz, and many others. And I agree with my colleague from Rhode Island with respect to the Federal oversight of Federal dollars. Yet I realize we do not have the financial support for the program within the administration. Perhaps that comes from their looking upon it as a process rather than as a program.

Perhaps it can be that we will be adapting these without relinquishing the Federal oversight responsibility, or general Federal thrust and direction, but it could be patterned to some of the States needs.

I think that is the primary concern now. Everybody is trying to change Washington. Maybe we can change OMB to think in terms that President Ford, himself, was talking about: more of these programs responding to local needs.

I think, Mr. Thomas, you have a very good statement for me to work with and study.

Did you meet over this statement? Did you and Mr. Schwartz develop it, or did you folks debate it?

Mr. THOMAS. There is a footnote, Senator Hollings, where the original draft was circulated to all members of the Coastal States Organization and they were polled by telephone for comment. There was not an opportunity, sufficient time to get written statements from them, but the remarks here represent the consensus of the views of the membership from whom we were able to get comments.

If I could make one additional remark, possibly in amplification of this, the coastal zone management organizations in the main derive their present know-how and manpower from people who have been generated within the sea grant programs. I think that you would expect us to come to you and talk about activities that would support and enable us to move our coastal zone management programs more rapidly. Within the sea grant program I think that if the funding could be increased to the point that the discretionary funds available to the States could be increased, then many of the needs of us for immediate quick response—this is one of the major problems in

coastal zone management today, Senator, is decisionmaking information.

As we move to permitting requirements and interface with the Corps of Engineers, EPA, the National Fisheries Service, the Fish and Wildlife Service, someone wants a permit to conduct an activity in the State's coastal waters, there is a dearth of hard information from which you can say, yes, we will permit this operation because we are aware that downstream we will not regret 5 years from now that we permitted it.

It is against that background that we feel that we have to point out that this is a need, otherwise we will have to seek another research organization somewhere within the State maybe to do this.

In the case of Mississippi, I don't know what the numbers are, but I am sure Mississippi is overmatching the money that is going into sea grant by substantial numbers. I don't know what they are. But it is not a matter of solely asking them to fund us, but another program that is a national imperative, coastal zone management, is depending upon sea grant people for their needs.

Senator HOLLINGS. There are so many real problems confronting us, there is no reason to belabor the hypothetical. You have it right on your doorstep now and that is a frustration.

Mr. THOMAS. Yes, sir.

Senator HOLLINGS. That is the frustration you are expressing here in this testimony.

I want to thank you, and thank Mr. Schwartz. Is he running for office again?

Mr. THOMAS. Yes, sir.

Senator HOLLINGS. Wish him my best.

Senator PELL. And I like your presentation, the format you used. I have not seen it used before. For those of us who have to do a lot of reading, it is very helpful.

Mr. THOMAS. I have to give credit for that to Mr. Joe Mosely, who is director of the Texas council and who serves as secretary for the organization.

Thank you.

[The statement follows:]

STATEMENT OF J. E. THOMAS, DIRECTOR, MISSISSIPPI MARINE RESOURCES
COUNCIL REPRESENTING THE COASTAL STATES ORGANIZATION

INTRODUCTION

Thank you, Mr. Chairman. I am J. E. Thomas, Director of the Mississippi Marine Resources Council, and am here today representing the Coastal States Organization. The Organization's Chairman, Texas State Senator A. R. "Babe" Schwartz, was to have been here, but a conflict—called a primary campaign—precluded his appearance, and he asked me to appear. The Coastal States Organization is an alliance of the coastal states, formed under the auspices of the National Governor's Conference to help provide the states a larger voice in the formulation and execution of the Nation's legislation and policies concerning coastal and marine resources.¹ Thus, these comments reflects the views of state officials who have the responsibility to develop state coastal management programs and who must work with a wide variety of interests, both technical and political.

Reflect views
of state officials
involved in
coastal zone
management.

¹This testimony was developed by contacting most delegates by phone, drafting this document, circulating it to the Executive Committee for comment, and then revising it.

GENERAL OBSERVATIONS

Before addressing particular questions raised by the legislation being considered, I'd like to summarize a few general state feelings. Specific opinions about Sea Grant—its accomplishments, its effectiveness, the need for modification/change—vary considerably from state to state when viewed from the perspective of the individuals in coastal management activities in state government. However, some consensus opinions do exist:

Sea Grant has been of some value to states in one or more of the following ways: a) providing technical assistance and scientific support, b) developing, through the educational process, a reservoir of trained manpower, c) increasing, through education efforts and the Marine Advisory Services, an increased public knowledge of and appreciation for marine and coastal affairs.

The concept of Sea Grant—providing block grants to states through educational institutions—is sound, of benefit to the states, and should be continued.

There is room for improvement if Sea Grant is intended to be more responsive to state needs in coastal management. From the perspective of state government much improvement could come in the administration of the program. Changes should be made to reduce the existing long lead time from initial proposal development, through site visit, approval, work and completion. The current 2-plus years is simply too long to be of use to most state coastal management efforts. The tendency of the national office to pore over, in great detail, each project in an institution's proposal rather than assess the program as a whole is inappropriate. Collectively, these cause loss of time; tend to discourage the best researchers from participating; and, more importantly, tend to orient a program, not toward the state's needs as they may be articulated by state officials, but rather to how such needs are perceived by a Washington-based bureaucrat who happens to be monitor of that program. This places the director of a particular Sea Grant program in a very uncomfortable position—should he try to meet state needs, or should he respond to the national people who control the grant.

The states believe much of the difficulty could be resolved if a) block grants were awarded; b) the receiving institutions were given near-complete flexibility to allocate the block grant according to state perceptions of priority and need; and c) after the work was completed, a performance audit was done to evaluate accomplishments. This is the procedure used in similar agricultural programs.

PARTICULAR ISSUES—OFFICE OF MARINE SCIENCE AND TECHNOLOGY

Conceptually the Office of Marine Science and Technology (OMST) sounds great, and the states would certainly like to see greater coordination between NOAA's many various programs. It is often very difficult to tell just what NOAA is doing and how it may be trying to technically "assist" a state because there are so many apparently non-coordinated activities: National Marine Fisheries Service, Coastal Zone Management, National Ocean Survey, Sea Grant, National Weather Service, etc. However, having watched from the recipient's perspective, states are skeptical that reorganizations within the federal bureaucracy will really make much difference.

There is no strong state feeling either way concerning the creation of OMST. However, there is a belief that if an effective reorganization could be accomplished, it would be very beneficial

States consider
Sea Grant
helpful.

States urge
continuation
of Sea Grant.

Room for
improvement
to make more
responsive:
Timing and
orientation.

Replace
detailed
proposal and
site visit with:
Block grant,
plus
performance
audit.

OMST okay if
can be effective.

and therefore endorsed by the states. What should be avoided is the creation of a "toothless tiger" that would delay whatever progress that might otherwise be made by shuffling organization charts and offices and keeping the bureaucrats jockeying for position for a year.² We have some positive views on what role/powers should be assigned to the OMST if indeed it is created.

Principal Role.—It seems that the prime duty of OMST is to force, not a "marriage," but rather a "substantive relationship" between NOAA's many science programs.

Authority.—in order to do this, OMST must have some real "clout," and this means some form of budgetary control; simply trying to talk things out and get consensus without threat of a club will be useless.

On-Site Cooperation.—this substantive relationship must also exist between NOAA programs within a state as well as just at the national level. Let's examine a real situation that is occurring in many states: the identification of wetlands and establishment of their boundaries. Four NOAA bureaus are involved: a) the National Ocean Survey directly with its coastal mapping; b) Sea Grant, through the universities doing wetland research; c) Office of Coastal Zone Management supporting a state agency developing a State coastal zone management program; and d) National Marine Fisheries Service, both by carrying out its mandate of assessing proposed projects to determine their impact on marine fisheries, and by providing grants directly to the state fisheries agency. Frequently very little or no coordination exists between any two, much less all four, and a state, who is supposed to be the recipient of the results often can't tell what's going on. If OMST could bring some cooperation and order to this chaos, states would be most appreciative.

Mutual Reviews.—a suggestion was made by one state that a mutual review and comment be required at the state level by all state entities receiving NOAA funds. For example: a Sea Grant proposal from a state university could not be formally accepted by NOAA until other agencies receiving NOAA grants (coastal zone management, fisheries, etc.) had reviewed and given their opinions on the proposal. Similarly, a coastal zone management application would have to be reviewed by Sea Grant and the state fisheries, etc. Another state felt very strongly that university Sea Grant research proposals should be reviewed by the state coastal management agency, but that the agency's program should not be subject to review on campus. We are not so naive as to believe that a "review and comment" procedure will, in itself, accomplish very much; however, it would help foster improved communication between NOAA funded entities at the state level. It might be valuable for the committee to get some information on the effectiveness of the A-95 process on HUD programs from OMB.

National Plan/Strategy.—the portion calling for OMST to develop a six-year national plan for research and development in marine science and technology bothers some states. Conceptually it's o.k., but the implications of the intent of the word "plan" are most disturbing. It gives the impression that someone or a group, can sit down and come up with the "answer," which is then debated, and ultimately adopted as "the guiding word." To even suggest this in the coastal and marine field seems in direct conflict with the fact that this is such a rapidly developing field and even contradicts most other portions of the draft. This subject is simply too dynamic and wrought with unpredictable changes involving science, politics, nature, social change, wars, etc., to try to package

Avoid toothless tiger.

OMST should have budget control powers.

Improved cooperation between NOAA activities needed at all levels—especially at sub-D.C. level.

Have all programs within a state receiving NOAA \$'s review each others proposals.

Plan seems inappropriate because it implies rigidity.

² State bureaucrats are familiar with this because we do the same thing when either reorganization is under consideration by the legislature or actually occurs.

its needs in a "plan." States conceptually agree with what this requirement seems to imply, but we suggest "plan" be dropped and call it a "National Strategy" instead. Granted, it's semantics, but the change seems in order to clarify what we believe is really intended. There should be a specific mandate for its periodic revision. Budget request should have some relevance to this strategy, since the budget is often the prime force in program control.

What is really needed is a national strategy.

National Council (S. 709).—it seems that S. 709, which establishes a cabinet-level National Council on Marine Science, Engineering, and Resource Development, and an Advisory Panel on Marine Science, Engineering and Resource Development may be revived. The states, recognizing the need for attention to this topic at the highest levels of government wholeheartedly support it. We support the Council as proposed. On the Advisory Panel we have a suggestion: that there be an explicit provision for representation on the panel by both state government and private industry.

Include state government and private industry on advisory panel.

SPECIFIC ISSUES—SEA GRANT PROGRAM AND MARINE ADVISORY SERVICES

The various states have some strong feelings on these matters. At the time this statement was prepared and circulated, only Staff Draft #1 was available. Since then, Draft #2 has been released, but the Coastal States Organization has not had time to review it in detail. Thus, rather than speaking to particular elements in the drafts, this statement will concern itself with the basic issues raised in the drafts. Each state has been asked to submit any views it may have on specific language. Also, as the legislative process proceeds, we will give our views on specific provisions as they merge. I will now turn my attention to the various issues:

Question 1. Do the states support the concept of Sea Grant?

Answer. Yes, very strongly, but believe improvement is possible and needed.

States support Sea Grant.

Question 2. What do the states believe have been Sea Grant's principal contributions?

Answer. Several: (a) technical assistance, (b) pool of skilled manpower, (c) increased public awareness of coastal and marine affairs.

Contributions.

Question 3. Where do the states see the major need for improvements?

Answers. The biggest problem is responsiveness to state needs, both in reaction time and flexibility. Much of this arises from current administration procedures, which apparently came over with Sea Grant from the National Science Foundation, that may be well-suited to the management of individual research projects but are not applicable to broad program grants.

Sea Grant has been touted and sold before the Congress and to the states as a grant program handled through the state educational institutions to help cope with state problems. However, the national administration of the program has had the effect of nearly turning Sea Grant into an extension of NOAA's research efforts, by requiring greatly detailed proposals delineating each individual project coupled with a nit-picking site visit where individual projects are often discussed in great detail. What results is frequently a package of individual projects that more nearly fit the perceived state needs of the national office and other, usually far distant, members of the site visit team than those of the state as established by the state university in conjunction with state officials. For example, a site team that is strongly pro-fisheries, proenvironmental protection, anti-oil, etc., may come into a Gulf Coast state where the state policies and views support economic development, and a real feud develops. Most state officials support the Sea Grant program with our Congressional delega-

Sea Grant should be more oriented to state needs.

Often have a "D.C. bureaucrats perception of a state's need."

tions at appropriations time and we do so, with the qualifications that it is a state-oriented, state university administered program. However, I can assure you that when I, as a state official, attend a site visit in my state and see a group of outsiders trying to tell us what's good for my state and what our policies and priorities should be, my blood pressure increases, and sometimes I get the urge to call our Congressmen and "explain the situation to them." If the program is to be sold as a state program—which it is—then it should be administered that way—which it is not! Some states felt that certain Sea Grant Programs have become virtual "empires," that are truly responsive to no public policy body, even though they use public funds, and that they are able to operate in this manner by playing the "states off against the feds" and vice versa.

Sold as a state program, but run with a D.C. bias.

So much for the "problem," what about solutions? We believe that most of the difficulties could be eliminated if NOAA would follow the agriculture grant model more closely. Namely, provide the block program grant to the state with relatively little discussion of the particular projects, and allow the institution to fund projects as it sees fit. Require some coordination with other NOAA grant receivers, i.e., CZM, NMFS, in the state. This would cut the horrendous leadtime and administration cost currently involved with the proposal cycle. This leadtime is typically :

Use block grants.

Date	Action	Elapsed time (months)
September 1974.....	Submit preliminary project idea to university administration.....	7
November 1974.....	Revise preliminary.....	0
March 1975.....	Submit application to NOAA.....	3
June 1975.....	Receive approval.....	9
September 1975.....	Start work.....	12
August 1976.....	Complete work.....	24

Thus, between the time one has an idea and starts work, it's at least one year, and until completion, a minimum of two years. This may be o.k. for some basic research, but if Sea Grant is interested in doing relevant applied work and responding, at least in part, to state needs, a two year lag-time is utterly unrealistic. The block grant approach with some flexibility would solve this difficulty. Many state people have noted that the most competent and brilliant research people either have left or are continuing to abandon Sea Grant programs. It should be no surprise, because who wants to go through the administrative hassle for "near-token" money when you have to wait two years? Coupled with this open grant, there should be a post-grant audit of accomplishments. Currently, one must load their proposal with high-sounding statements about how they are going to solve all the world's (or at least state's) problems, even when one knows it is not true! But, it's the game. However, no one comes around later to see what, if anything, was ever completed, or what it may have accomplished. An analysis, after project completion, of its actual contributions to the state of the art research, or state government, or industry, or just plain old education, should be done. Performance is much more critical than promises. We recognize that certain members of Congress have singled out individual research projects and severely questioned their worth, and realize that those administering Sea Grant are probably a little nervous about this. However, it seems that a careful post-project audit, plus the fact that the state made the decision on an individual project would be safe. In fact, the criticism seems to usually fall on single, individual projects directly administered from Washington. We could not identify any specific project under a block agricultural grant than has been so criticized!

Current 2-year lead time severely limits usefulness to state CZM.

Best people leaving.

Base assessment on performance audit not application promises.

In calling for this overhaul, the states recognize that a large percentage of the Sea Grant Awards are not strictly competitive on the merits of individual projects (such as NSF) but rather on the basis of the entire program. That is why it is ridiculous to fuss in detail over half-fictitious project promises, instead of looking at the aggregate accomplishments of the big picture.

Not a strictly competitive program.

Mr. Chairman, we believe you gentlemen in Congress intended the latter. We hope so, and we urge you to take this opportunity in renewing the Sea Grant program to make sure it actually functions in this fashion.

Question 4. Should the Marine Advisory Service be separated from Sea Grant?

Advisory services most successful.

Answer. State opinion here was strong: "No." The reasons are several-fold.

Marine Advisory Services had been one of the most successful of Sea Grant's efforts—especially in the area of public education and development of interest/support for coastland marine affairs. Since the draft clearly says that it's a national policy to strengthen Sea Grant, it seems unrealistic to separate one of its strongest elements.

Splitting the Marine Advisory Service out of Sea Grant would severely compromise its main function, which is to get research results beyond the research community where they can be utilized by others. Let's face it, separating the two would lessen the communication between them. The first thing you'd know, the advisory people would be saying "The research folks aren't telling us what we need to know, so we are going to have to do our own research." Similarly, researchers would claim, "The advisory people aren't disseminating our results, so we'll have to start doing it ourselves." The states don't want this, and we urge Congress not to set up a system where this would likely develop.

Would restrict communication between researchers and users.

Cause duplication.

There is a good political reason not to separate them. Many states have two strong university systems, each with their influential friends in Congress, who compete vigorously for every federal buck they can find. Would it not be a rather easy political "solution" for the politically responsive federal administrator to give Sea Grant to one institution and Marine Advisory Service to another! This would really mess things up.

Could split universities.

A fourth reason, at least from the standpoint of the Coastal States Organization delegates, most of which are responsible for state coastal zone management programs, for not splitting the two is that state government now has enough trouble coordinating with one entity, much less two. Some states would say "keeping an eye on," rather than "coordinating with." This can get to be a particularly sensitive political issue in many states as the coastal zone management group goes through the "public participation" phase required under the Coastal Zone Management Act. The state coastal management agency is required to develop politically acceptable recommendations for state policy and legislative action, that will inevitably meet strong opposition. Such agencies are at least somewhat attuned to the political realities. Many academicians are not the least politically aware, and if they go round giving out "advice," however well-meaning, that is imprudently phrased/packaged at the wrong time, it can cause severe problems—and may completely compromise the states coastal zone management program efforts. It is not that the "advice" in itself is either "incorrect" or "devastating," but it can be quoted out of context by the very substantial anti-coastal zone management forces in each state, and since it came from a "university expert" it carries a degree or aura of respect that would not be associated with an equally casual remark of a corporate lobbyist, a local union leader, etc.

Would cause confusion.

Might bring difficulties to state CZM.

Question 5. Is the National Sea Grant Advisory Council valuable and should it be made a statutory entity?

Make advisory panel statutory.

Answer. Yes in both cases. It is somewhat useful, but it could be made more so. First, the terms should be lengthened, possibly to four years; staggered so that there's a 50 percent change in membership periodically; members be limited to one four-year term. There is some complaining that the group has become something of a "gentleman's club," is too supportive of the status quo, and should be more aggressive. Also, current two-year appointments, if one serves only a single term, barely allow that person to find out what's happening before their term expires; four-year staggered terms would allow time and provide continuity. The Advisory Council, if made statutory, should be given a specific directive to establish and update semi-annually, broad priorities on categories of research. These should not be solely limited to "national needs," but should explicitly recognize and voice certain regional needs and note how one area's priorities vary from another's.

Rotate members.
Longer term.
Single term.

Specific mandates.

Question 6. Do the states support the separate National Needs Research Section with its 100% funding?

Answer. Yes. For two reasons. First, some problems fall into this category and should be directly addressed by the federal government. Secondly, by giving the Sea Grant administrators in Washington some funds they can allocate directly to specific projects, their "urge to meddle in the individual projects within a Sea Grant program allocation" should be lessened. Admittedly, the problem could arise where Washington might try to run all programs like they were 100% funded "National Need" projects. Hopefully, the committee staff will be able to develop language making clear the distinction between the two types of programs and establishing a different administrative approach for each. The states are sympathetic to this legislative hurdle—"trying to legislate administration is like trying to legislate morals." We do believe that the National Needs element should be a separate appropriation and not be a maximum percentage of the Sea Grant allocations for state grants. No firm amount was determined, but possibly something not more than 1/5 of the state grants seems okay. Anything much more than this begins to shift the whole concept from that of state programs to that of a national one. If NOAA wants an increased research budget, then let NOAA ask Congress for it as such, and don't call it a state-oriented program and then keep 30%, a half, or more and control the rest!

Endorse national need research.

Keep separate from Sea Grant budget authorization.

Question 7. Should Sea Grant be more or less oriented to "applied" rather than "basic" research?

Answer. This is a tough question, partially because there is no universal, accepted definition of either. The states believe that a major portion of Sea Grant's role should be "applied" research. However, probably much to the surprise of some members of the academic community who continuously promote applied research, there is a very real state recognition of the need for some basic research! We are continually drawing on our account of basic knowledge, and there is a real need to "put something in the bank." Some of Sea Grant's funds should be allocated for this purpose.

Balance hard to achieve.

Mostly applied.

Some basic.

Question 8. Do the states have an opinion on the National Fellowships and Awards?

Answer. The fellowships should not be administered by Washington, but rather through the state Sea Grant programs. They can be done more efficiently this way, since the institution is most familiar with the student. Also such individual assistance should be supplemental to and in support of the overall research program activities of Sea Grant. The majority of Sea Grant funds usually are ultimately allocated for graduate student salaries. In a so-called national competition for individual fellowships, it's really the professor and not the student who does most of the competing. Some states felt these should be training grants (where some work was required) rather than the more flexible fellowship. There was some opposition to making any such awards to undergraduate students.

Administer fellowships locally, not from D.C.

CLOSING

This concludes my remarks before this committee on behalf of the Coastal States Organization. Again, let me stress that the states sincerely appreciate what Sea Grant has done for them, strongly urge Congress to continue the program, and offer our criticisms only in a manner so as to improve the program in the future. As state officials involved in coastal management, we are appreciative of Sea Grant, and are vitally interested in seeing it be made more responsive to state needs. It will become increasingly critical to achieve better cooperation to maximize the return on the public dollars we are spending. Even with this increased emphasis on technical support to state coastal management efforts, the States recognize that the basic role of the university is education and research. Believe me, for myself and quite a few of the other Coastal States Organization people, speaking ill of Sea Grant is not unlike correcting an errant child. We only want to see things change for the better.

Again, thank you for allowing me to appear here today, and give you the Coastal States Organization's views on this most important matter.

Senator HOLLINGS. The committee will now hear from Mr. Lawrence G. Mallon, assistant program director for Marine Advisory Services, University of Southern California, Marina del Rey, Calif.

**STATEMENT OF LAWRENCE G. MALLON, ASSISTANT SEA GRANT
DIRECTOR FOR MARINE ADVISORY SERVICES, UNIVERSITY OF
SOUTHERN CALIFORNIA SEA GRANT INSTITUTIONAL PROGRAM**

Mr. MALLON. Mr. Chairman, at the outset, let me express my appreciation for your interest in strengthening the sea grant program evidenced in the proposed draft of the Ocean and Coastal Resources Act of 1976 and my gratitude for the opportunity to comment on the draft as a private individual, albeit one intimately involved in the national sea grant program. As a product myself of the interdisciplinary law training received at a sea grant sponsored and research and education project, my experience with this national effort spans several years and several institutions.

I will limit my comments today to two key areas of primary importance germane to our consideration of this proposed extension and revitalization of the national sea grant program. The first of these is the provision for an Office of Marine Science and Technology with the express purpose in its creation of the design and coordination of a national plan for marine science and engineering. The relationship between this framework and the inclusion of a national needs section in the sea grant authorization is the basis for initial comments. Later, I will treat the envisaged new and expanded role for the National Ocean and Coastal Advisory Service with the proposed Office of Marine Science and Technology implementing its plan both through resources transferred to other entities of Federal Government engaged in marine advisory work and by contracts and grants passed through the existing sea grant institutional network.

The national sea grant program has received attention and comment out of all proportion to its relative dollar position both in the national ocean effort and the overall Federal budget. Perhaps it is

because of this fact that discussions involving the sea grant program tend to confuse the concept with the functioning institution itself, its actual operation with its potential impact upon our economy and national applied research effort in the oceans. In its 10 years, it has reaped many benefits for the Nation, most importantly forging a continuing alliance between the Federal Government and academic institutions in addressing problems susceptible of solution by applied marine science and engineering.

It has proved that scientists, engineers, lawyers, and social scientists can work together to solve societal problems through interdisciplinary investigations. It has trained a cadre of young scientists and engineers, substantially motivated toward solving ocean problems and developing and conserving marine and coastal resources. The advisory service component emulating the successful century-old agricultural extension service has provided visibility to the sea grant program, focused its attention at the institutional level upon local problems seeking approaches and resolution and has provided the link between the heterogeneous marine user community and the base of researchers on the sea grant campuses across the country. These are facts.

If, and this is the threshold question, Mr. Chairman, we wish to design a Federal ocean program coordinating the Nation's ocean efforts to solving national problems and developing and conserving national oceanic resources, the time for institutional change is upon us.

The resources sea grant represents, researches, programs albeit of a State and local focus in situ, a network of advisory service agents having contact with a diverse ocean constituency are all available as building blocks.

What is needed at the time as a way of restructuring if this be our chartered course?

First, there is needed a home for sea grant that gives it skeletal structure which it presently lacks. The appendages are strong, the institutions and the advisory service program, but the skeleton is weak. The status of a responsive granting agency at the national level is inconsistent with a dynamic field organization especially with the addition of a national to an existing State and local mission. Even the National Science Foundation (RANN) program research applied to national needs has criteria with which to review projects addressed to national problems.

The other main line components of the NOAA all have a national charter whether it be the National Marine Fisheries Service or the National Weather Service. By comparison, the national sea grant program exists only as a collection of institutional programs and an occasional regional body but only at the advisory service level. Sea grant's home in NOAA today shelters an imperfect marriage.

The creation of an Office of Marine Science and Technology and the installation therein of the national sea grant program, and I emphasize national, would solve its structural problem. Its focus would expand to addressing national problems pursuant to guidance from the National Director, who in turn would be responding to national needs identified and prioritized by the Associate Administrator of

the new Marine Science and Technology Office. The system of identification of State and local problems, review at the State level and initiation of institutional programs at that level subject to review by the National Sea Grant Director and his advisory panel could continue unchanged. I emphasize this fact.

Indeed, the instigation of the Office of Marine Science and Technology could provide a sorely needed option at the sea grant institutional level of where to channel vitally needed "linkage" research. An example would be molting problems in the commercial Cancer crab which may fall outside the priorities of other funding agencies and may be classified as basic research for sea grant relevancy purposes, yet is vitally needed background information to successful crab mariculture in the United States. In short, I see the OMST as a complementary program to the sea grant, coordinating basic and applied marine science and engineering programs while preserving the diversity, initiative and creativity present in marine science and engineering institutions throughout the United States.

As for the proposed National Ocean and Coastal Advisory Service, there is no doubt in my mind that its time has come. Our ocean constituency is diverse, growing and from all indications seeks not only technical information about the oceans but answers to questions where this historically maritime nation from its inception is proceeding in its national ocean effort. Sea grant generalists, resident extension agents, and specialists in such divergent fields as marine recreation and marine transportation can at present provide limited response to inquiries in the technical information categories, having an imperfect relationship to the remainder of our Federal civil ocean agencies in Washington and in the regions. Questions of the latter variety go unanswered because there is no national focal point and marine advisory program with a mission to transmit the message to the farthest most reaches of our marine community of what the national Government feels its interests are in development and conservation of oceanic resources.

Speaking as an individual, I have worked closely with several Federal ocean agencies. I have provided them services and information as I have for my public and private user groups at the State and local levels. There is much information that these agencies from the Office of Coastal Zone Management to the National Marine Fisheries Service have under their aegis.

Each has some sort of information dissemination program of its own whether it services its State contacts in the case of the former or the commercial and sport fishing industry as a whole via its research in the case of the latter. Yet no coordinating mechanism exists pursuant to a national plan for ocean development, let alone a comprehensive mechanism for marine information dissemination and user assistance. As with the proposed sea grant revisions, the NOCAS concept can be implemented without modifying the structural integrity of existing agent-contacts network of the present sea grant advisory services.

What can be superimposed is a mechanism whereby other agencies can draw on sea grant advisory services expertise to serve their marine clients and concurrently sea grant advisory services can

represent more comprehensively and effectively all of the civil ocean mission oriented agencies in a broader sea grant mandated service role.

Provisions of an individual's time in the form of reimbursement of agencies for time invested in advisory service activities and money in the form of cash, and in kind resources, in sea grant parlance "matching funds" are presently lacking.

This resource deficiency constitutes an institutional barrier to cooperation and integrated servicing of the vast marine community by marine advisory services of sea grant university personnel and Federal employees of other ocean agencies. With a national plan predicated upon goals and policies, like the State of California has recently adopted with respect to its sea grant program support and evaluation, and flexibility in funding and coordinating sea grant and other Federal programs of advisory services, the Director of the National Ocean and Coastal Advisory Services can provide the two-way management link between the proposed associate administrator of OMST and the individual marine and coastal resource users in the field. This can be accomplished by providing feedback to OMST on the benefits of the Federal ocean program as well as transferring information and technology, while explaining Federal ocean policy and programs to the marine community.

Senator HOLLINGS. If I had to describe these concepts, I would use your statement.

Mr. MALLON. Thank you, sir.

Senator HOLLINGS. I think it is right on the point. When Dr. Abel hears his own students, and I am a student of sea grant, refer to errant child or to the weak skeleton, it is only an effort to build sea grant up in a statutory fashion the way it should be. There is a gold mine of talent and dedication in the sea grant program. If we could only get it packaged and properly financed, as Senator Pell has been trying to do over the years, we would have some real leadership in the ocean field.

I don't really have any questions. Do you, Senator Pell?

Senator PELL. I have no questions either.

Senator HOLLINGS. Do you wish to add anything?

Mr. MALLON. No, Senator.

Senator HOLLINGS. The committee will reconvene at 10 a.m. tomorrow in room 5110 in this building.

Thank you very much.

[Thereupon, at 3 p.m. the hearing was recessed, to reconvene at 10 a.m. the following day.]

SEA GRANT PROGRAM IMPROVEMENT ACT

TUESDAY, MARCH 23, 1976

U.S. SENATE,
COMMITTEE ON COMMERCE, AND
COMMITTEE ON LABOR AND PUBLIC WELFARE,
Washington, D.C.

The committees met at 10:10 a.m. in room 5110, Dirksen Senate Office Building, Hon. Claiborne Pell presiding.

Senator PELL. The committees will come to order.

Senator HUMPHREY, I would like to apologize to you. I have to leave and go to the Foreign Relations Committee where the Oceans Assistant Secretary is coming up for nomination right now. So I will read your testimony, but forgive me for not being here to hear it.

Senator HUMPHREY. Before you leave, may I say for the committees' record that Senator Pell has constant vigilance over all matters relating to the oceans, and on the Senate Committee on Foreign Relations he is the one strong voice for which those of us who serve are most grateful.

Senator PELL. Thank you. As you can see, I have to be there.

Senator HUMPHREY. Please do, sir.

I understand Senator Pell is also the father of our sea grant program, which is the principal subject of discussion in these hearings.

Senator HOLLINGS. Senator Humphrey, your ears would be burning if you read the record yesterday. Everyone was referring to your bill, but more specifically, they were referring to your service as chairman of the Marine Science Council in your capacity as Vice President, and how, at that time, you gave true leadership to the oceans program. So with that feeling of gratitude, we welcome you here to the committees' hearings this morning on your bill and the other measure which attempts to upgrade and develop our sea grant process into a sea grant program, and to provide visibility and coordination to the program at the top level in our Federal Government. We welcome you not just as an interested Senator, but as an expert who has served and given leadership in this particular field over the years.

STATEMENT OF HON. HUBERT H. HUMPHREY, U.S. SENATOR FROM MINNESOTA

Senator HUMPHREY. Mr. Chairman, let me say that I have enjoyed my brief association on the subject of our Oceans Commission which you chaired. We are indebted to you, as I said to Senator Pell, for your leadership, and I am saying it very candidly and frankly. I

think that without the leadership of yourself and Senator Pell, much of our programs that relate to the use of the oceans and the development of the ocean resources would be in limbo.

And at least we have kept them alive by congressional action.

I have a prepared statement, I don't intend to take all of your time to read it. I would like to concentrate on just a few features in it, a few sections, and ask if you will permit me to have the entire statement printed in the text of the record.

Senator HOLLINGS. It will be included in the record and you can highlight it as you wish.

Senator HUMPHREY. Thank you. As you indicated, at one time during my service as Vice President I had statutory responsibility to study the needs and opportunities and to advise and assist the President in carrying out a mandate passed by the Congress in 1966 to bring the oceans into the mainstream of public policy.

It is from that vantage point that I should like to share some of the reasons why I regard the oceans as important to our future, and also some observations as to the insufficiencies in the present management of transforming a fragmented, unsteady and loosely knit caboodle of Federal agencies into a broadly based, coherent marine program sparked by a sense of urgency.

We noticed in the 1950's, and indeed in the early 1960's, an indifference to ocean opportunities. It was because of that that the Congress worked very hard and spent time and gave attention to developing a national policy and a strategy to focus on the resources of the oceans and on a wide range of our social needs.

And it is a melancholy fact that the current initiative which you are undertaking here now, constitutes the fourth occasion over the past two decades when the Congress has had to goad the executive branch to recognize the role of oceans in national affairs.

This is despite the fact that the United States is essentially a maritime power, that we have a great maritime history, and that we must continue to be a maritime power, second to none.

For one thing, although we are a maritime nation, with a rich and proud maritime history, we seem to have paid attention to the oceans only in time of war. As you look back over the history of American activity and the seas, generally it is in periods of war.

I have noted in my testimony where the tonnage, for example, of merchant shipping arrived at high levels only during periods of conflict.

Now, it was in 1959 that Congress made its first effort to try to upgrade the priorities for the oceans. The administration then in power, however, was not listening, and 2 years later, shortly after his inauguration, President Kennedy took note of this state of affairs and gave a major boost to the Federal support for oceanographic research.

By 1965, again the enterprise was drifting. This time under the leadership of the chairman of the Commerce Committee, Senator Magnuson, the Congress undertook a probing diagnosis and came up with a major, indeed an unprecedented piece of legislation.

I have to emphasize that the executive branch has proceeded by fits and starts on ocean policy. Temporarily there may be someone

that reports to the President, the President gets interested, and then the administrative machinery comes grinding to a halt, the OMB shows less concern, and at that point Congress has had to come back in and remind the executive branch that we are essentially a maritime nation.

As a result of the work in 1965 and 1966, an unprecedented piece of legislation was developed, the Marine Resources and Engineering Development Act of 1966.

And for the first time in our Nation's history that act declared it to be the policy of the United States to develop, encourage, and maintain a coordinated, comprehensive and long-range national program in marine sciences for the benefit of mankind.

That declaration of policy stated what should be done, but that legislation, Public Law 89-454, also did two other things. It asserted clearly and unambiguously who should carry out these directions, and it provided high level policy planning and coordinating machinery to facilitate implementation as to how the directions or the policies were to be carried out.

Thus the legislation related the oceans to our national interest. It took note that a wide range of uses of the seabed had been made the responsibility of a large number of different Federal agencies, whose diverse interests could be orchestrated by only one man, and in that instance the constitutional bandmaster, the President of the United States.

The new machinery was then created to advise and assist him—a National Council on Maritime Resources and Engineering Development. This was a staff agency, chaired by the Vice President of the United States, including those Cabinet officers and agency heads who headed operating arms within the executive branch, to implement whatever marine-related goals were established by the President.

The legislation also provided for a small full-time staff agency to support that Council, headed by a Presidentially appointed staff director.

Now the reason I mention this is that I learned in the executive branch that no specific agency can coordinate other agencies. There is such jurisdictional pride and jealousy that you simply have to have a cut above a Cabinet officer or above an agency to get any coordination.

And that person has to be also blessed with Presidential authority. In this instance of the Marine Sciences Council, which was established under the act of 1966, the legislation established the Vice President as the chairman of that Council. That was by statute, and the President had to say to the Cabinet of the United States in the presence of the Vice President "It will be the Vice President that will be my chief adviser on this Council and he will work with you and he will in fact insist that you work with him; and he has my blessing."

Without that kind of authority, nothing will happen.

Now we did develop during that period of time from 1966 to January of 1969, I think, a rather good program. I thought it was a reasonably good use of Vice Presidential time. Vice Presidents don't

have too much to do unless they are assigned duties, and this was one instance where the Congress assigned the duty. That is much more important than having the President assign the duty, because without the statutory assignment, the Vice President can be shuttled around, pushed aside, and pretty soon the whole thing grinds to a halt again.

During that interval between 1966 and 1969, let me tell you what this Council did.

Dr. Wenk is here, who was our staff director. We were able to recruit him from the Library of Congress. He was well-known in the Congress of the United States. He was appointed by the President of the United States, which the law required.

First, this Council identified unmet national needs. Second, it identified new opportunities to direct Federal marine sciences and technology. It recommended priorities. It insured that appropriate resources of the Federal Government were brought to bear upon presidentially enunciated goals.

With the help of outside advisers, it evaluated Federal programs so as to eliminate marginal activities and the inevitable competition for funds. It developed background studies that would bring together not just the scientific and engineering components of marine affairs, but also the legal, economic, social, and political considerations.

Last but by no means least, the Council took the initiative to develop programs to strengthen world understanding and security, through international cooperative marine endeavors, and to deal with the oceans as a community of nations rather than a form of parochial territorialism.

Let me cite a few examples of what happened. To meet the conflicting uses of the shoreline, the States were encouraged to develop their individual management plans, to protect and utilize their coastal resources wisely.

New Federal policies were examined to assist States in this task.

On the basis of Council studies and preparation, the President launched the exciting International Decade of Ocean Exploration.

At the same time we initiated steps toward the seabed arms control agreement.

By the way, that arms control agreement on the seabed was initiated by the Marine Sciences Council, and we were the advisers to the State Department. They didn't rush off by themselves without the expertise that we could bring to bear on it from the different agencies of the Government.

The Council took special efforts to strengthen the base of science and technology, including support for the initial implementation of the sea grant colleges.

In 1971, the authority of this Council expired. I think that is unfortunate. And that is why I introduced this bill, S. 709, which is a combination of reestablishment of the National Council on Marine Science, Engineering and Resource Development, along with the advisory panel.

We had an advisory commission that was operating under another resolution of Congress. Mr. Stratton headed this Commission. And

the reports of that Commission are a good base for much of the activity which Congress is concerning itself with today.

I feel that there was no justification for disestablishing the Council. We need that Council, and I implore the committees here to reestablish it.

Senator HOLLINGS. I was going to make that point. You saw what that Council was doing, whereas Vice President Agnew attended only one meeting in 2 years.

Senator HUMPHREY. Well, that is unpardonable.

Senator HOLLINGS. That is in contrast to the tremendous enthusiasm and drive that you gave to the program.

We couldn't get the gentleman to attend even a meeting, and that is why we lost that distinguished director, Ed Wenk; he went back to the college campus because he didn't want to twiddle his thumbs. There weren't any meetings, so that is the reason the Congress said why appropriate and legislate when no one was really carrying out the program.

Senator HUMPHREY. I know that is what happened, and it is a shame it happened, because it lost a sense of momentum we were beginning to build up.

Senator HOLLINGS. I just want to say for the record it was not due to a lack of awareness and interest on the part of Congress. We were just as sad as you are about that development.

Senator HUMPHREY. I understand that. And I also understand the President ceased to ask even for funds for this Council.

Senator HOLLINGS. That is right.

Senator HUMPHREY. There was a lack of interest in the White House. The Congress needs to give a directive to the President one way or another, whether you do it through this council or not, that the oceans are of such significance to the national security of the United States, to the well-being and health of our people, to our environment, to the recreational needs of our people, to the food for our people, and to the fishing industry, that the President of the United States should be told in unmistakable language "We will no longer tolerate this kind of lackadaisical attitude."

What you can accomplish with the President after that is always questionable. But you can at least target the message, which I know you will.

In S. 3165 much of this is, of course, directed toward NOAA. But it is my judgment, Mr. Chairman, that while you should strengthen NOAA, and surely I am here to testify on behalf of the sea grant college program, I think it is imperative that the Sea Grant Act be reestablished and be continued.

I hope not only continued, Mr. Chairman, but expanded. Because this is an important piece of legislation.

Senator HOLLINGS. That is the thrust of S. 3165. In fact yesterday, Senator Humphrey, we heard academic witnesses from Stanford, the University of Southern California, and New Hampshire University on the east coast, and we heard industry witnesses, such as the director for ocean resources of Kennecott Copper. All testified in support of your particular measure, S. 709, and spoke in the same tone that you are using here this morning with respect to giving it top level leader-

ship above even the cabinet members. They all thought that the two bills, S. 709 and S. 3165, were not incompatible, but that they could work together. Is it your feeling that we could weave in the provisions upgrading sea grant and leadership within NOAA with the national leadership your measure provides—the reinstatement of the Marine Science Council?

Senator HUMPHREY. Yes, sir. I think you need the package, Mr. Chairman.

I would conclude my testimony in this manner. This Nation has to wake up to the importance of the oceans. The food needs of the world alone require we have an ocean policy. Our fishing industry in this country has been destroyed, literally, because of lack of attention and because of certain international problems. From a security point of view, it is ridiculous for the Pentagon to talk about national security without an ocean policy, Mr. Chairman.

Here is a whole new industry, tremendous new economic opportunity for us, and I would think that it is about time that Congress told the President or the Vice President of the United States that he has got work to do, and hold him accountable. We can hold him accountable. He can be given an assignment, and he can be called before a committee of Congress under the statute to testify as to his administration, once he is assigned the statutory responsibility.

I think the constitutional interpretation of what I have said will justify that. I know that many times the President has said that he doesn't want a Vice President to testify. But if he is given statutory responsibilities, if he gets appropriated funds to the agency he heads, he then is responsible to the Congress of the United States. And I would have him up here in short order asking why this is being done, or this is not being done.

Senator HOLLINGS. It couldn't be put in a more dramatic way than you have put it to the committees this morning, Senator.

Talking about being responsible for the environment, I think back to the witnesses we brought in, Mr. Hyerdahl from Norway, and Jacques Costeau, who attested to the dying ocean. That conference in Cameroon in the middle of Africa was really the forerunner of the Conference on Human Environment we held in Sweden that enunciated against ocean dumping and allowed us to finally pass a law.

Now we have fought the administration down to the wire. You talk about the Cabinet; you couldn't get a Department of State position in favor of a 200 mile jurisdiction limit, or Department of Commerce, or any other department to come up. Yet every nation that attended the Law of the Sea Conference has agreed on that for the last 5 years.

So we are finally sending that on to the President. And we are expanding the jurisdictional limits for fisheries of the United States by one-third its size, bigger even than the Louisiana Purchase.

Congress is shoving the Government and the Executive into the wall whether they like it or not.

Senator HUMPHREY. That is correct.

Senator HOLLINGS. Well, I just wish we had you there and then we wouldn't have any trouble. You are just a magnificent help, Senator, is what I am trying to say.

Senator HUMPHREY. Thank you, Mr. Chairman. I want to say that the most engaging responsibilities I had when I was Vice President, by far, was the work with that Council. I didn't know much about it, I was a neophyte. But by the time we got through with it, I knew a little bit about it and nothing disappointed me more than later to see the lack of attention on the part of the executive branch to ocean policy. In fact, the former Vice President completely ignored this great opportunity, and he represented a coastal State, may I say.

For the United States Government to ignore an ocean policy, to leave it in the second drawer, to make it not even second-best, is, I think, incredible. It is a threat to our very well-being.

We have to have not only a navy, but we have to have a merchant marine, we have to have fisheries, and we have to explore with other countries the resources of the ocean. I think that the public would be entranced if they knew what the oceans have to offer us in terms of minerals, in terms of food, in terms of climate, in terms of environment. Anybody who is an environmentalist ought not to be interested only in what comes out of a smokestack and what goes into a lake and river. The environment of the world in which we live will be more conditioned by what happens in the ocean than any other single area.

Three-fifths of the surface of the globe is water. For the United States of America, with coastlines running thousands of miles, to have a second-rate oceans policy I think is incredible.

I implore you, Mr. Chairman, to go forward strongly, and get these two pieces of legislation on the books.

Senator HOLLINGS. You may not have known anything when you started, but you are the best informed in the world on it now.

Thank you very much.

[The statement follows:]

STATEMENT OF HON. HUBERT H. HUMPHREY, U.S. SENATOR FROM MINNESOTA

It is a great pleasure to respond to your request for comment on two pieces of legislation that focus on what I regard as one of the most crucial areas of national interest, and one of the most neglected. Both bills highlight the untapped potential of the oceans to contribute to human satisfaction, to strengthen our economy and to preserve a wholesome environment. And both set forth explicit ways and means by which we may promptly and effectively realize these opportunities. Quite apart from a personal conviction that I have held since 1959 that the oceans offer great benefits to humankind, I had the statutory responsibility while Vice President of the United States to study these needs and opportunities and to advise and assist the President in carrying out a new mandate passed by the Congress in 1966 to bring the oceans into the mainstream of public policy. It is from that vantage point that I should like to share some of the reasons why I regard the oceans as important to our future, and also some observations as to insufficiencies in present management of transforming a fragmented, unsteady and loosely knit caboodle of federal agencies into a broadly-based, coherent marine program sparked by a sense of urgency.

My starting point is the dilemmas of our contemporary society and the prospects offered by the oceans for developing new maritime solutions to deal with old problems. These are problems of world hunger; of growing needs for energy and materials, with sources that are not vulnerable to monopolistic pricing or threats of arbitrary cut-offs; problems of unwitting pollution of our planetary environment, problems of an unmet need for coastal recreation, simultaneously with the decay of our urban waterfront, problems of international scrambling for ocean based resources, with conflicts and threats to

world order; problems of employment of our coastal populations that would choose to fish, in the face of an absurd contradiction that we are obliged to import almost half of our fishery products and continue to stress our balance of payments.

It was in that perception of national indifference to these ocean opportunities that the Congress worked hard in the middle 1960's to develop an unprecedented national policy and a strategy to focus resources of the oceans on this wide range of social goals. They passed the "Marine Resources and Engineering Development Act of 1966." That Act is still on the books. Yet I believe over the last five years that we have faltered in sustaining the vision, innovative spirit and the momentum that were accorded our nation's program in the initial attempts to implement that mandate. Our goals are blurred and timid. A large number of different agencies in the Executive Branch have fragmented, uncoordinated and even competing responsibility for carrying our various ocean functions. Their energy is dissipated in sheer rivalry. And, most important, the role of the oceans has slipped from the President's priority list. It was out of this recognition and out of this concern that over one year ago I introduced S. 709.

During this interval, I know that this Committee has mounted a comprehensive study of national ocean policy. Indeed, I should like to express my appreciation for your consideration of the bill. More than that, I should like to salute this Committee on its leadership in now opening hearings on the shortfall of our ocean accomplishments and evaluating the causes, and in its determination to develop remedies that once again might restore a sense of direction and momentum to our maritime enterprise.

It is a melancholy fact that this current initiative constitutes the fourth occasion that the Congress has had to goad the Executive Branch to recognize the role of the oceans in national affairs. There are a number of reasons for this. For one thing, although we are a maritime nation with a rich and proud maritime history, we seem to have paid attention to the oceans only in time of war. Tonnage of merchant shipping, for example, reached peaks in 1815, in 1865, in 1918, and again in 1945, thus, dramatizing the decline in maritime priorities in between these crises.

There are other reasons for this indifference. Those that study the sea, engaged in oceanographic research, had until recently very great difficulty in soliciting adequate funds. Oceanography was a late starter in the scientific disciplines and for a long time seemed to be very low in the pecking order within the scientific community itself.

Even those that use the sea for fishing, for shipping, for marine-based resources have not been articulate in expressing their interests. Small as each of these sectors has been, they sought no coalition and their soft voices did not represent a constituency that often seems necessary to animate the public process. More than once we have had cause to remember that the fish don't vote.

Apart from these problems outside of the government, there were also problems within it. The federal bureaucracy was highly disjointed. A number of new functions were generated over the years, assigned to some old and some new agencies; and it is very clear that the organizational structure of government was never carefully designed to fulfill a clear set of marine requirements. The federal enterprise grew piecemeal, sometimes accompanied by a game of bureaucratic musical chairs as agencies were expanded, modified or transferred, but virtually all of these agencies were low down in the management hierarchy, suffered from insufficient authority, low visibility, tenuous access to the top management of the government itself, and budget malnutrition.

Then there was another problem. Not only were these agency voices drowned out in the noisier clanking of larger federal enterprises, but they were not singing the same song. They lacked a central focus, central leadership and central coordination.

This was the dismal state of affairs that led the Congress in its first thrust in 1959 to try to upgrade priorities for the oceans. The Administration then in power was not listening. Two years later, shortly after his inauguration, President John F. Kennedy took note of this lamentable state of affairs and gave a major boost to the federal support for research. But by 1965, the enterprise was again drifting.

This time, under the leadership of your chairman, Senator Warren Magnuson, the Congress undertook a probing diagnosis and came up with a major, indeed unprecedented, piece of legislation. The "Marine Resources and Engineering Development Act of 1966" for the first time in our nation's history declared it to be a policy of the United States "to develop, encourage, and maintain a coordinated, comprehensive and long range national program in marine science for the benefit of mankind." That declaration of policy stated *what* should be done. But that legislation, P.L. 89-454, also did two other things: it asserted clearly and unambiguously who should carry out these directions, and it provided high level policy planning and coordinating machinery to facilitate implementation as to how.

Thus, the legislation related the oceans to our national interest; it took note that a wide range of uses of the sea had been made the responsibility of a large number of different federal agencies whose diverse interests could be orchestrated by only one man, the constitutional bandmaster, the President of the United States.

New machinery was then created to advise and assist him—a National Council on Marine Resources and Engineering Development. This was a staff agency chaired by the Vice President of the United States, including those Cabinet officers and agency heads who headed operating arms within the Executive Branch to implement whatever marine-related goals were established by the President. The legislation also provided for a small, fulltime staff agency to support that Council, headed by a presidentially appointed staff director.

At the time P.L. 89-454 was enacted, I was privileged to be serving as Vice President of the United States. In all candor I have to say that given the constitutional definition of that office, I was thrilled by the notion that the Vice President would have some duties other than ceremonial. That is, almost for the first time in our history, the legislation assigned to the Vice President the role of assisting his boss in those difficult and complex tasks that attend the Presidency.

During that interval between 1966 and 1969, let me tell you what the Council did:

On the one hand, it identified unmet national needs; on the other, it identified new opportunities to direct federal marine science and technology to meet these needs.

It recommended priorities; it identified impediments to progress within the Executive Branch and strategies for circumventing red tape. It developed new policies and made on behalf of the President clear assignments to implementing agencies. In those cases where the programs needed the collaborative effort of several, especially where the basic statutory missions overlapped, the Council recommended one agency assume a lead responsibility.

It insured that appropriate resources of the federal government were brought to bear upon presidentially enunciated goals.

With the help of outside advisors, it evaluated federal programs so as to eliminate marginal activities and in the inevitable competition for funds, made choices as to the more important.

It developed background studies that would bring together not just the scientific and engineering components of marine affairs but also legal, economic, social and even political considerations which are essential parts of the public process.

And, last but by no means least, the Council took initiatives to develop programs to strengthen world understanding and security through international cooperative marine endeavors—to deal with the oceans as a community of nations rather than a form of parochial territorialism.

In looking back over that interval, I think it is fair to say that that new national policy and its activist implementation bore considerable fruit. In his State of the Union message, in special messages to the Congress, in statements, speeches and appropriation actions, the President employed the potential of the sea to meet national needs on sixty-five separate occasions.

Let us cite a few examples: To meet conflicting uses of the shoreline, the states were encouraged to develop their individual management plans to protect and utilize their coastal resources wisely, and new federal policies were examined to assist in the states in that task.

On the basis of Council studies and preparation, the President launched an exciting International Decade of Ocean Exploration.

In that same theme, it was the Council that initiated steps toward seabed arms control that several years later led to the signing of a major treaty.

During these same years, the Council instituted measures to meet pollution emergencies from oil spills.

And the Council took special efforts to strengthen the base of science and technology including support for the initial implementation of Sea Grant.

Now, what do we find? In 1971 the authority of the Council, which had been accorded only limited life, was allowed to expire. That dismantling of the Council has had two major effects. First, opportunities have been lost to present government-wide policy options directly to the President. And, second, lacking that central, politically powerful and potentially creative leadership, the marine programs of so many different agencies that respond to diverse outside clientele have lost their sense of community and their activities are now shattered by family quarrels.

It is a strange irony that at a time when so many citizens are wringing their hands over ineffectiveness of government, over disparity of promise and performance, and over problems of steering our potential scientific and technical resources to meet social purposes, that we should have permitted to meet social purposes, that we should have permitted to lapse an innovative component of governmental machinery with such a record of high performance.

Certainly, there is no justification for disestablishing the Council because the oceans have lost their importance. Indeed, there is compelling evidence that the needs and opportunities to employ the oceans to meet the aspirations of the American people have increased. Let me tell you why.

The threats to world peace continue, and instead of the oceans forming a new and inviting theatre for international cooperation we now find an atmosphere in the last few years of tumultuous wrangling on the basis of narrow territorial interests and complete indifference to rational management of resources.

Over one billion people on this planet suffer nutritional deficiencies while the protein potential of the sea continues to be neglected.

The United States initiative seven years ago for the International Decade of Ocean Exploration has eroded to primarily an American rather than a multinational enterprise; it has been level funded; it has lost advocacy by policy leadership; and it has failed by virtue of that abdication of leadership to provide an antidote to the nationalistic passions that are being acted out at the United Nations.

Our domestic fisheries are in a shambles. We depend so much on imports such that we contribute well over one billion dollars a year to a negative balance of payments because the demand for fishery products is almost double the domestic supply. There is unemployment and despair among our coastal fishermen. Now with the possibility of extension of our fishery jurisdiction for a band 200 miles wide around our coasts, we discover that the U.S. government has no long range plan much less the capability to manage those fishery stocks for which we will be responsible.

As to the potential of developing oil and gas on the Outer Continental Shelf—we have restarted leasing with fits and starts that trouble the oil industry itself, as well as those who are concerned about utilization of these common property resources that are held as a public trust for all citizens. We have continued past practices of leasing that were developed in a different era without, for example, examining the benefits of separating exploration from development. If we did that, it would be possible to bank offshore resources once they are charted, and thus preserve them for future generations. The government still has too little geophysical data to assure a fair return from its leases. And we still do not have an adequate assessment of adverse impacts of offshore development on the nearby coastal communities, and systematic ways and means to assist such states to meet social costs that they may have to bear.

Marine accidents of commercial ships still continue at levels that would be unacceptable in any other form of transportation.

The potential threat of ocean pollution has not brought about the necessary monitoring and major cooperative ventures with other nations to stop using the oceans as an open sewer.

Finally, let me note that as far as the federal bureaucracy itself is concerned, the creation of the new National Oceanic and Atmospheric Administration was

an important step toward strengthening our marine operating arms. But it has not proven a viable substitute for the Council. It was believed, incidentally, that the consolidation of a number of major ocean endeavors into one unit would reduce the number of agencies engaged in marine activities. Today, instead of there being fewer federal agencies, there are actually more.

As I review this status of our current situation, I do not feel that we have lost ground from the new level of perception and priorities that were established ten years ago. But over the last five years, we have made no progress at all. Several key opportunities may be completely lost.

As you know, I introduced S. 709 in February of last year as a signal of my concern about the unevenness and the unsteadiness of the national ocean program. My present responsibilities in the Congress do not include detailed oversight of this area and, thus, I, like all of your colleagues in the Senate, look to the National Ocean Policy Study for which you have a clear leadership to deal with these problems and to develop options for improvement. I am not rigidly committed to the language of S. 709, nor do I believe that we should simply switch on a Marine Council without examining alternatives. I submit, however, that P.L. 89-454, enacted in 1966, contained the genius of legislative diagnosis as to the problems, and the key to the solutions: (1) it stated the goals of marine policy and the relationship of the oceans to our national interests; (2) it emphasized the role of the President of the United States to fill that vacuum in leadership, to correct a limp priority for ocean affairs, and to assert administrative supervision over the participating agencies of government; and (3) it provided the President with modest staff for independent advice and counsel, and assistance in carrying out his responsibilities—to head off agencies from developing their own goals which may not coincide with those of the President, and from running off in separate directions, competing with each other, and possibly engaging in unnecessary duplication. It is one thing for me to cite the track record of the National Council on Marine Resources and Engineering Development from my post as chairman, but I think it is fair to say that a large number of observers of the scene in Congress and in the marine community have also paid tribute to that operation.

In quite a different sense, the Council was an experiment in public administration for, whatever the specialized intent, it was unique in calling on the Vice President of the United States to serve as an Assistant President.

I mentioned earlier how little the Constitution requires of the Vice President. In speaking of that office, John Adams, the first Vice President of the United States, asserted that this country had "in its wisdom contrived for him the most insignificant office that ever the invention of man contrived or his imagination conceived."

The Vice President's key role lies, of course, in his readiness to ascend to the Presidency in the unhappy event of the removal of the President from office or of his death, resignation or inability to discharge the power and duties of his office.

It has seemed to me for a long time that the President does need someone with constitutional standing and sufficient stature and prestige not too far below him to act in a continuing supportive role. In the case of the Marine Council's experience, the Vice President was of assistance to the Chief Executive in identifying unmet needs and developing new programs and policies to serve them, in recommending priorities and matching resources to goals, in clarifying and coordinating responsibilities of various participating agencies and in minimizing conflict, and, finally, in interpreting economic, social, legal and political considerations with the scientific and technical.

One reason why I am taking this occasion to mention these views is that we are in an election year. The attention of the nation is drawn to filling the Number One post in our government. I believe that we should give balanced attention also to the Number Two position. It may just be that his or her qualifications with regard to management ability and leadership deserve just as much consideration in strengthening a political ticket as the person's home state, religious affiliation, or political ideology. To consider these dimensions of the Vice Presidency, in my view, would certainly be in the national interest.

In summary, I believe there is an urgent need to examine the relationship of the oceans to our national interest and to restart the engines of the Executive Branch. The present Administration has been indifferent to these needs and opportunities. It has not asserted the necessary leadership to give coherent

focus to the different interests of our nation and the different agencies of government having piecemeal responsibilities. We need a renewed dedication to ocean-related priorities and we need more energetic federal management. And, above all, we must make renewed efforts to discover how the oceans may be turned to the cause of peace and to the interests of other nations on this planet as well as our own.

This Committee is on the right track with the questions it is raising. Let me assure you of my support as you formulate solutions.

Senator HOLLINGS. Our next witness is Dr. Ed Wenk, who has already been properly introduced by the previous witness.

Dr. Wenk, we welcome you back to Washington. How is it out in the hinterlands?

STATEMENT OF DR. EDWARD WENK, JR., DIRECTOR, PROGRAM IN SOCIAL MANAGEMENT OF TECHNOLOGY, UNIVERSITY OF WASHINGTON, SEATTLE, WASH.

Dr. WENK. Well, sir, at this season of the year we think it is remarkable when the sun is shining, as it is today. But for 3 months of the year it is beautiful, and I hope we can share some of that delightful marine environment with members of this committee from time to time.

Senator HOLLINGS. You heard the distinguished former Vice President. I only regret we couldn't keep that Council going, but we are indebted to you for your constant leadership and we are vitally interested in your comments today on the two proposals.

Dr. WENK. Thank you very much, Mr. Chairman.

Before I present this statement, I think that the members of this audience who may be newer to marine affairs, ought to be reminded of your own leadership in this area.

I remember having been present firsthand when there was a quantum jump in public service to this country from the point of view of marine policy in 1970. That progress was entirely, as a matter of fact, on your initiative, on your vision, your foresight and your willingness to go to bat for the oceans. And you have continued that, Senator.

Senator HOLLINGS. I had to go and talk to the Attorney General, you, and Dr. Stratton.

Dr. WENK. Yes, sir. But that, I believe, was the catalytic moment that made the difference between having a NOAA and not having a vitally needed agency.

I really believe that it was your message that was transmitted to President Nixon, that turned him around. He had been against forming NOAA. He had been advised by the then Bureau of the Budget and by the Office of Science and Technology not to favor the reorganization proposed by the Stratton Commission, and I believe it was your intervention that brought it about.

Senator HOLLINGS. Well, we have got it now, but it has languished a little, I think, and perhaps we can beef it up.

I would like to hear your views on these two bills now.

Dr. WENK. Thank you very much.

Mr. Chairman, it is a great privilege to respond to your invitation for comment on bills now before your committee that deal with

the sea grant program, the National Oceanic and Atmospheric Administration, and with the national program, generally, in marine science and technology.

All of these bills concern central questions as to what stake this Nation has in the oceans, and how adequate are existing policies and governmental structure to realize that promise.

At the outset, I should like to congratulate this committee on the timeliness, clarity, and thrust of its initiative. We have needed a national policy and a strategy to focus the resources of the oceans on a wide range of social goals and aspirations, and a public stewardship of the marine environment as a common heritage of humankind. A sense of direction; momentum has slowed; and the varied missions

Instead, since 1970 we have been drifting. We seem to have lost and activities of as many as 21 Federal agencies that deal with the sea are no longer coordinated.

Finally, what was a conspicuous item on the Nation's agenda and on the President's agenda in the late 1960's and early 1970's, no longer captures a deserved spot on the priority list.

The Congress must find it terribly frustrating to be obliged, as Senator Humphrey said, for the fourth time in the last 17 years, to reawaken national interest in the sea, to end this groping for policies and a program to set new directions and finally to evoke from the executive branch formal, concerted and sustained effort.

In submitting this statement, I should mention that I speak only for myself; I represent no organization or institution. What I hope to share with you is a distillation of professional experience, perceptions, insights, and conclusions that have accumulated from a long interval of exposure and direct involvement in marine policy planning.

At the same time, I should make clear that I am an unabashed partisan of ocean affairs. I believe very simply that the oceans can contribute to our highest aspirations and that we have failed to realize the opportunities.

This committee has stated that the goals of its current enterprise are: (1) to invigorate the development of ocean opportunities through more perceptive application of marine science and technology to social purposes; (2) to strengthen the National Oceanic and Atmospheric Administration and designate it as the lead Federal agency for marine planning and assessment; and (3) to reorganize, strengthen, and extend the National Sea Grant Act.

This is rich and compelling agenda, and I shall endeavor to address points on all three elements. The primary essence in what follows, however, concerns the broader perspective with regard to national marine policy and governmental apparatus for its implementation.

NATIONAL POLICY FOR MARINE AFFAIRS

Title I of the Ocean and Coastal Resources Act of 1976 deals with overall marine science and technology policy. Indeed, the declaration of policy and national principles, with the exception of the organizational focus that I shall discuss subsequently, sets

forth a comprehensive view of the ocean potential. It is clear; it balances concepts of resource development and conservation; and it portrays a sensitive concern for social benefits. In my view it deserves absolute and unequivocal support.

It is somewhat puzzling, however, that this enunciation of goals and principles did not take note of and build on existing legislative framework. The Marine Resources and Engineering Development Act of 1966, Public Law 89-454, was in my view a triumph of long range vision, skilled draftsmanship, and potent statecraft in setting forth for the first time in the history of this country a declaration of marine policy and purpose. The act declared that we should "develop, encourage and maintain a coordinated, comprehensive, and long-range national program in marine science for the benefit of mankind." This mandate was developed after a long, searching and strenuous inquiry by this committee, and it is a tribute to the tenacity of its chairman, Senator Magnuson, that he overcame numerous political hurdles in seeing that proposition pass both House and Congress and then be signed by the President. And, incidentally, signed by the President over, again, the objections of the Bureau of the Budget and Office of Science and Technology.

That elemental piece of legislation is still on the books. Its purposes, now 10 years old, should be updated to reflect new needs and new opportunities and changes in value preferences of our citizens. Perhaps the intent of section 101 could be rephrased as important amendments to the existing statute.

NEED FOR A CENTRAL FOCUS FOR MARINE LEADERSHIP

The 1966 legislation, incidentally, recognized that the existing structure of the executive branch was not able to implement the new mandate without institutional reform. Indeed, I believe that it was your committee of the Congress that sensed the requirement for the same central focus that is emphasized in section 101(a)2H of S. 3165.

In Public Law 89-454, they rationalized, first, the need of high level policy leadership. Second, they determined that the various engines of the bureaucracy that deal piecemeal with marine activities should be integrated with a coherent sense of purpose and a coordinated action program.

In short, that legislation noted that the only officer of Government having a constitutional authority to deal with involved departments and agencies was the President.

Perhaps, inadvertent contrast with that notion, section 101(b) could be interpreted as specifying NOAA as the "Central focus for the planning, development and implementation of a successful marine resources, science, and technology program of the United States."

In my view, there is widespread and even dramatic experience within the Federal Government that suggests assignment of leadership to one of a family of collateral agencies over a governmentwide program is almost doomed to failure.

For one thing, sister agencies are not motivated either by penalties or incentives to concerted action.

Senator HOLLINGS. Maybe I shouldn't interrupt as we go along, but if you would go back to the top of the page there about section 101, I think perhaps the phrasing of the original Marine Resources and Engineering Development Act could be updated. Perhaps, though, it is the style right now. There has been a lot of talk for some time about the need for a sunset law, that every law ought to come up after 10 years and be reenacted or repealed.

Specifically the drive is to correlate, coordinate, and eliminate many of those programs.

We look at it with that view. I agree with you that there is no better piece of legislation than that which instituted the Stratton Commission. Now coming back down to the matter of trying to give the leadership position to one of the Cabinet members, among other Cabinet members—you say that is doomed to failure. You would have to have, as you see it, the President appoint or assign it to the Vice President as is proposed in Senator Humphrey's bill?

Dr. WENK. Pretty much so, Senator Hollings. In the first instance, no single agency would be able to coordinate activities or other agencies. But there is still another reason for highlighting the role of the President. And that is, it makes the ocean his priority. That is at the heart of the whole business. In other words, it is not only mechanical coordination that is involved, it is almost a form of spiritual leadership.

I think that unless the ocean potential is brought back up on the President's priority list, the mechanics of coordination will not achieve what is desired.

Senator HOLLINGS. What happens if you have another Vice President like Vice President Agnew with respect to the Marine Science Council—inattention, and failure to even to go to the meetings?

No good corporation of America would have a chairman of the board that only attended one meeting in 2 years. So the Government is no different. What do you do? How do you provide against that?

Dr. WENK. My impression, sir, is that all of the legislation that the Congress enacts is based on the premise of high quality leadership and implementation. In other words, there may be occasions when that leadership is abdicated. I believe history confirms just what you said; but I believe from the point of view of national goals, you must begin with assertion of congressional intent. Then you are on strong ground and can operate with the premise that indeed you will have quality performance with implementation. If you don't get that performance, you can hold the responsible officials accountable.

Senator HOLLINGS. I could talk about the other extreme, namely, a Cabinet member with the confidence of the President, Rogers Morton.

When he was in Interior, all of the oceans programs went to Interior. Then he came over to Commerce and we were pushing ocean programs back to Commerce. I believe if he had gone to Agriculture we would have put the oceans under Agriculture.

Now I have a feeling that perhaps Secretary Richardson is going to fill that gap and expand on it. Maybe we finally have the right Secretary here to give us the leadership, one who could really coordinate throughout the entire Government.

Dr. WENK. Senator, I think your points are well taken; one has to examine all of these possibilities. Secretary Richardson is an enormously competent man. But he has already had five senior posts and I wouldn't be sure how long he will stay in Commerce. That is another reason you hear this morning Senator Humphrey and myself and maybe others advocating reestablishment of the Marine Council. Whether or not that occurs, you want better performance out of the executive branch and therefore it seems to me that taking every step possible is warranted. Strengthening NOAA, I believe, would be a further step in this direction.

Senator HOLLINGS. Let me be more direct. I think Secretary Richardson is enthusiastic. He is another Hubert Humphrey; he didn't know very much about the oceans to start with, but he has learned very quickly in the last month.

Just as we are getting him enthused, and I feel that enthusiasm, if we were to have this turned over to Vice President Rockefeller, then I think in a sense that would stultify or arrest the interest, perhaps, of Secretary Richardson.

I don't know that we have got Nelson that charged up. He is charging around rather than up.

I just wonder about that. Maybe we should take the cards as we deal them and change the laws as they fit the situation to get the program moving. I hate to pass a new law every time we get a new Cabinet member or a new Vice President. I don't want to have to do that, but if we have to do it to get the thing moving, we will do anything up here.

Getting right to the point. I believe we have got Secretary Richardson going, but I don't know if we could keep him going if we had the Vice President in charge of it.

Dr. WENK. To respond to that, Senator Hollings, first, I believe that having the enthusiasm of a cabinet officer is a necessary condition for effectiveness of any of the agencies within his ambit of jurisdiction. No matter what NOAA might want to do, and whatever leadership it had, unless it had a sympathetic responsive Cabinet officer, as you assert Mr. Richardson is, it seems to me they couldn't fulfill their goals.

So this strikes me as a major accomplishment. I don't believe, however, that any Cabinet officer operates under the illusion that he can offer the entire Government the sort of leadership that is needed and that could be provided within the Office of the Presidency.

We had another interval in our history when the Navy was taking all of the initiative for the whole Governmentwide program. There was an Assistant Secretary of the Navy that chaired the then Interagency Committee on Oceanography. The Navy provided some leadership, but in looking back we find it never was able to bring some new spirit of ocean priority and program strength within the

civilian agencies. Second, it was not able to bring the policy issues to a sufficiently high level in the Government, that is, to the White House, and all of the offices around the President that would accord the oceans the priority it deserves.

Senator HOLLINGS. Very good, sir.

Dr. WENK. To go on, with regard to this problem of central focus, and this is just a minor point, it struck me that section 102(c)3, which centers responsibility on a new Office of Marine Resources, Science and Technology in NOAA—to conduct planning activities including the identification of national and international objectives and human needs which may be satisfied through marine science and technology—may need review to be consistent with the question of making NOAA the marine focal point for the entire Government.

INTEGRATION AT THE PRESIDENTIAL LEVEL

This committee has before it an alternative in S. 709. That bill may serve to remind the Congress that Public Law 89-454, in sensing the need to confer a unified sense of purpose to the constellation of marine agencies, created an interim National Council on Marine Resources and Engineering Development to assist the President in carrying out his responsibilities. In short, that legislation recognized that the President was the only officer of Government with authority to fulfill the mandate in its implementation, and that he needed a small, independent staff to advise and assist him. As I shall outline subsequently, that Marine Council has a unique record of accomplishment. It was, however, disestablished in 1971. Qualified observers of the marine affairs scene, however, considered that the high point in effective Government administration developed during the 4 years that the Marine Science Council was operating, and especially the first 3 years under the statutory leadership of Vice President Hubert H. Humphrey.

The termination of the Marine Sciences Council left the Nation without a single qualified spokesman in the area of marine policy. The vacuum left by the Council encouraged the continuance of existing marine-related agencies, whose fragmented jurisdictional authority and narrow scope prevents the attainment of a national perspective at any level of policy. Recognizing the symptoms of an ineffectual national marine program, but not of its cause, additional authority has been vested in new agencies to deal with problems along narrow, disciplinary boundaries, with the result that program coordination is becoming increasingly difficult. There does not now exist any institution within the Federal Government with the resources and expertise necessary to synthesize marine programs at lower governmental levels.

Given that state of affairs, the intent of your legislation to generate a new central focus is not only reasonable, it is urgent.

However, as an alternative to assigning this responsibility to NOAA, I would urge the following: (1) refresh, renew and strengthen marine science purposes by amendment to the legislative mandate of Public Law 89-454; (2) underscore provisions of the existing

legislation which assigns the President key responsibility for implementation as Chief Executive. Incidentally, that authority is still there, despite the termination of the Council, (3) given the demise of the Marine Science Council that was provided for in Public Law 89-454, examine alternatives for reestablishing some form of specialized marine advice and assistance to the President within the Executive Office of the President. The Council suggested in S. 709 is one very attractive model.

PERFORMANCE OF THE MARINE SCIENCES COUNCIL

Mr. Chairman, I have a small section in the testimony with regard to the operation of the Marine Council, and I am not sure of your time. If you wish, I can just put this in the record and proceed.

Senator HOLLINGS. Yes, let's include that in its entirety and you emphasize those parts you wish.

Dr. WENK. Let me just summarize again with regard to the role of the Council. Apart from the individual accomplishments during that time, there was the opportunity of pulling together the senior officers of the Government toward one concerted purpose. It is here that I want to point out that the effectiveness of the Council depends on the leadership of the chairman himself.

COUNCIL CHAIRMANSHIP UNDER VICE PRESIDENT HUMPHREY

Vice President Humphrey presided at these meetings, not simply as an umpire at a bureaucratic dog fight, but as a facilitator forcing decisions.

Very often members of the Council sat on the fence. Others introduced reasons for delay, particularly when some action seemed to dilute the power of their agencies.

The Chairman was determined that everyone would have an opportunity to express his views and there would be an openness to express differences. But the Vice President was also determined to reconcile these to every extent possible, in order to bring about a decision.

One final point. The Chairman tried to raise the perspective of cabinet level members, for example, from their natural parochial concerns to a Presidential level. As often as not, the skillful and good-humored probing by the Chairman brought out the basis for the reluctance of officers to agree and in almost every case it was possible to advance to a point of action. With that consensus, the Chairman was then in a position to report to the President that the proposition had gained the support from a cabinet level body.

May I say, parenthetically, Mr. Chairman, that during the 3 years that Vice President Humphrey was in the Chair, 65 different propositions were generated by the Council, approved by the President and made public—in a state of the Union message, in special messages to the Congress, in appropriation messages and other actions by the President.

In the subsequent 8 years, there have only been a total of five. This is simply another example of the sort of thing you were saying earlier of the difference.

COUNCIL GENERATED INITIATIVES

The high batting average for the Council during that period includes such initiatives as: launching the international decade of ocean exploration; initiating a treaty for seabed arms control; identifying needs for coastal management; starting a demonstration project on the extraction of fish protein concentrate; drafting a policy framework for the development and environmental protection of the Arctic; accelerating exploration of offshore oil and gas; intensifying use of new technology, including that from outer space activities, to conduct environmental observation on, in and under the sea, to store and catalog such data and to make it more readily available; beginning a concerted inquiry into the potential of aquaculture; providing prompt and effective implementation of the Sea Grant Act.

Incidentally, if I could recall a point Senator Humphrey touched on when he was Vice President, the sea grant program act was supported by the Council immediately after enactment, and as a matter of fact again, over objections of the OMB.

The Council also instituted measures to prevent and alleviate pollution from the spillage of oil and other hazardous ship cargo; and last but by no means least, was the work of the Council to promote world order and understanding by strengthening the framework of international law and cooperation that governs ocean activities.

COUNCIL DYNAMICS

Quite apart from the catalog of policy initiatives accepted by the President, I want to emphasize again the effectiveness of the Council in gaining coherence from a wide array of agencies. In an environment of departmentalism, coordinating bodies such as the Council must operate to gain consensus. By and large, their techniques applied in the content of commonly developed fact reflects the role of mediation and persuasion rather than executive fiat. Coordination may result in a coherent program, incidentally, but it makes few friends.

But flawed and imperfect as they are, these coordinating mechanisms become the proving ground for public administration. In the end, it is the sense of community and the suppression of parochial interest to the commonwealth, the systemic rather than sectorial approach that ultimately tests the degree to which a public enterprise can fulfill its purpose.

The Council has no additional legal authority beyond what the member agencies contributed, only a license to harmonize the sectors. Yet, it saw its role as far more than a referee in adjudicating disputes. It was creative in linking new maritime solutions to stubborn social dilemmas.

In my view, the Council derived considerable measures of power from its position in the governmental hierarchy, particularly in being within the Presidential ambit.

But it also gained its effectiveness from the development of mutual respect among the participants and the mutual expectations

each had of the other, and, finally, of the respect and expectations exchanged between the members and the chairman.

Indeed, I feel that the record of accomplishments of the Council would be incomplete without this insight as to the role of a chairman, his capacity to blend together the inputs of marine science and technology with a sensitive perception of varied needs and wants of a pluralistic society, and of the maze of public and private implementing institutions.

Put another way, the appropriate structure of Government to integrate the energies of potentially rival agencies does depend upon a legislative framework of the kind set forth in Public Law 89-454 and restated in S. 709. But, that structure, while necessary, is not a sufficient condition. The other conditions have to do with the intent of the President to use that apparatus, and qualifications of the Council Chairman to preside.

And as you mentioned that, indeed, that had not been done in the Nixon administration, and the qualifications of the Council Chairman.

Senator HOLLINGS. That is the real hurdle. I mean a man convinced against his will is of the same opinion still. We passed the Coastal Zone Management Act and they appropriated in 1973, the ensuing year, zero dollars.

Land use planning is yet to be a law in this country, and they appropriated \$20 million.

Dr. WENK. It is hard to understand.

Senator HOLLINGS. It is hard to understand. There is a problem to get someone with the excellence of Senator Humphrey. If we could just legislate Hubert! Or, if you want to get the President's attention, let's put Mrs. Ford as head of the Council.

One way or the other, I am getting a feel for where we are going. Suppose, for example, that you did not develop the Marine Science Council as we had it originally instituted, how would you handle it within NOAA, if you were in charge of the program?

Dr. WENK. Well, there is yet one other alternative. You mention the Council as one possibility, and—

Senator HOLLINGS. Yes, and I agree with you on that. But from your experience, how would you handle it?

Dr. WENK. The other possibility exists within the Executive Office of the President. As I think was called to the attention of the country yesterday, there is pending legislation to reestablish a Scientific and Technology Policy Office in the Executive Office of the President that would help the President in all science and technology affairs. In the Senate that capability would be created under S. 32. My impression is that that is still being negotiated with the House, but there may be passage momentarily.

I mention using this new Office as a second possibility.

The third possibility would be through explicit legislative initiative of the Congress to assign that new Office, after it is created by the law, the responsibility to assist the President to carry out these marine policy duties. I suggest that only as a third option.

As a fourth alternative, you could make that assignment to NOAA. I don't believe there is much precedent for that being done, but I think all of us look forward to some type of innovation and experi-

mentation in Government. The way that could be done, incidentally, would be to give the Cabinet officer a second hat as a special assistant to the President and the White House. That has been done before.

As a matter of fact, the Chairman of the AEC at one time, I think, under President Eisenhower, also wore a second hat to get Governmentwide cooperation; he wore a second hat as a Special Assistant to the President.

I am not sure whether or not that is subject to legislation, but that would be one way Secretary Richardson could simultaneously exercise the existing authority he has as a Cabinet officer, an additional authority he would have as a representative of the President.

Senator HOLLINGS. Very good.

If my memory is correct, I think Secretary of Interior Morton, and later as Secretary of Commerce, retained the hat of Chairman of the Energy Advisory Council or the Energy Section of the President's Domestic Council.

Perhaps Secretary Richardson wears that hat right now. We might have a situation of that kind and maybe we can give him a third hat or get him to swap the energy one for an ocean one.

ANNUAL REPORT

Dr. WENK. Just to continue on some further details in the proposed legislation before the committee, section 103(a) provides for an annual report on Marine Science and Technology to be submitted by the Secretary of Commerce to the Congress and President each year. That report would include a general description of the Marine Science and Technology activities across the entire Federal Government and analysis of such projects in light of principles set forth earlier, a general evaluation of the Nation's marine science and technology capability and a summary of activities regarding interaction of programs between Federal and State government. That provision authorizes the Administrator of NOAA to obtain information necessary for the preparation of that report from other Federal agencies.

Section 105(a) repeals the section 7 of the older Public Law 89-454. That section called for a very similar annual report. The difference in these annual reports, however, is that one would be from the Secretary of Commerce and the other would be from the President.

The one from the President would carry a statement of his priorities. I think this would make a considerable difference from the point of view of the impact of the report.

So, therefore, I would urge you to reconsider whether or not to repeal section 7. To be sure, it has been neglected in recent years. There was a 2-year delay in the President's releasing of the 1974 report, and none have appeared for 1975 or 1976.

In the absence of adequate staff assistance, either from the Marine Council that was terminated in 1971, or OST that was dismantled in 1973, the President no longer has the assistance needed to draft it. I do not believe, however, that the remedy lies in transferring the responsibility to a lower echelon.

NEW ROLES FOR NACOA

Let me move to a related point regarding new roles for the National Advisory Committee on Oceans and Atmosphere. Both bills would add new functions to the statutory advisory body that was created in 1971. S. 3165 would have NOAA comment on the annual report of the Commerce Secretary.

S. 709 would go further, to have it serve in a continuing consultative role to a reestablished Marine Council. Both would be salutary in my view because they would bring the Government the expertise, objectivity and diverse points of view representative of the citizenry.

Such brain picking is bound to help upgrade quality of in-house operations and sensitize it to potential impacts beyond the Government transactions. Such advisory bodies can be effective if their advice is genuinely sought, if they are not misused as rubber stamps to legitimize bureaucratic initiatives, and if representation is broadened to include social points of view beyond the traditional elitist establishment, and at the same time, to exclude members whose parent organizations are direct and conspicuous recipients of Federal project funding.

STRENGTHENING NOAA

I should like next to turn to the intent of this new legislation to buttress the effectiveness of NOAA. The major technique advanced by S. 3165 would introduce institutional reform, particularly through a new Office of Marine Resources, Science, and Technology. As I read the bill, that Office would have a mixture of three duties: (1) It would serve as staff to the Government as a whole, although it is not completely clear to whom it would report in that capacity; (2) it would serve as staff to the Administrator of NOAA and assist him with internal long-range planning and coordination; and (3) it would serve in a line relationship with regard to advisory services and, in particular, with regard to sea grant. It is not at all clear that this triad of duties is compatible, nor is it clear that the desired results could be obtained by this innovation.

Given an unpleasant fact of life that the major policy planning for marine affairs conducted by the Marine Council has evaporated, there is strong reason to build a policy planning staff somewhere in the Federal Government. And there are good reasons for NOAA to undertake this task in relation to its own jurisdiction.

There are, however, other approaches to strengthen NOAA. Careful observers, both inside and outside of the Agency, have identified several difficulties which have prevented that Agency from achieving the aspirations of the Stratton Commission. For one thing, it did not embody all of the preexisting bureaucratic elements that had been proposed. By virtue of its creation under a reorganization act, it was also not granted new authority to undertake additional urgent functions. To some extent the new Agency represents a gluing together of existing components, which, despite heroic efforts by a brilliant administrator, still maintain their prior functions, identities, and life styles.

Major updating in agency missions are required to meet changing needs, and it may be necessary to put all of the NOAA components in a "Mixmaster," so as to restructure the entire organization.

There are a number of new functions I would like to suggest as nominations for NOAA. I believe they would help the Agency fulfill its aspirations and certainly help the Government and the country.

First and foremost there is the opportunity to assign to NOAA new authority in the field of civilian marine technology. This, technical engineering activities in a new institute. Indeed, may I recall for this committee that Public Law 89-454 was a Marine Resources and Engineering Development Act. That second phrase and its legislative intent were never fully implemented. This function urgently needs detailed congressional examination and legislative initiative.

There are three other areas in which I believe NOAA could make a major contribution:

1. The development of a network of coastal research capabilities that would be developed on a regional basis and serve State as well as Federal interests.
2. The coordination of weather modification research and demonstrations that may be undertaken within the Federal Government.
3. Creation of new authority for dealing with the problems of the Arctic environment that include a very sensitive appreciation of the social and economic, as well as scientific factors involved in future Arctic development.

SEA GRANT AMENDMENTS

Title II deals with the national sea grant program amendments. And I will close with a few comments on this provision.

Senator PELL. I would add at this point that we must conclude this hearing by half past 12 or quarter to 1, because of conflicting duties, so I will have to ask all of the witnesses to compress their statements to 10 or 15 minutes. If they want to put the statements in the record that will be fine. There will be more time for questions.

On the other hand, if they use the time by reading the statement, it is up to them.

Dr. WENK. Thank you, Mr. Pell. I will compress the rest of the statement.

First, I supported title II and all of its provisions.

In particular, I find that section 204(c), which calls for new focus of sea grant on national needs and problems, to me is important and deserves full support. This is the kind of policy research that is necessary for wise decisionmaking. And it is unbelievable that with the \$20 billion that we spend on research and development in this country, we spend less than a tenth of 1 percent on this type of activity. Put another way, out of \$100 we spend \$99.90 for the engine under the hood of the car, and only 10 cents for maps, steering information, steering apparatus and maintenance manuals.

In closing, may I again congratulate both committees for your initiative. I hope a few years from now we won't all be back in

the same hearing room talking about a fifth congressional initiative to try to get the executive branch moving.

Thank you very much.

Mr. PELL. I think we well may be, but I hope not, too. It is good to see you back in Washington, Dr. Wenk. And we thank you for your testimony for which we are very grateful.

Dr. WENK. Thank you very much.

Senator PELL. Our next witness is Mr. Rudolph A. Trefny, American Oceanic Organization.

STATEMENT OF RUDOLPH A. TREFNY, PRESIDENT, AMERICAN OCEANIC ORGANIZATION

Mr. TREFNY. Mr. Chairman, and members of the committee, as President of the American Oceanic Organization, I appreciate this opportunity to comment on the pending legislation and its relationship to our national oceans picture. Three years ago, when I accepted this position, as President of AOO, I presented our membership with an approach called my "2 x 4 Platform." At that point in 1973, I felt that in order to effectively accomplish our objectives, we would have to get the attention of the key decisionmakers who could legislate and implement an effective national oceans program. For the last 3 years, the 2 x 4 has been used quite often, and hopefully, if the laws of physics apply, "for every action there was an equal and opposite reaction." I do feel that we have made, and will continue to make an impact, and thereby achieve our objectives.

Before I make specific comments, I believe it appropriate to provide a brief overview of the AOO and its activities as they relate to the national interest in the future development, exploration and utilization of the oceans. I have provided copies of our organization's brochure that briefly summarizes our objectives. AOO was formed in 1968 as a nonprofit organization to support the implementation of the Stratton Commission recommendation—the formation of NOAA. We all know that reorganization plan No. 4 did not fully implement this recommendation; thereby, further reinforcing the critical need for an organization like AOO, that would provide a common meeting ground to promote a continuous dialog both formally and informally and make the oceans and their potential visible to as many as possible, especially to the Congress and the Executive.

We have accomplished this to a degree, but more effective communication is vitally needed. The American people, and their leadership, must be made aware of the critical importance of the oceans and the requirement for policy, planning and programs. Our membership has diverse interest and backgrounds over the broad spectrum of all ocean related activities, these include science, technology and engineering, both industrial and academic, labor and management, all aspects of Federal, State and local government, to include both national and international interests, both military and civilian. Equally as important, we have some individuals who are just interested in the future of the oceans as they may affect the quality of life, especially for future generations.

Now, by reviewing the objectives that AOO has established, I will develop several points that I feel should be considered by this

joint committee, others who have or will make comments and by the people and the leadership of this country.

Our first objective is, "to encourage the creative and enlightened use of this planet's 'inner space'—our oceans." Therefore, we encourage and endorse any legislation or action that will make a contribution to the realization of this object. There are many issues related to the oceans that are being discussed here in the Congress and now at the United Nations in New York, and to say the least, the outcome will be critical to the orderly exploitation, utilization and effective management of the oceans and their resources.

We mentioned "this planet." This country and others as part of this planet have been blessed with resources both onshore and offshore that have and will continue to be used to support and enhance the quality of life. However, we are leaning rather quickly, and at times rather dramatically, that while utilizing these resources some may be exhausted and not be replenished.

In our excitement, we may even contaminate or destroy some while gathering or utilizing others. Therefore, I submit that there is no substitute for an approach that will provide a clear and total scientific and technical understanding of the sometime delicate and carefully balanced systems that we are dealing with.

I further submit that, the development of a national oceans strategic plan at the highest level will provide a framework for effective management and control and at the same time will not constrain exploitation and utilization. A carefully conceived, well balanced program will support national needs and priorities and provide the best data possible when impact judgments are made.

Keeping that in mind, I would like to move to our second objective, and that is to: "Support and inspire the programs of the United States in developing and maintaining a coordinated comprehensive and long-range national effort in marine and environmental affairs."

If one looks carefully at the purpose and principles delineated in S. 709 and the basic objectives that I have stated for AOO, they are very similar, "develop encourage and maintain a coordinated, and long-range national effort in marine and environmental affairs." I suggest that it be "marine affairs" and not marine science alone to assure that it be viewed and understood in the broadest context possible. Congressman Charles A. Mosher, Chairman of the Board of Directors of AOO, stated it as follows on the floor of the House, December 1974, and I quote:

Many of us remember that an earlier Vice President, Hubert Humphrey, was at one time an ex officio Chairman of the National Council on Marine Resources and Engineering Development. He provided really excellent leadership in that role. But that council was later abolished. I very definitely believe that something of the same sort at the White House level deserves to be reactivated and I am presuming to urge that, as a proposal for President Ford's consideration.

Also, in a letter to the President in August 1974 Mr. Mosher said, and I quote:

Frankly, Mr. President, our important oceans initiatives have come from the Congress in recent years. But, we legislators, industrialists, scientists and engineers, all alike recognize our imperative need for more support at the White House level; we need your galvanizing influence, your specific attention to our ocean policy needs.

I feel that anything of this nature that is done should be done with full consideration of, not only the near term situation, but with a view to the 1980's and 1990's beyond. We should be flexible and well armed with alternatives to our basic plan, due to the ever changing political, social, and economic factors that constantly influence our decisions and actions.

Teamwork, between the Congress and an oceans group of the type proposed in the White House, could provide national oceans policy and programs that might well be viewed as a model for the rest of the world. We lead in space technology, agricultural development, overall technology development and have the capability to provide leadership related to ocean development.

Mr. Chairman, I do have a response from one of our corporate members and he has asked me to read his statement as part of my testimony. With your permission, Mr. Chairman, I will read it now:

I would like to say some words for Mr. Otto Klima, who works for the General Electric Company as a Corporate Officer in charge of the Re-entry and Environmental Systems Division. Mr. Klima was unable to be here today, but he asked me if I would convey a few thoughts for him in my testimony. He has worked on many major ocean programs including Tektite, Navy Surveillance Systems, Underwater Cybernetic Manipulators, and Underwater Rebreathers and MK500 for the Navy Trident program, and has been a member of the Sea Grant Advisory Panel for the past four years.

I quote Mr. Klima:

I believe the oceans will have an ever increasingly important role in the economic and military competitive posture of the United States. The very high standard of living in our country, which results in a very high labor cost, makes competition based on equivalent manpower unthinkable. Low technology products, where the technical skills are available to our overseas competitors, eliminates the ability to compete, because of our high cost labor rate. High technology products, on the other hand, that are beyond the technical capabilities of our competitors allow us to compete while paying considerably higher labor rates. Clearly, a similar scenario to the economic competitive posture can be drawn in the military arena.

Much of the new technology that we have developed in this country over the past 20 years—digital equipment, microminiaturized circuitry, sophisticated servo mechanism, etc., put us in an excellent position to apply these products and technologies to ocean systems that have, in the past, been unthinkable. These systems can be used to our competitive advantage in many ocean fields, such as ocean farming, major steps forward in ocean fish production; ocean drug harvest; oil drilling; mineral exploration and harvest; and many others.

The oceans are a fertile field for the application of the high technology available in the United States; all that is needed is program leadership that would attract the high technology skills available in our country, and the people that enjoy working in new and exciting areas. These same people were attracted a decade ago to our space program. As these entrepreneurs develop the ocean programs, they will attract many more skills and people, opening up jobs for the unemployed. So jobs will be created directly, others from the vacancies created by the people currently employed moving into these new ocean-related opportunities.

With bulging work force of highly-educated, post war youths now available, it is my belief that a major step forward in the well being of this country could be made if meaningful ocean programs were instituted. The Sea Grant program has made a humble, although very effective, start in this direction; increasing its scope as proposed in this Bill is another step toward increasing the technical leading edge that the United States now enjoys allowing our industry to compete to maintain a favorable balance of trade while our military uses the new technology in maintaining its competitive position.

At this point, Mr. Chairman, I would like to discuss, from the standpoint of stated principles only, factors that relate to S. 3165 the "Ocean and Coastal Resources Act of 1976."

I believe it is fair to state that to date we have developed our society largely on what I choose to call—"A Land Ethic." We have looked to the land for resources and solutions to our problems. We have conducted research and developed programs related to agriculture, transportation, energy, the environment and although it departs somewhat from the land ethic, space research, exploration and utilization.

We have organized to provide a focal point for each of these areas. We probably well understand the critical research requirements, the development potential and the associated constraints for each area. Now, if we will shift our thinking for a moment, I propose that future developments be based on a "land/ocean ethic."

Within our free enterprise system, based on supply/demand, and national priorities, we propose to move from the land, through the coastal zone to the oceans and develop them. There isn't any Sputnik, nor is there famine or are there lines at the gas pumps yet we realize that there is hardly any facet of our national needs that is not somehow directly related to the resources of our oceans. There are opportunities for tremendous inputs toward the solution of our energy, minerals, chemicals, and protein needs to name only a few.

Yet, I believe a recent GAO report stated that in some way at least 11 Federal departments and 23 agencies are involved in matters related to the oceans. Further, even though they have different names, for all intents and purposes there is but one ocean—and contrary to boundless space, this ocean does in fact have boundaries and limits that we can define. We can judge, even if only in rough terms, the potential and the constraints associated with the oceans.

But, we have to do better than that, based on the broad scope of activities that we are planning for that one ocean, such as fishing, and fish farming, mineral mining, oil and gas recovery, transporting goods, swimming, boating, developing new energy systems like Ocean Thermal Energy Conversion (OTEC), wind, tides, et cetera, farming seaweed, building offshore ports and so on—once again all in that same ocean.

Today we still have a chance to ensure proper development based on an understanding of the interaction of all of these activities and the ocean.

To this point, it appears that the principles stated in the proposed legislation represent a first step in the development of a systematic approach to research and development related to the oceans. There are common needs and problems and so much can be gained if implementation results in more effective basic and applied research, a better understanding of critical research needs and coordination that will help eliminate duplication of efforts.

Further, if it will stimulate industrial research and development and utilize the talent mentioned by Mr. Klima and through effective communication provide needed results to the user, then it is sound. These results, coupled with a solid national policy and a

long-range plan would establish a framework to allow knowledgeable forecasting and assessment of research and development requirements and most importantly, the definition of and the justification for all oceans programs and activities in the future.

In summary, one could ask who at the present time, has the responsibility to know all about our oceans, relate this knowledge to our national needs and priorities and develop a plan and programs that will help us grow and be better prepared in the future. I am not in a position to comment on the details of S. 709 and S. 3165; however, the principles and objectives of these bills appear to be compatible with the objectives of the American Oceanic Organization. I believe that with the proposed legislation we can now step forward and play a leadership role in this most important area—our oceans.

On behalf of the AOO, I would like to thank you, Mr. Chairman, and the members of these committees for the dedicated efforts that you have put forth to solve these critical and vital issues.

Thank you, Mr. Chairman, for affording me this opportunity.

Senator PELL. Thank you very much, Mr. Trefny. I was struck with your thoughts, especially the suggestion that we use the words "marine affairs" instead of "marine science affairs," which I think has merit, and your various other ideas will be studied carefully. Thank you very much indeed.

I will be taking the next witness out of order also, since my colleague, Senator Roth, who is under the same pressures as Senator Hollings and myself, wishes to introduce the witness from his State, Dean William Gaither, College of Marine Studies, University of Delaware, Newark, Del.

Senator Roth.

STATEMENT OF HON. WILLIAM V. ROTH, U.S. SENATOR FROM DELAWARE

Senator ROTH. Thank you, Mr. Chairman. I do have some introductory comments.

Mr. Chairman and committee members. As you know, Delaware is a State with a large frontage on tidewater in comparison to its overall area.

Further, its location is central to the solution of several problems of acute importance to the Nation, specifically, the development of potential oil and gas reserves in the Baltimore Canyon Trough area east of our ocean coast, and the potential construction and operation of a deepwater terminal to serve the Delaware Valley.

These problems of national significance, and their solutions, as well as important local marine resource problems and opportunities facing my State and its citizens, cause me to be acutely interested in Senate bills 709 and 3165 being considered in these joint committee hearings.

As you are aware, I have served as a member of the National Ocean Policy Study Committee and have kept abreast of its efforts to provide national leadership in the establishment of a unified

national ocean policy. For the record I wish to state my continued support of this effort in the Senate.

Concerning the bills before us today, I want to first indicate my support of S. 709 as providing a mechanism in the Federal Government to coordinate national ocean programs and policies through the establishment of a National Council on Marine Science, Engineering, and Resource Development.

Of particular importance in the bills before the committee is S. 3165, since it deals with the reauthorization of the national sea grant program.

As the senior senator from Delaware, I have maintained close contact with the sea grant program, both at the national level and at the State level. In my mind the program has clearly proven its value at both levels and deserves support for reauthorization and for improvement and extension.

With regard to the purpose and goals of the program, specifically " * * * to accelerate national development of marine resources, including their conservation, proper management, and maximum social and economic utilization," I believe that these are even more valid and important now than they were in 1966 when the original act was signed.

The sea grant program is working as planned, it is stimulating the best university researchers to work on important marine resource development problems and opportunities, and most importantly, it is producing extremely important results.

All, I believe on a small Federal appropriation compared to similar enterprises elsewhere in the Government. As a consequence of these successes, I believe that our first responsibility is to see that the basic national sea grant program remains intact with its essential elements of research, education and advisory services.

Over and above the basic program, I see two areas in which important improvements can be made. The first is to permit sea grant funds to be used for ship time. Without this, we will continue to be bound to work on shore-based problems, when more and more of our problems which need attention are at sea, off our coasts on the Continental Shelf.

The second area in which we can make substantial improvement in reauthorizing legislation is to provide for the support of major projects of national value.

As I have watched our marine programs in Delaware mature, stimulated by the sea grant philosophy, I have seen several good ideas emerge which deserve additional funding at a higher level than the sea grant program could provide.

Further, some of these ideas, like the feasibility of manmade offshore industrial-port islands, are of national concern more than of concern to Delaware alone.

Here, then, the need exists for larger Federal support but without the requirement of one-third non-Federal match from local sources.

With these few general observations, I now would like, with the chairman's permission, to introduce Dr. William Gaither, who is head of both the Delaware sea grant program and the University

of Delaware's College of Marine Studies. He is prepared to make more specific comments on the legislation under consideration today.

We in Delaware are very proud of the outstanding marine studies school that has developed in a remarkably short time. The excellence of this school reflects the strong leadership of Bill Gaither.

Dean Gaither is prepared to make more specific comments on the legislation today. Bill Gaither.

Senator PELL. Thank you very much indeed, Senator Roth.

I would also mention the fact that Dean Gaither is known as a very able and aggressive proponent of his State and university.

**STATEMENT OF WILLIAM S. GAITHER, DEAN AND PROFESSOR,
COLLEGE OF MARINE STUDIES AND SEA GRANT PROGRAM
AND DIRECTOR, UNIVERSITY OF DELAWARE, NEWARK AND
LEWES, DEL.**

Mr. GAITHER. Thank you, Senator Roth. Senator Pell and committee members, thank you for inviting me to testify here today.

My name is William Gaither. At the University of Delaware I am dean and professor of the College of Marine Studies and sea grant program director. The opinions I express today are my own and do not necessarily reflect an official position of the University of Delaware or the State of Delaware.

My remarks will be directed to S. 709 and S. 3165.

First, I will address S. 709 to provide for a comprehensive, long range, and coordinated national program in marine science, to establish a National Council on Marine Science, Engineering, and Resource Development, and an Advisory Panel on Marine Science, Engineering, and Resource Development.

I support this proposed legislation and its objectives. It is my observation and belief that several Federal agencies have the responsibility to operate in the marine environment to fulfill their missions and meet their legislative mandates. To do this will require special knowledge of the ocean.

It is therefore logical that each agency obtain the unique knowledge of the ocean necessary to do its job properly.

It is also my observation and belief that the United States needs to have an overall plan for marine science, engineering, and resource development made up of both the specialized bits and pieces required by each agency and the more general elements of major national initiatives to maintain the United States in a leadership position in the world.

To invest our tax dollars most efficiently, it is necessary to plan and conduct a coordinated national ocean program. The proposed Council appears to be a mechanism which at least has the representation to do that job.

If I were to find fault, I would say that the proposed Council has no teeth. By this I mean that the list of responsibilities defined in section 4 does not include the authority to enforce items (3) and (4) by controlling budgets.

While I do not like to see additional reviews and justifications required, I believe that the Council must understand thoroughly the total national marine program in advance of budget approval and, further, it must have the authority to establish priorities and make them stick in cases where voluntary interagency coordination fails. This provision should be added to the bill.

My second concern is that research necessary for defense gets done. Here I worry that by no fluke of democratic Council action is the Navy denied the resources necessary to maintain its capabilities in both strategic deterrence and in tactical operations.

My third concern with S. 709 is that the Advisory Panel on Marine Science, Engineering, and Resource Development may be constituted without members who will champion the important role of private industry and private individuals in conceiving, developing, producing, and marketing new products of economic importance to the Nation.

In times like the present when it is popular to publicly discredit big business, to conduct investigations of their possible misconduct, and to increase rapidly the burden of regulations under which they must operate, it is also necessary to keep clearly in focus the fact that it is private industry, operating, by the profit motive, which creates the new wealth which provides for the support of government and allows the United States to enjoy a position of worldwide influence and power.

With these three concerns resolved, I believe that S. 709 will be of great use to the nation.

Now I will turn to S. 3165, which I have four points to make. First, in title I, is the policy question of who is to be served by the establishment of an Office of Marine Resources, Science, and Technology. As now written, the office will be established to serve the Federal and State Governments and itself.

I contend that the office, if established, needs to serve the needs of the Nation by stimulating new commercial activities in the ocean with due regard for conservation and environmental protection. It is essential that this office be concerned with the creation of new wealth, which is of value in world markets.

This leads to my second point, which is concerned with who does research and development to create new wealth and meet national needs. Here I urge that private enterprise be encouraged to innovate, compute, and to succeed. This means that a system must be established in the Office of Science and Technology to stimulate the best people in the best organizations to bring forth their best ideas for development and implementation.

Here I believe that industries, working with universities, can do the most with the least money. The policies of an Office of Science and Technology should recognize and utilize entrepreneurship.

As a taxpayer, I am strongly opposed to the establishment of new Federal laboratories such as an institute for engineering research in the ocean proposed by the National Advisory Council on Oceans and Atmosphere. Such laboratories are poor investments for two reasons:

1. They enlarge the permanent Federal payroll, and
2. Their long-term motivation is to obtain annual funding to stay in existence instead of identifying and solving important commercial or defense problems.

The third issue on which I will comment is the National Ocean and Coastal Advisory Service. In this area, the marine advisory service of the national sea grant program has built a strong and effective program in most coastal and Great Lakes States in just 8 years, since the national sea grant program was established. Those few States without advisory programs have tried to get started, but Federal funds have not been available to match university and State resources.

If funding can be increased by the amounts authorized in S. 3165, I believe that the sea grant network can be expanded to all coastal and Great Lakes States, and, in addition, the network can handle the dissemination of information from all Federal agencies which produce material which may be valuable to State, local, and commercial users.

Making use of an expanded sea grant advisory service network has many advantages and offers many economies since university basis, with State and regional connections, now exist and are in close contact with local problems and needs.

Further, a good advisory program is readily supported through matching at the State level since legislators see real value provided to their constituencies for the tax dollars they appropriate for advisory service.

Finally, it is necessary to recognize that the Federal advisory agents will have less chance of achieving the success that comes with the close rapport and trust that a university based advisory agents can and do enjoy.

It is therefore my recommendation that S. 3165 be revised to require the use of an expanded Sea Grant Advisory Service as the only marine advisory service. Restrict the use of funds provided to Federal agencies to the support of the director's immediate staff and the establishment of in-house liaison contact points in Federal agencies where information is generated which needs transfer to the user community. Here again, as a taxpayer, I believe that the Nation will buy the greatest value of effective service for each dollar spent.

Fourth, I am concerned that S. 3165 moves the national sea grant program down one step in the NOAA hierarchy. While I have read and heard the reassuring words that S. 3165 will "strengthen and improve" the national sea grant program, I will remain unconvinced unless the steps outlined in this testimony are incorporated in the final version of the bill.

The undisputable fact remains that the sea grant program has fared poorly in the NOAA budgeting process recently.

I am convinced that for the modest sums now appropriated at the Federal level for sea grant, that the Nation is receiving a great bargain for its investment, both in the quality of talent provided by universities and in the multiplying effect of non-Federal matching.

To insure the continuing, and I believe, increasing, benefits from the national sea grant program, it will be necessary to either keep

it at the highest organizational level in NOAA, or, expand its role and funding through the reauthorization legislation.

Finally, I want to commend the drafters of S. 3165 and S. 709 on their vision in two particular areas. The first is the recognition that a strong and coordinated national ocean policy is sorely needed.

Second, the national sea grant program has produced many excellent ideas and opportunities of high commercial promise which need special attention and funding to reach their full useful potential.

By making separate provision for national projects which qualify for full funding, I believe that important progress will be made in many new and exciting areas.

Mr. Chairman, this concludes my testimony.

I would like to make a further comment, if I might, and that is that Dr. Stan Murphy, the president of the Sea Grant Association and professor of Oceanography and Engineering at the University of Washington, had planned to appear as a witness.

Unfortunately he was taken ill, and I understand he will file his statement with the committee.

I trust this statement can be included in the record.

Senator PELL. It most certainly will when we receive it and we are aware of Dr. Murphy's illness.

I thank you for your testimony. I was very interested that you believe that the advisory services should be continued and concentrated under the sea grant program, and enlarged in that way, and also that you share the concern we had that if you move the director of the sea grant program down from the Director of NOAA, that the program would suffer. I would agree with your viewpoint in that regard.

I thank you very much for being with us. I must move on to our next witness because of constraints of time.

I ask you to give my personal regards to Dr. Gerard Mangone when you get back.

Mr. GAITHER. Thank you.

Senator PELL. Our next witness is Mrs. Janet Adams, president, California Coastal Alliance.

STATEMENT OF JANET K. ADAMS, PRESIDENT, CALIFORNIA COASTAL ALLIANCE, WOODSIDE, CALIF.

Mrs. ADAMS. Thank you very much, Senator Pell. It is a privilege to be here today to testify about the citizens concern and participation in coastal zone management, particularly in relation to having thoroughly read the Ocean and Coastal Resources Act of 1976 working document.

I am Janet Adams, president of the California Coastal Alliance. We are an organization of 25,000 members and 107 affiliate organizations.

Senator PELL. Excuse me. I see you have two statements for two different committee hearings.

Mrs. ADAMS. The title is my error. I am sorry. I put them together carefully this morning.

Senator PELL. I didn't hear you.

Mrs. ADAMS. The incorrect title is my error. I am sorry.

Senator PELL. But you are reading the second one, is that right?

Mrs. ADAMS. Yes. I am interspersing them, really. I am sorry, in the time constraints I had it was impossible to get this typed accurately this morning.

We are an aggregate organization of many members, a total of about 1 million people, and we were formed to pass the proposition in California which created the Coastal Zone Management Act of California in 1972. We have been very involved in monitoring the commissions that were set up by that act, and we are very involved in following through on the details that brought about the necessity for that legislation.

Obviously our primary concern and success is coastal zone management, and certainly our major concern has been citizen involvement.

We have also been very well aware that the factual backup made it very possible to pass the type of legislation that we did in California.

As you probably know, California's coastline is 1,072 miles long, and has a different problem almost for every mile, from preservation of the pristine wilderness areas to very heavy overuse of beaches and industrial areas.

The resolution of the problems and the reconciliation of conflicting activities have upon occasion been very heavily helped by sea grant at a level that is very visible and understandable to the general public.

An excellent example of that recently is a rapid response concerning the Marina del Rey regional plan. The antagonistic forces were brought together to fight to a solution under the stewardship of the sea grant program. The scientific information that could be provided brought the possible resolution into focus, so compromises could be achieved. The key to that project was the fact that it was tailored to the situation and the personalities and was backed up with data, not readily obtainable anywhere else.

The sea grant projects at the University of California have provided many levels of data at both the State and regional levels. And with a very selected set of references and citations of documents pertinent to the coastal plan.

The project's research library on coastal zone management numbers approximately 5,000 pieces and has been used by all of the commission, by many of the legislators recently and occasionally, regrettably, by conservation groups.

Although my exposure to sea grant in California has been chiefly in relation to coastal zone management issues, I have been impressed by the sea grant research in other areas of California, particularly in relation to fisheries.

In fact, in my very own county we have had a recent and very successful project in aquaculture that was heavily helped by sea grant. I don't think it would have happened without their assistance really.

Sea grant is an outstanding program, but it does need the sort of coordination and expansion that your legislation will provide.

Few members of the general public are aware of sea grant and the great store of information that is available, though there is a greater awareness that coastal zone management is not as simple as bringing local government under control so it functions at higher than a parochial level. The abuses caused by that might have ended much sooner if more time had been spent informing the public of something as easy to understand as sand erosion. Citizen awareness that responsible coastal zone management is necessary is primarily and regrettably an emotion reaction to visible blight, whether it is wall-to-wall development, parking lots paved on the beaches, or denial of access to former recreational areas.

There is little understanding of why there isn't a greater interest in better managed coastal resources than at the State and National level.

When I read section 101(1)(2) (a), (b), (c), and (d) of the legislative draft I concurred instantly. I think of the potential for real understanding and involvement that exists if the sites were fixed at several needed and certainly lower levels.

It is difficult at best to influence local government to cooperate in the management program if they do not understand it, and if there is little public support. There should not be unusual isolated instances of working on the spot with community leaders to bring about resolution of conflicting interests.

Responsible adversaries can and do change their views when confronted with facts. An expansion of the sea grant services must take place where the public marketplaces are, not in the research laboratories solely.

When I read the section on education and training programs, I had to reflect on my own State, a State with 20 million people, all living within 4 hours of the beach, and 16 million of them are within a half-hour drive of the beaches.

To understand what the sea means to them has not really happened, or to their present or their future. As trivial as it seems, until our volunteer organization published a bibliography of readily available interesting and informative books about the coastal zone in 1971, no one had produced such a simple and useful document.

We were and we are inundated by requests for that and any and all information from students and teachers from every State in the Union, and from a few foreign countries.

There is a void at the lower education level. No one appears to be educating the coastal managers of the future at a time when they could absorb and understand the need for restriction of expansion of resources uses, so it becomes a routine part of their heritage. It would be refreshing to teach the future city councilmen and State legislators while they still have sand buckets and surfboards that resources can be finite.

As to world understanding of coastal management, I think of the thousands of foreign students that come to our country and almost without exception, particularly from the Third World countries, go home and assume a leadership role in their land. A basic course in world ocean resource management should be mandatory

and could be as painless as conquering colloquial English for the foreign students. They should know what will happen to the economic base if the resources are abused or the engineering—the list is endless.

Sea grants could design such a program out of its own infinite resources and probably very easily. As a coastal campaign manager who was and is aware of the lack of easily obtainable information, I read section 6 under “duties” and I can only plead that a public information section be written in with mandates to get outside the academic and governmental halls to the most successful advertising people one can find. The public does not understand the need for resource management, because no one has entertained them with the subject. A little humor, “do you wonder where the fishes went, if you filled our world with sediment” might crack through.

You might do a lot more that way towards public support of wetland management than one in-house study. I do not question the need to expand sea grants resources, nor do I wish to degenerate the research aspects, but it needs expansion and focus in the operating world of local and State government implementation of management plans.

I urge that the services be expanded and public information and education be included. I urge that a real advisory panel be set up in each State, not one made up of administrators.

I urge the community leaders be brought into the process so they can have the backup to say “Don’t fill that marsh, don’t build on that bluff,” and then have the data to back it up.

I urge the planning be coordinated and the future horizons be labeled with obtainable goals.

Your legislation is excellent, and I hope it becomes a law very soon.

Senator PELL. Thank you very much indeed. I was struck with your thoughts about the foreign students who go home and assume important roles in their own nations. That might have a relationship to the international sea grant program too.

Are you familiar with that concept?

Mrs. ADAMS. No, I am not.

Senator PELL. I thank you very much indeed for your statement and for the long journey you had in coming here.

Our next witness is Mr. Roy Martin, National Fisheries Institute, Washington, D.C.

STATEMENT OF ROY E. MARTIN, DIRECTOR OF SCIENCE AND TECHNOLOGY, NATIONAL FISHERIES INSTITUTE; ACCOMPANIED BY GUS FRITSCHIE, DIRECTOR, GOVERNMENT RELATIONS

Mr. MARTIN. Mr. Chairman, I welcome the opportunity to be here today.

I am Roy E. Martin, director of science and technology for the National Fisheries Institute. With me today is Gus Fritschie, NFI’s director of government relations.

The National Fisheries Institute represents more than 500 companies which process and market a vast majority of the fresh, processed, cured, and frozen seafood in this country.

I might mention that the Honorable Senator is one of the recipients of our highest award, the Man of the Year Award.

Senator PELL. I thank you for that. It is a lovely award, and I have it proudly located in my house. I will always remember that evening. Thank you for that.

Mr. MARTIN. The legislation which is before the committee this afternoon to amend the national sea grant program and to provide for the institution of an Office of Marine Resources, Science and Technology within the NOAA, is a subject of much interest to industry, as this Nation seeks to develop its marine resources.

One measure before the committee, S. 709, would establish a National Council on Marine Science, Engineering, and Resource Development in the Executive Office of the President.

While this proposal has much merit, the institute believes that the development of a comprehensive marine science and technology policy can best be promoted within the agency involved, namely, the National Oceanic and Atmospheric Administration.

We do, however, recognize the strong need for an effective spokesman representing the marine resources with the White House.

Therefore, we suggest that this committee evaluate the feasibility for the appointment of a Marine Resources Advisor to the President.

At this time, Mr. Chairman, I would like to specifically comment on title II of the staff working draft, national sea grant program amendments, and address in a more general manner, questions raised by the provisions of title I.

The sea grant program has been a new assist to the commercial industry; it is much more than we ever had prior to the establishment of the program.

Information, research and basic knowledge is now beginning to come forth that we, as this Nation's oldest industry, never had time or funds to develop before. We, as a Nation, are going to need these inputs, if we are to look to the oceans as a new frontier and capitalize on them. Such information is long overdue.

It may be of interest to the Senate to cite but two examples of industry/sea grant interface.

Three weeks ago, the National Fisheries Institute carried its Technical Committee to the campus of Texas A&M University for a 2-day conference to exchange information, discuss sea grant research results, and look to future directions in research needs that will put additional marine resources before the U.S. consumer.

The program was highly successful, pointing out the one real weakness in the present program—communication. This must be improved and strengthened. Our most significant comments were "When can we return and do it again?"

The institute plans to conduct similar visits to other sea grant schools and continue this important dialog.

In another example, the institute has a scholarship fund that supports graduate work in Marine Science and Technology, and through this fund we were approached by a young man at the University of Rhode Island, who had an idea on how to measure the freshness of fish.

From our seed funding of this project, the student went on to convince sea grant, on the basis of his first year's NFI-supported research results, that the research should be supported by a larger grant—that was done, and we now will be testing his new dip stick quick test for seafood freshness. That young man and four others that NFI has supported during the past several years has stayed with the seafood industry, helping us grow professionally and technically.

We feel strongly that the program to date has been underfunded, that additional colleges and universities, especially in the coastal States, should be brought into the program.

We also urge that a greater percentage of the funding in the future be devoted to direct commercial utilization needs. Present estimates put these roughly at 10-12 percent of the program.

Living marine resources constitute one prime basic need—food for man—an additional source of protein. Our continued cooperative goal should be to build each year on our present per capita consumption of only 12 pounds of seafood.

With regard to title I of the proposed legislation, we believe a new office of Marine Science and Technology at this time may be premature.

Without the establishment of a national policy and commitment to the oceans by either Congress or the White House, the creation of another layer of administration under this legislation has little meaning. Perhaps such organization may be determined to be beneficial, after we have measured the impact of the National Marine Fisheries Service National Plan, the Senate's Ocean Policy Study, the Mid-1976 National Planning Conference on the commercial development of the ocean, the Eastland Resolution Study and the Congressional Office of Technological Assessment's Marine Resources Study.

It seems to us that at present this organization would be somewhat duplicate of what presently exists within the NMFS. Until these basic studies are complete, we urge the Congress to proceed with title II concerning sea grant reauthorization and hold for the present the title I considerations, until such time as a national plan shall dictate such implementation.

Because food for man should be the prime concern in our research endeavors, we suggest section 203 definition (5) be changed to reflect this priority. It should read: "the term includes (1) commercial, (2) habitat, (3) biological, (4) conservation, (5) economic, (6) wildlife habitat, (7) recreational, (8) scenic, and (9) esthetic."

Under that same section and again in (8) the following priority is also suggested "(1) fish, (2) shellfish, (3) plant life, (4) wildlife, and (5) mammals."

Under section 205 (b) (2), the Advisory Services have been a very valuable part of the present sea grant program, it has worked extremely well as presently designed. NFI feels it would be ill-advised to subject this part of the present program under any Ocean and Coastal Resources Act. Direct interaction with sea grant research is a vital link in bringing technological transfer down to the user level. The advisory service does not need another level of administration.

Mr. Chairman, it has been a pleasure to appear before your committee today, and I am ready to answer any questions you or members of the committee may wish to ask.

Senator PELL. Thank you very much indeed.

I was struck with your testimony. I found myself particularly sympathetic, as the original sponsor of the sea grant bill, with the fact that more concern should be placed on the commercial application of it. My belief always was that this would be one program where the cost-benefit to the American taxpayers, the businessmen, was going to be about the highest.

And I think your thought is good there.

It is a philosophy that I know that I had in mind in the beginning, and perhaps over the years it has been lost sight of.

In general, on the bill, I gather you are supportive of it. Obviously there are new concepts in it, but we weighed these in advance, we talked it out between our committee staffs and ourselves and the bill as presently written I think is a pretty good one, although out of these hearings and suggestions like yours we may make improvements.

Mr. MARTIN. We would be pleased to assist wherever we can in helping you redraft it.

Senator PELL. One question: In connection with the 200-mile limit, won't that mean a vast expansion in the New England fishery business, because as we move into those areas, the foreign vessels are eased out of them?

Mr. MARTIN. Yes. If we cleverly structure a national plan to go after those particular resources that are there, it will. We must learn to redesign our vessels to do more with the entire catch than we have. We are approaching a time when we can no longer throw some of the catch overboard, we must learn to bring those fish home and use them in all of their many aspects.

Senator PELL. I remember Professor Merman of Yale some 20 years ago did some excellent work with the use of trash fish.

Do you have any programs whereby you are teaching your fishermen to use these fish?

Mr. MARTIN. Yes, we have sponsored in the last 4 years two highly important and significant conferences on just the one technological subject of minced fish, where either a trash fish or what is left over from the normal filleting operations, can now be put through this equipment, and for want of another term, we come out with a product that resembles, let's say, fish hamburger.

Senator PELL. Would it be visceraed before or not?

Mr. MARTIN. Yes, most definitely.

Senator PELL. The insides are not used then?

Mr. MARTIN. That is correct. We think those insides, properly looked at, through something like sea grant research, may yield to us certain drugs or other agents that we are not aware of at the moment. You see, this very same pattern was overlaid by the Department of Agriculture in its inception, in using all of the other byproduct materials of meat to show the commercial industry what might be in what was being thrown away.

We are just at the beginning of doing that for the seafood industry. So sea grant research is extremely important at this time.

Senator PELL. What percentage would you say of the fish that are now tossed back? About a half, a third?

Mr. MARTIN. No, it is more like 70 percent, sir.

Senator PELL. 70 percent in total?

Mr. MARTIN. That is right. Because, you see we have by tradition developed fisheries that go for a specific fish. We have a halibut industry, a salmon industry, we have a shrimp fishery. And what else is brought aboard usually is not kept in most instances.

Senator PELL. If it is a 70 percent reject rate, most of the fish that are thrown back are dead?

Mr. MARTIN. That is correct.

Senator PELL. So what you are really saying is the fishery production of the world could be tripled if every fish that was caught was kept.

Mr. MARTIN. That is correct.

Senator PELL. That is quite a startling thought.

Mr. MARTIN. Now we must learn to manage it. We must learn to use the right sized nets to give us either an optimum yield or a maximum yield, depending on what our biologists tell us we can actively fish for.

Senator PELL. And also I know I have always had the thought, again in the original sea grant legislation, that we should have access of the ocean, or areas of water in the Great Lakes, that would be turned over to the States, like land was turned over in the land grant colleges, to be turned over to sea grant colleges, and they could stake out and actually cultivate and grow fish there.

How you make the fences would be a problem. We had electric pulsating rays under discussion for this at one time.

Have you given any thought to that idea, something like a fish ranch?

Mr. MARTIN. That we have considered and the point on the Great Lakes is well taken. It could be the Nation's greatest aquaculture pond. But we have an overriding problem with inland waters, that water seems to be everyone's sink, and we wind up with all of the contaminants of the world that we must contend with in our final resources.

So that must be considered. But of those new techniques you just mentioned we have not had the capital to take a look at those possibilities. Those results should be put into a framework, as should aquaculture, to show industry that here is a potential for you and as a business enterprise, and work it out on that basis.

Senator PELL. I think if you had the opportunity to go to China, you would find it very interesting.

I went there last summer, and I saw in all of the farms, the communes, from 5 to 10 percent of the area would be in water ponds, and they would cultivate in the ponds fish they would harvest. And they would harvest them at 4-month intervals. They either had nets that could be lowered to catch the bottom-feeding fish, or nets on the surface to catch the top-feeding fish, and as I say, every 3 or 4 months they would harvest that pond.

And they looked at fish as they should be looked upon, as a feed animal, not as we continue to look on it in our country as game to be chased and caught.

Mr. MARTIN. You see, our economy is based on red meat and we have devoted most of our research to feed our people protein from the land. We are just beginning to discover the exciting new field

of fishery research that can then give us these protein sources from the sea.

Senator PELL. I think more and more people are becoming like myself; I have not willingly ordered red meat for about 4 years to eat, I always go to fish if I have a choice.

I think people feel better for this, and this habit will gradually prove contagious, if for no other reason than good health.

I thank you, and again when I see that lovely glass fish when I go home tonight, I will think of your testimony and the good work that the National Fisheries Institute does.

Mr. MARTIN. Thank you, Senator.

Senator PELL. Our final witness today is Mr. Charles D. Matthews, National Ocean Industries Association, Washington, D.C.

STATEMENT OF CHARLES D. MATTHEWS, NATIONAL OCEAN INDUSTRIES ASSOCIATION, WASHINGTON, D.C.

Mr. MATTHEWS. With your kind permission, I have a 19 page statement that I will submit for the record, and I will highlight it if that is acceptable.

Senator PELL. Absolutely. Your statement will be placed in the record in full.

Mr. MATTHEWS. I am Charles D. Matthews, president of the National Ocean Industries Association, on whose behalf I am appearing here today.

NOIA is a Washington-based trade association serving as the legislature and administrative spokesman at the Federal level for almost 300 member companies which are engaged in the many facets of the Nation's offshore and ocean-oriented activities. These member companies include almost every different type of endeavor and can truly be considered as the most vital ingredient in an effective national ocean program.

Mr. Chairman, the National Ocean Industries Association applauds the serious and conscientious efforts of the distinguished members of these honorable Senate committees to come to terms with the need for a strong ocean program.

We are enthusiastic in our support of the statement of policy and the enumerated objectives of the U.S. marine science activities as stated in section (2) of Senator Humphrey's bill, S. 709.

We are also in accord with your evident recognition of the need to improve the utilization and conservation of ocean and coastal resources, but we may differ with some of the ways the proposed Ocean and Coastal Resources Act of 1976 would attempt to meet the need. And we heartily endorse your announced purpose of re-authorizing and improving the national sea grant program.

Again, however, we do not agree with the suggested method to accomplish this purpose as contained in the proposed Ocean and Resources Act.

In summary of our general overall position, then, it may be said that while we may agree with the announced "ends" of the proposals, we heartily disagree with the specifically stated "means" in staff working draft No. 2 of the Ocean and Coastal Resources Act of 1976.

It is our intention, therefore, to attempt to assist the members of these honorable Senate committees in your sincere desire to solve the pressing national problems relating to the ocean program.

With your kind permission, we will do this by systematically going through the three pieces of legislation here before you and commenting on specific provisions.

But let me emphasize that we do this in a spirit of friendship and cooperation and with a sincere desire to help clarify these issues. Some of the points we will raise may appear to be nitpicking, but be assured they are not intended to be.

The precise statement of law will reduce the possibility of misunderstanding or misinterpretation and will minimize the possibility of some future Federal judge turning the intent of the Congress around by his opinion of what might have been meant by the law.

Now let us begin on page 1 of the staff working draft No. 2 dated March 12, 1976.

Even the long title of the bill starts right out by creating an impression of the legislation which is somewhat misleading because it states it to be "A bill to establish a national marine science and technology policy of the United States, to extend the national sea grant program, and for other purposes."

However, throughout the bill many of the provisions are related more directly toward the development of ocean resources rather than to the establishment of a national science and technology policy.

Nowhere is there clear and concise statement of national policy. Those three little words at the end, "for other purposes," really have to cover a multitude of things. In fact, the short title does not appear to have anything to do with the long title. The short title is: "Ocean and Coastal Resources Act of 1976."

This seeming dichotomy between the long title and the short title gives the proposed bill a split personality from the beginning, which confuses its real purpose throughout the remainder of the bill.

Title I on page 3, The Marine Science Technology policy is supposed to contain a "declaration of Policy and National Principles." However, section 101 is merely a statement of congressional findings. NOIA can find little fault with section 101(a) (1) because, as pointed out in the introductory part of our prepared remarks which were submitted for the record, those are the kinds of activities in which the member companies of this association are engaged. They do supply food, energy, and minerals through the development and wise application of marine science and technology and do contribute to health and quality of the environment, the national security, and the enhancement of commerce. But, section 101(a) (1) is not a declaration of congressional policy.

Section 101(a) (2) (A) suggests that a successful marine resources, science and technology program for the United States would require the establishment and maintenance of a strong research capability in Government. This is the first point in which we come to a very strong disagreement with the stated position in staff working draft No. 2. NOIA does not believe a successful marine program requires the establishment within the Federal Government of a strong re-

search capability. The Federal Government may have some scientific and technological oversight responsibilities for ocean programs. It may even need to employ scientists and technicians to evaluate and coordinate Federal participation in the research activities of industry and educational institutions. But, this does not mean that the Federal Government should establish a strong research capability of its own in direct competition with educational or proprietary businesses.

NOIA has recently had the unfortunate experience of having a member of the Board of Directors resign and his private marine biological research firm withdraw from our membership because the company was forced into bankruptcy due to the inability to compete economically with the Federal Government's in-house activities.

These statements of NOIA concerning the direct involvement of the Federal Government in proprietary activities are based upon our very strong belief that it is in the national interest to preserve and strengthen this Nation's traditional concepts of free private investment enterprise.

Let me remind you the basic national policy approved by the Congress regarding resource development has always been and continues to be that the exploration, development, and utilization of the natural resources of this Nation, including ocean and coastal resources, should be accomplished through private investment enterprise.

Subsection (D) provides that a successful science and technology program requires "prompt dissemination and ready availability to potential users of the knowledge gained through research." This provision should be written to clarify that confidential and proprietary information should be protected and the dissemination of information should be limited to data gained through research "funded by the Federal Government." The concept of protecting confidential or proprietary information is clearly set forth in laws going all the way back to the Constitution of the United States. Nothing done by Congress in this context, or in any other pending legislation, should be construed as abrogating that basic and fundamental concept.

Section 101(b) really lays out on the table the fundamental purpose of this legislation as envisioned by its authors.

It states clearly and unequivocally that: "It is therefore declared to be the purpose of the Congress in this title to recognize the NOAA as the central focus for the planning, development, and implementation of a successful marine resources, science and technology program for the United States."

Let me highlight that again. NOAA will be the central focus for the development of a successful marine resources program for the United States.

In this avowed purpose, Mr. Chairman, the National Ocean Industries Association does not concur.

While we recognize it has long been the goal and ambition of the distinguished junior Senator from South Carolina to create an independent department of ocean affairs using the NOAA as the central focus for that operation, we do not concur in the approach

taken by the staff in working draft No. 2 to accomplish that goal, desirable as it may be. We agree there should be a central focus in the Federal Government for coordinating its marine science and technology program. But we were of the opinion that is what NOAA is already intended to do.

Furthermore, it is our opinion that if NOAA is the central focus for marine science and technology in the Federal establishment, as we believe to be the case, then it is not necessary to create another level of subordinate bureaucracy below the Administrator level such as the Office of Marine Resources, Science, and Technology to carry out the responsibilities which should be totally with the Administrator.

We also believe the present responsibilities of the Department of the Interior for the development and management of marine mineral and energy resources of the Outer Continental Shelf, and beyond, should not be confused and clouded by such an intrusion of NOAA into those activities as is called for in working draft No. 2. There are certain other science and technological activities of a national defense nature that are currently being carried on in various offices of the Department of Defense which also should not be interfered with by a bureaucratic reorganization such as herein proposed.

Subsection (3) relates to applied rather than basic research and the staff draft provides it "should receive continuing support from the Federal Government in order to achieve the management, conservation, protection and enhanced utilization of living and non-living resources of the oceans and coastal zone."

If this provision means the applied research in the management of ocean resources is to be carried out in the "strong research capability in government," previously discussed, then we must vigorously oppose such a concept.

However, since we generally consider that applied research in marine science and technology is primarily carried on within the industrial sector of the economy by companies such as the members of the National Ocean Industries Association, and if this provision in the draft means only the Federal Government should continue to support such industrial activities, then we would say this is a good idea and we look forward to the continuation of such support.

However, the full meaning and implication of this subsection is not clear and we would suggest very strongly the subsection be strengthened to recognize—as the Marine Resources and Engineering and Development Act of 1966 recognized—that "the marine science activities of the United States should be conducted so as to contribute to the encouragement of the private investment enterprise in exploration, technological development, marine commerce, and economic utilization of the resources of the marine environment."

Subsection (e) of section 102, providing for research assistance, should be revised in such a way as to assure that Federal financial assistance be made available only where the necessary research or development of science and technology is in the national interest and it not or cannot be done by non-Federal entities without the proposed financial assistance.

This point is almost made in subsection (e) when it provides that "such assistance is for the purpose of insuring that the objectives of sections 101(c) and 102(d) are being carried out when existing programs are not able to provide the necessary assistance."

The thrust of my suggestion is that there are other circumstances where existing programs may not be providing necessary assistance, but financial aid is coming from nongovernmental sources and, therefore, the expenditure of Federal funds is unnecessary.

We have several additional questions or points which should be brought before these Committees. For example, section 103(a), in setting forth the requirements for an annual report on marine science, provides that such a report shall include "a general description of marine science and technology projects and programs conducted or assisted by the Federal Government."

This provision clearly indicates it to be the intention of the staff drafters that the Federal Government will conduct science and technology projects and programs. We believe this kind of activity, as you know, is contrary to the best interests of this country.

Mr. Chairman, we will now turn our attention to title II of the proposed Ocean and Coastal Resources Act of 1976 which provides for amendments to the national sea grant program.

While we do not believe a national sea grant program is so perfect it cannot be improved; at the same time, we do not believe the national sea grant program is so inadequate that it must be as drastically revised as suggested in Title II.

We recognize the authorization for appropriations to continue this program is running out; and, therefore, some legislative action is imperative. However, it does not seem to us to be serving the best interest of the Nation or of the program to take advantage of this need for legislative action to overburden the poor ship known as sea grant with a load such as contained in title I of the staff draft and even the involved nature of the proposed amendments in title II. This burden could well swamp this worthwhile program.

The third item on the committee's agenda is "an executive communication to extend the sea grant program."

This proposed bill would clearly, in a straightforward manner without dubious and devious appendages, extend the appropriation authorization for the National Sea Grant College and Program Act of 1966 for the fiscal years of 1977 to 1979. Enactment of this proposal would clear the necessary legislative slate and then allow the Congress ample opportunities to more seriously and thoughtfully consider fundamental changes in the national ocean program such as those suggested in the staff draft of the Ocean and Coastal Resources Act of 1976.

We would humbly suggest that this is not the time or the place to sacrifice the worthwhile sea grant program for a major power play such as this.

Mr. Chairman, the second piece of legislation under consideration by these two distinguished committees is the Marine Science, Engineering, and Resources Development Act of 1975, S. 709, introduced on February 18, 1975, by Senator Hubert Humphrey.

Section 2 of the bill reiterates the basic declaration of policy which was contained in the Marine Resources and Engineering Act of 1966.

I would like to repeat again for emphasis that the 1966 act and Senator Humphrey's bill, S. 709, provide that it is the policy of the U.S. Government to "encourage private investment enterprise in exploration, technological development, marine commerce and economic utilization of the resources of the marine environment."

This is not a new and novel concept. It goes back into the late 19th century in the mining laws of this Nation and has been reiterated in the Mineral Land Leasing Act of 1920, the Atomic Energy Act of 1954, the Mining and Minerals Policy Act of 1970, and so on up until today.

Mr. Chairman, and distinguished members of the hearing panel, I think we can all agree that there is a need for a reexamination and a sharper focus of the national ocean resource development program and the need for a new emphasis on the marine sciences and technology as the Nation goes into its third century.

But, Mr. Chairman, this is not the time to destroy or hobble our Nation's industrial enterprises upon whom the public must depend for future development if we are going to continue to strengthen and improve the economic system which has made America the envy of the world.

Perhaps the best action which these two distinguished committees and the Congress can take would be to approve S. 709 as a means of focusing the activities within the Federal establishment, and by approving the simple extension of the appropriation authorization for the sea grant program for fiscal years 1977 to 1979.

The late President Lyndon Johnson said: "It is not difficult to do what is right, but to know what is right."

Mr. Chairman, NOIA believes that S. 709 and the proposal by the administration to extend sea grants presents the Congress with the best answer to the question "What is the right thing to do at this juncture in our nation's history and development?"

Thank you, Mr. Chairman. That concludes my statement.

Senator PELL. If you believe sea grant is a worthwhile program and support it, would you not support a higher authorization than the administration bill, which is only \$25 million?

Mr. MATTHEWS. Yes. In a word, yes, we would support a larger authorization.

All I am saying is that a simple extension, even with an improved or increased authorization would be sufficient at this time; because of the need to move on with the authorization. Then let's sit down and work together on the other provisions of the suggested bills.

To quote President Johnson again, "Let's reason together" as he was so fond of saying, and we want to work with the staff in doing that.

Senator PELL. That is very much appreciated. Thank you very much indeed, Mr. Matthews.

[The statement follows:]

STATEMENT OF CHARLES D. MATTHEWS, PRESIDENT, NATIONAL OCEAN
INDUSTRIES ASSOCIATION

Mr. Chairman and distinguished members of the Committees on Commerce and on Labor and Public Welfare, I am Charles D. Matthews, President of the National Ocean Industries Association on whose behalf I am appearing today. NOIA is a Washington-based trade association serving as the legislative and

administrative spokesman at the federal level for almost 300 member companies which are engaged in the many facets of the Nation's offshore and ocean-oriented activities. These member companies include almost every different type of endeavor and can truly be considered as the most vital ingredient in an effective national ocean program.

... It is upon companies, such as the NOIA members, that the American people must rely for the "development and wise application of marine science and technology."

... It is companies, such as the NOIA members, which will "satisfy many human needs and contribute to the achievement of national and international objectives."

... It is companies, such as the NOIA members, which can assure that "the oceans and the coastal zone can supply food, energy, and minerals, and can contribute to human health and the quality of the environment, the national security, and the enhancement of commerce."

These NOIA member companies have been, and will continue to be the world's leaders in ocean science and technology unless the Congress in an unwise move literally legislates them out of business. They include air and marine transportation companies, drilling contractors, fishing operations, geophysical and geological surveying and expolariton, manufacture and supply of offshore and ocean-related equipment, mineral and energy producers, ocean construction companies, pipeline operators, service companies, shipyards, and others.

The almost 300 NOIA member companies have their headquarters in 26 states and the District of Columbia but they have facilities in almost every one of the 50 states. Many are small businesses, employing just a few workers, but they all have a direct involvement in ocean affairs and have an economic stake in the satisfactory resolution of this problem of providing for a coordinated national ocean program. So you can understand why we appreciate the invitation by Chairman Magnuson to present these views on such important proposals as these pending before you today.

Mr. Chairman, the National Ocean Industries Association applauds the serious and conscientious efforts of the distinguished members of these honorable Senate committees to come to terms with the need for a strong ocean program. We are enthusiastic in our support of the statement of policy and the enumerated objectives of the United States marine science activities as stated in Section (2) of Senator Humphrey's bill—S. 709. We are also in accord with your evident recognition of the need to improve the utilization and conservation of ocean and coastal resources, but we may differ with some of the ways the proposed Ocean and Coastal Resources Act of 1976 would attempt to meet the need. And, we heartily endorse your announced purpose of reauthorizing and improving the National Sea Grant Program. Again, however, we do not agree with the suggested method to accomplish this purpose as contained in the proposed Ocean and Coastal Resources Act. In summary of our general over-all position then, it may be said that while we may agree with the announced "ends" of the proposals, we heartily disagree with the specifically stated "means" in Staff Working Draft No. 2 of the Ocean and Coastal Resources Act of 1976.

It is our intention, therefore, to attempt to assist the members of these honorable Senate committees in your sincere desire to solve the pressing national problems relating to the ocean program. With your kind permission, we will do this by systematically going through the three pieces of legislation here before you and commenting on specific provisions. But let me emphasize that we do this in a spirit of friendship and cooperation and with a sincere desire to help clarify these issues. Some of the points we will raise may appear to be nit-picking; but, be assured they are not intended to be. The precise statement of law will reduce the possibility of misunderstanding—or misinterpretation—and will minimize the possibility of some future Federal Judge turning the intent of the Congress around by his opinion of what might have been meant by the law.

Now, let us begin on page 1 of the Staff Working Draft No. 2 dated March 12, 1976.

Even the long title of the bill starts right out by creating an impression of the legislation which is somewhat misleading because it states it to be: "A bill to establish a national marine science and technology policy of the United States, to extend the national sea grant program, and for other purposes." However, throughout the bill many of the provisions are related more directly toward the development of ocean resources rather than to the establishment of

a national science and technology policy. Nowhere is there clear and concise statement of national policy. Those three little words at the end, "for other purposes", really have to cover a multitude of things. In fact, the short title does not appear to have anything to do with the long title. It says, "Ocean and Coastal Resources Act of 1976."

This seeming dichotomy between the long title and the short title gives the proposed bill a split personality from the beginning which confuses its real purpose throughout the remainder of the bill. It should be made more clear whether the intent of these honorable committees is to establish a national marine science and technology policy or to provide for some system of ocean and coastal resource development by the federal government. This difficulty is not clarified by Section 2 which states the purpose of the Act is to improve the utilization and conservation of ocean and coastal resources through the encouragement of marine science and technology directed toward the wise development of ocean and coastal resources. Subsection (2) of Section 2 also says that the establishment of an Office of Marine Resources, Science and Technology will be to stimulate and coordinate development among other things. It is not made clear how this marine science and technology policy (which is not precisely stated) is going to encourage resource development and by whom.

Title I on Page 3—Marine Science and Technology Policy—is supposed to contain a "Declaration of Policy and National Principles." However, Section 101 is merely a statement of congressional findings. NOIA can find little fault with Section 101(a) (1) because as pointed out in the introductory part of these remarks those are the kinds of activities in which the member companies of this association are engaged. They do supply food, energy, and minerals through the development and wise application of marine science and technology and do contribute to health and the quality of the environment, the national security, and the enhancement of commerce. But, Section 101 (a) (1) is not a declaration of congressional policy.

Section 101 (a) (2) (A) suggests that a successful marine resources, science, and technology program for the United States would require the establishment and maintenance of a strong research capability in government. This is the first point in which we come to a very strong disagreement with the stated position in Staff Working Draft No. 2. NOIA does not believe a successful marine program requires the establishment within the federal government of a strong research capability. The federal government may have some scientific and technological oversight responsibilities for ocean programs. It may even need to employ scientists and technicians to evaluate and coordinate federal participation in the research activities of industry and educational institutions. But, this does not mean that the federal government should establish a strong research capability of its own in direct competition with educational or proprietary businesses. NOIA has recently had the unfortunate experience of having a member of the Board of Directors resign and his private marine biological research firm withdraw from our membership because the company was forced into bankruptcy due to the inability to compete economically with the federal government's in-house research activities.

These statements of NOIA concerning the direct involvement of the federal government in proprietary activities are based upon our very strong belief that it is in the national interest to preserve and strengthen this nation's traditional concepts of free private investment enterprise. We would not want to believe that conscientious members of these honorable Senate committees are ready in this bicentennial year, to approve legislation that would significantly contribute to the destruction of the very economic system upon which this nation was built. Let me remind you again of an important fact. The basic national policies approved by the Congress relative to resource development have always been and continue to be that the exploration, development and utilization of the natural resources of this nation, including ocean and coastal resources, should be accomplished through private investment enterprise. In this regard let me digress a moment from my sequence of comments to note a provision in S. 709 to buttress this point. Page 2, line 12 of S. 709 clearly restates that the marine science activities of the United States should be conducted so as to contribute to "the encouragement of private investment enterprise in exploration, technological development, marine commerce, and economic utilization of the resources of the marine environment." It is because of this kind of statement that NOIA expressed endorsement of the objectives of S. 709 in the introductory part of this testimony. This strong statement of national policy should

not be minimized or abrogated by the unwise requirement in this legislation that there be established in the federal government a strong research capability.

Subsections (B) and (C) of this section do not cause us any serious concern except the rather loose construction still does not make it absolutely clear as to who will have the primary responsibility for some of the activities.

Subsection (D) provides that a successful science and technology program requires "prompt dissemination and ready availability to potential users of the knowledge gained through research." This provision should be rewritten to clarify that confidential and proprietary information should be protected and the dissemination of information should be limited to data gained through research "funded by the federal government." The concept of protecting confidential or proprietary information is clearly set forth in laws going all the way back to the Constitution of the United States. Nothing done by the Congress in this context, nor in any other pending legislation, should be construed as abrogating that basic and fundamental concept.

Subsection (F) of Section 101 (a) (2) also provides that the program would require the "investment and efficient expenditure of public funds." This is certainly not true in all cases and the subsection should be clarified to provide that limited public funds should be expended only where such expenditures are absolutely necessary and are not forthcoming from non-federal sources or will not be forthcoming from non-federal sources.

Subsection (G) provides that the program requires "coordination of effort to avoid duplication, waste, and delays." This subsection, we believe, is virtually important; and, in it, we completely concur.

At this point, the drafters of Staff Working Paper No. 2 should have stopped while they were ahead. But instead they went on in subsection (H) to say a successful marine program requires leadership from the federal government. Since I have already pointed out that much of the leadership of ocean science and technology development has been coming from and will continue to come from the private sector, it is difficult to accept the statement that for a program to be successful there must be federal leadership. The drafters also said a successful program would require encouragement from the federal government. In this view, we might concur but certainly not that leadership must come from the federal government. Unfortunately, they even go on to say in this subsection that such a program would require the establishment "within the federal government, of a central focus for the implementation of policy and the promotion of marine science and technology activities." While it may be possible for NOAA to concur that it would be beneficial to have a central focus for the promotion of marine science and technology activities, we are not sure it would be beneficial to have that same central focus be responsible for resource development which, as I pointed out earlier, is the second part of this schizo-legislation. Even though Title I of this working draft is supposed to be the statement of marine science and technology policy, I can find no place in the title where there is a clear and concise statement of national policy.

Section 101 (b) really lays out on the table the fundamental purpose of this legislation as envisioned by its authors. It states clearly and unequivocally that:

"It is therefore declared to be the purpose of the Congress in this title to recognize the National Oceanic and Atmospheric Administration as the central focus for the planning, development, and implementation of a successful marine resources, science, and technology program for the United States, . . ."

Let me highlight that again. NOAA will be the central focus for the development of a successful marine resources program for the United States. In this avowed purpose, Mr. Chairman, the National Ocean Industries Association does not concur.

While we recognize it has long been the goal and ambition of the distinguished junior Senator from South Carolina to create an independent department of ocean affairs using the National Oceanic and Atmospheric Administration as the central focus for that operation, we do not concur in the approach taken by the staff in Working Draft No. 2 to accomplish that goal—desirable as it may be. We agree there should be a central focus in the federal government for coordinating its marine science and technology program. But, we were of the opinion that is what NOAA is already intended to do.

When NOAA was established in 1970, the announced goals included (1) development and execution of a national program to insure identification, management, and conservation of marine resources for the economic and social good of the nation; (2) the development and operation of a national system to moni-

tor and predict weather and environmental conditions for protecting life and property, and to increase the efficiency and productivity of the government, industry, and the individual; (3) the preservation and development of the nation's coastal resources by assisting the states and other public agencies in the wise management of land and water resources of the coastal zone; and (4) the provision of the basic maps, charts, surveys, and specialized data required for safe navigation and accurate location.

We believe, however, that if the staff would have the Congress go beyond those stated broad goals in an attempt to assign the National Oceanic and Atmospheric Administration the lead-agency responsibility for development of a marine resources program—when those resources are defined in other sections of this working draft to include minerals and energy resources in the Outer Continental Shelf and beyond—then this proposal goes much too far.

Furthermore, it is our opinion that if NOAA is the central focus for marine science and technology in the federal establishment as we believe to be the case, then it is not necessary to create another level of subordinate bureaucracy below the Administrator level such as the Office of Marine Resources, Science and Technology to carry out the responsibilities which should be totally with the Administrator.

We also believe the present responsibilities of the Department of the Interior for the development and management of marine mineral and energy resources of the Outer Continental Shelf should not be confused and clouded by such an intrusion of NOAA into those activities as is called for in Working Draft No. 2. There are certain other science and technology activities of a national defense nature that are currently being carried on in various offices of the Department of Defense which also should not be interfered with by a bureaucratic reorganization such as herein proposed.

It would be much more productive if the present thrust of congressional and federal executive department thinking and activities were directed toward minimizing or reducing federal bureaucracy, burdensome regulation, and excessive paper work. There is a federal commission established by law in 1974 to work on this problem. But, the suggestions contained in Working Draft No. 2 seems to be working at direct cross purposes with these worthwhile goals set forth by the Congress in establishing the commission. We would be very happy to work with the members of the committees or your staffs to reverse the trend towards increased bureaucracy and make concrete suggestions for the reduction of additional bureaucracy, regulatory interference, and unnecessary paper work.

Section 101 (c) is a statement of National principles to be followed if this legislation were to be enacted. It seems that frequently when the staff drafters restate the suggested purposes or principles, they go a little farther than previously. For example, subsection (1) under this section brings in for the first time the "effective and proper management . . . of the ocean . . . resources." As pointed out just a moment ago, the effective and proper management from a federal point of view of these ocean resources does and should reside in the Department of the Interior rather than in a reorganized and strengthened National Oceanic and Atmospheric Administration. This subsection goes on to state that an effective and proper management of the ocean resources requires a "continuing assessment of national policies." May I reiterate, the established national policy is to encourage private enterprise development of ocean resources rather than to have the federal government so directly involved. Subsection (1) concludes by observing, "Basic research; applied research; and technological development, application, and transfer; and education and training programs are all prerequisites for the achievement of these objectives." I would suggest to the drafters of this legislation that there be a clarification of this provision because there is no statement of what these "objectives" might be. There is a statement of "purposes" and of "principles," but no statement of what these "objectives" are or might be.

Section 101 (c) (2) relates to basic research in marine science. The Staff Working Draft No. 2 says, "Such basic research should be fostered by the federal government through the encouragement and support of theoretical and empirical efforts . . ." While I realize that it is often difficult to get basic research adequately funded, I would anticipate that the federal government might "foster" basic research only by making financial assistance available in those areas and at those times when adequate funding is not otherwise available or will not be otherwise available from non-federal sources.

Subsection (3) relates to applied rather than basic research and the staff draft provides it "should receive continuing support from the federal government in order to achieve . . . the management, conservation, protection, and enhanced utilization of living and non-living resources of the oceans and coastal zone." If this provision means the applied research in the management of ocean resources is to be carried out in the "strong research capability in government," previously discussed, then we must vigorously oppose such a concept. However, since we generally consider that applied research in marine science and technology is primarily carried on within the industrial sector of the economy by companies such as the members of the National Ocean Industries Association; and, if this provision in the draft means only the federal government should continue to support such industrial activities, then we would say this is a good idea and we look forward to the continuance of such support. However, the full meaning and implication of this subsection is not clear and we would suggest very strongly the subsection be strengthened to recognize—as the Marine Resources and Engineering and Development Act of 1966 recognized—that "the marine science activities of the United States should be conducted so as to contribute to the encouragement of the private investment enterprise in exploration, technological development, marine commerce, and economic utilization of the resources of the marine environment."

Subsection (4) of Section 101 (c) relates to technological development, application, and transfer and says this should be advanced through "federal programs of engineering development and technological innovation." Again, we question the precise meaning of the phrase "federal programs of engineering development." Since the staff drafters of the legislation already seem intent on building an in-house research capability in the federal government, we are concerned that a possible interpretation of this subsection would mean a control or direct carrying out of engineering development. We know the subsection goes on to say the technological development, application, and transfer should be advanced to encouragement of private investment and technological development; and in this part of the subsection, we concur completely and applaud the drafters. But, this concept should be pre-eminent and any federal activity should be limited to those areas and opportunities unavaialbe or unfulfilled by private investment.

Subsection (4) continues by calling for "public participation in the decision making process relating to technological development, application, and transfer." If this means there should be "public participation" in "private investment" decision making processes (since these two clauses are in juxtaposition in the subsection), this is a very serious intrusion in the established concepts of private enterprise and the responsibility of companies to make their own decisions and to suffer the consequences thereof.

Section 102 provides for the establishment of the "Office of Marine Resources, Science and Technology," and we have already expressed ourselves on this proposition. But a restatement of our position may be made in one sentence. NOIA feels the establishment of this Office is unnecessary bureaucracy and should not be undertaken.

If, however, such a provision is to be included in suggested legislation which might be enacted, it is appropriate to discuss the section and the provisions therein.

Section 102. (c) setting forth the duties of the Office, provides in subsection (2) it "shall coordinate marine research, technology development, and demonstration programs and projects within the Administration . . . and may initiate . . . demonstration programs and projects." The Association must seriously oppose the initiation or development of demonstration programs or something like pilot projecting by NOAA. This goes beyond the necessary and proper functions of the federal government and is even more objectionable than merely the coordinating of other demonstration programs and projects carried out by industry or other non-governmental units.

Subsection (3) provides that the Office shall "undertake technology assessment." Does this mean that the Office will duplicate or replace the Congressional Office of Technology Assessment which has been so helpful to the National Ocean Policy Study in its undertakings? If it does not, is this not more duplication which other parts of the legislation seeks to reduce?

Subsection (6) provides that the Office "shall establish and maintain an information service . . . for the prompt and timely dissemination . . . of the results of marine research." Has not the National Ocean Policy Study already

conducted examinations of existing "information services" and have they not reported there are presently too many government agencies having information services? Does this subsection mean that by rather simply adding another layer of information service to an admittedly already overly enlarged group, it may actually reduce the amount of federal bureaucratic activity by combining many or all the existing services into this one facility?

Subsection (9) gives the Office authority to "initiate and promote cooperative research and development projects and programs involving the Administration . . ." If the cooperative activity with the other enumerated entities such as State and local governments, private industry, universities, and individual qualified persons is only in the form of financial support, we would probably not oppose this activity. However, if the initiation of research and development projects should be carried out in the research capability established within the federal government, then we would be opposed.

Section 102 (d) sets forth the requirements for a six-year plan for "research and development in marine science and technology and for the demonstration and practical implementation of marine science and technology development." The development of such a plan would be beneficial because it would give some over-all focus and attention to the long-range goals and aspirations of a national research program. This is particularly true since the plan would be worked out in cooperation with the National Academies of Science and Engineering, NACOA, the academic community, industry, State and local governments, and all other interested parties. However, we must repeat the actual work should not be carried out by the federal government.

Subsection (e), providing for research assistance, should be revised in such a way as to assure that federal financial assistance be made available only where the necessary research or development of science and technology is in the national interest and is not or cannot be done by non-federal entities without the proposed financial assistance. This point is almost made in subsection (e) when it provides that "such assistance is for the purpose of insuring that the objectives of section 101 (c) and 105 (d) are being carried out when existing programs are not able to provide the necessary assistance." The thrust of my suggestion is that there are other circumstances where existing programs may not be providing necessary assistance but financial aid is coming from non-governmental sources and therefore the expenditure of federal funds is unnecessary.

Subsection 102 (f) provides for the establishment of a National Ocean and Coastal Advisory Service. NOIA believes that such an advisory service could prove to be beneficial but that it should remain closely tied to the known needs of a possible recipient of the services through state activities or through local sea grant organizations. The provisions of subsection (c) relative to a comprehensive plan seem to recognize this need.

Mr. Chairman and distinguished members of the hearing panel, perhaps it seems as though I have spent an inordinate amount of time discussing the concerns and thoughts NOIA has on these first few provisions of the Staff Working Draft No. 2. I have felt this to be important because these are the sections in which the basic attitude and philosophy of the proposed new governmental structure is set forth.

We have several additional questions or points which should be brought before these committees. For example, Section 103 (a), in setting forth the requirements for an annual report on marine science, provides that such a report shall include "a general description of marine science and technology projects and programs conducted or assisted by the federal government." This provision clearly indicates it to be the intention of the staff drafters that the federal government will conduct science and technology projects and programs. We believe this kind of activity, as you know, is contrary to the best interest of this country.

Subsection (b) of Section 103 authorizes the Administrator to secure information required to prepare such a report directly from any executive department, agency, or independent instrumentality in the federal government. Since the required report is so all-inclusive relative to project programs, personnel, vessels, facilities, equipment, and so forth, the requirement that each department furnish information upon request leads us to the natural question as to whether this includes proprietary information supplied to the certain government agencies under other programs. A considerable amount of time and effort was expended with the Senate Commerce Committee and with the Senate

Interior and Insular Affairs Committee on clarifying the status of certain resource information on the Outer Continental Shelf during hearings and considerations of S. 521, the proposed amendments to the Outer Continental Shelf Lands Act. We would simply repeat here—any requirement that information be supplied to the NOAA Administrator should carry with it the same restrictions and prohibitions as to the use or public availability of those data as now exist in law. Other provisions to Title I will not be touched upon on this time.

Mr. Chairman, we will now turn our attention to Title II of the proposed Ocean and Coastal Resources Act of 1976 which provides for amendments to the national sea grant program. While we do not believe a national sea grant program is so perfect it cannot be improved; at the same time, we do not believe the national sea grant program is so inadequate it must be as drastically revised as suggested in Title II. We recognize the authorization for appropriations to continue this program is running out, and, therefore, some legislative action is imperative. However, it does not seem to us to be serving the best interest of the nation or of the program to take advantage of this need for legislative action to overburden the poor ship known as Sea Grant with a load such as contained in Title I of the staff draft and even the involved nature of the proposed amendments in Title II. This burden could well swamp this worthwhile program.

The third item on the committee's agenda is "an Executive Communication to extend the Sea Grant program." This proposed bill would clearly—in a straightforward manner without dubious and devious appendages—extend the appropriation authorization for the National Sea Grant College and Program Act of 1966 for the fiscal years of 1977–1979. Enactment of this proposal would clear the necessary legislative slate and then allow the Congress ample opportunities to more seriously and thoughtfully consider fundamental changes in the national ocean program such as those suggested in the staff draft of the Ocean and Coastal Resources Act of 1976. We would humbly suggest that this is not the time or the place to sacrifice the worthwhile sea grant program for a major power play such as this.

Mr. Chairman, the second piece of legislation under consideration by these two distinguished committees is the Marine Science, Engineering and Resources Development Act of 1975—S. 709—introduced on February 18, 1975 by Senator Hubert Humphrey (D-Minn.). Earlier in my remarks, I did refer to one provision of this bill; but, with the permission of the committees, I will now direct my remarks to S. 709.

Senator Humphrey's bill would primarily re-establish the National Council on Marine Science and Engineering which was allowed to go out of existence in 1971. Section 2 of the bill also reiterates the basic declaration of policy which was contained in the Marine Resources and Engineering Act of 1966. I would like to repeat again for emphasis that the 1966 Act and Senator Humphrey's bill, S. 709, provide that it is the policy of the United States Government to "encourage private investment enterprise in exploration, technological development, marine commerce, and economic utilization of the resources of the marine environment." This is not a new and novel concept. It goes back into the late 19th century in the mining laws of this nation and has been reiterated in the Mineral Land Leasing Act of 1920, the Atomic Energy Act of 1954, the Mining and Minerals Policy Act of 1970, and so on up until today.

Section 2 (b) reiterated the statement of the eight objectives contained in the Marine Resources and Engineering Act of 1966 with minor variations. Beginning on page 3, line 10 and continuing through line 18, Senator Humphrey adds three new objectives to be followed by the marine science activities. They are to improve cooperation among federal and state governments, to provide for the protection of life and property associated with the marine environment by adequate safety standards, and the protection of the marine environment by conscientious development to ensure its use by future generations.

Section 3 of the bill would establish a National Council on Science, Engineering, and Resources Development which is a slight revision and renaming of the old National Council on Marine Resources and Engineering and Development which was allowed to expire in 1971. It will be remembered that Senator Humphrey, when he was Vice President, was Chairman of that Council and did an outstanding job for the benefit of the nation in that capacity. It is therefore, understandable why he has expressed such a current interest in a national ocean program.

Mr. Chairman, and distinguished members of the hearing panel, I think we can all agree there is a need for a re-examination and a sharper focus of the national ocean resource development program and the need for a new emphasis on the marine sciences and technology as the nation goes into its third century. But, Mr. Chairman, this is not the time to destroy or hobble our nation's industrial enterprises upon whom the public must depend for future development if we are going to continue to strengthen and improve the economic system which has made America the envy of the world. Perhaps the best action which these two distinguished committees and the Congress can take would be to approve S. 709 as a means of focusing the activities within the federal establishment and by approving the simple extension of the appropriation authorization for the sea grant program for fiscal years 1977-1979.

The late President Lyndon Johnson said, "It is not difficult to do what is right, but to know what is right." Mr. Chairman, NOIA believes that S. 709 and the proposal by the administration to extend sea grant presents the Congress with the best answer to the question, "What is the right thing to do at this juncture in our nation's history and development."

NOIA will support enactment of these two bills because we believe they will offer a workable program to meet the needs of the ocean futures. S. 709 outlines the necessary program and leaves the principal administrators with enough discretion to adjust to the real world circumstances rather than attempting to codify their every action. It does not propose the excessive proliferation of the federal bureaucracy when existing ones are capable of handling the responsibilities of coordinated action. For these reasons, we believe S. 709 and the simple sea grant extension harmonizes with what we think is the national mood for clarity and simplicity in our laws and more efficient and less expensive execution of them.

If the ideas and schemes of the few individuals who want to make NOAA the focus of an over-all Department of Ocean Affairs are sound and legitimate, then those individuals should not be afraid to bring up their schemes in a proper manner in the legislative process. But, they do not seem to be willing for the Congress to work its proper will. It is well-known that the other body of the Congress is presently marking up a bill to extend the sea grant program without all the burdensome provisions to reorganize the "ocean world," as Title I of the staff draft would do. Assuming for the moment that the House sea grant extension comes over to the Senate and a load such as this were placed on it for the Conference to cope with, two things could happen. Either the sea grant program would be sacrificed by failure to act or the other body would not have a full and complete opportunity to work its will on a major federal reorganization. I suppose a third option could be that the Senate conferees could recede and approve the less complicated sea grant extension. But, if that is the scenario, then why waste all this time now. Just extend sea grant.

Mr. Chairman, this concludes our formal statement. We thank you, and gentlemen of the Committees, for the opportunity to appear before you today and to discuss these important issues. Please be assured again the officers and members of the National Ocean Industries Association stand ready, willing, and able to work with you and your staff in any way we can to further the national interest in developing the ocean resources.

Senator PELL. This concludes the 2 days of hearings by the Commerce Committee and the Labor and Public Welfare Committee on these two bills.

The record will remain open for any additional testimony for 10 days. The committees will adjourn.

[Whereupon, at 12:25 p.m., the hearing was concluded.]

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

STATEMENT OF ROY D. GAUL

My name is Roy D. Gaul. I currently am Director of the Long Range Acoustic Propagation Project, related to development of antisubmarine warfare systems, which is in the Naval Ocean Research and Development Activity of the Office of Naval Research. During the last 20 years my professional experience has been split about evenly between government (Navy Department), industry and academia in various aspects of oceanography. I served as a member of the Sea Grant Advisory Panel in 1970 prior to joining the Federal government in 1971. I have maintained close touch with Sea Grant thereafter.

COMMENTS ON S. 709

Among the proposed legislation furnished to me for comment was S. 709 introduced in February 1975 by Senator Humphrey. I had no perception as to the rationale or need for such a bill based on prior information. The bill did little to broaden my perception. It is loosely written and seems to grant broad charter responsibilities to still more components of an already complex superstructure of marine related committees mixed into the bureaucracy. It seems to me that the national needs in marine science and technology might better be served through Congressional insistence on performance within the Executive Branch under existing statutes. There already seems to be an excess of high level pontificators, planners, evaluators, advisors and influence peddlers.

A National Council on Marine Science, Engineering and Resource Development may have the positive attribute of giving visibility to national interests in marine affairs. Under no circumstance should the Council become another mechanism for distributing the taxpayers wealth, this being the proper province of established departments within the Executive Branch. Its functions should be delimited clearly to evaluation of Federal plans and advising the President. If appropriations are required beyond support of a staff (hopefully more modest than stipulated in the bill), then such appropriations should be specific and assigned to NOAA for implementation under Council direction.

I strongly oppose the proposed Advisory Panel on Marine Science, Engineering and Resource Development. It seems only to enlarge the existing National Advisory Committee on Oceans and Atmosphere (NACOA) with politicians. NACOA, as a group of citizens serving at the pleasure of the President, fulfills a useful and clearly partitioned function. The value of NACOA deliberations to Congress as well as the President are enhanced by this degree of detachment of NACOA members. If we must create a National Council, then the bill need only to cite responsibilities of NACOA to contribute advice and information to the Council. Sec. 5 should then be deleted in its entirety.

OCEAN AND COASTAL RESOURCES ACT OF 1976

General Remarks

The "Staff Working Draft No. 2" of the "Ocean and Coastal Resources Act of 1976" dated March 16, 1976 has the prospect of being a major stimulus in a lethargic Federal effort in marine science and technology. Title I of the bill reaches within NOAA to demand greater attention and more determined action to accelerate the national posture in marine science and technology. Title II goes beyond mere extension of the national Sea Grant Program by introducing policy changes that could have significant impact on its present mode of operation. I strongly support the intent of the bill as clarified by discussions with and memoranda from the staff of the National Ocean Policy Study. It appears to me that the provisions of the bill are equally deserving of support with a few exceptions as discussed below.

Management within NOAA

NOAA was formed by pulling together an existing set of organizational components. Names have changed but otherwise these components have tended to operate as before. The main exception has been staff functions reporting to the Administrator. Associate Administrators have tended to operate in advisory and coordination roles. Special line functions, such as Sea Grant and Coastal Zone Management, have floated loosely in the structure while reporting directly to the Administrator. Personal persuasion and initiative among principals necessarily must have been the primary factors in avoiding duplication and ensuring transfer of technology within NOAA. Clear cut lines of responsibility and authority for marine science, technology and advisory services are not evident in the current NOAA organizational structure.

Title I obviously attempts to put more teeth in the marine side of the NOAA structure. If anything, the statement of authorities and responsibilities in Sec. 102 does not go far enough. Nevertheless, Title I unmistakably gives line authority to the Associate Administrator for the Office of Marine Resources, Science and Technology. It is essential that this Associate Administrator be given unilateral control over the total budget authorized by the Act and a significant measure of influence over other marine related programs in NOAA. The provisions of Sec. 102(c) should be adequate in this regard.

The structure of the National Ocean and Coastal Advisory Service as given in Sec. 102(f) of Title I is proper. The last half of Sec. 102(f)(3)(c) is particularly important in establishing a link with Sea Grant that both recognizes the proper advisory services role of Sea Grant and provides for transfer of funds to it from the Advisory Service.

The role of NACOA is very satisfactorily set in Sec. 102(c). This arrangement is an important mechanism for assuring that the intent of the Act is implemented in NOAA.

I know that there is considerable consternation in the NOAA hierarchy as to the consequences of introducing an Associate Administrator between the Administrator and the Director of Sea Grant. I share the concern for Sea Grant and am sympathetic with the management constraints imposed on its Director. Since NOAA is a mature bureaucracy, it well can assure that both the Associate Administrator and the Sea Grant Director are procedurally ensnared. On the other hand, roadblocks can be cleared and much increased advocacy for Sea Grant can be expected if the Administrator moves positively to exploit the provisions and intent of the bill. Recognizing the dangers, I favor placing Sea Grant wholly within the Office of Marine Resources, Science and Technology. It further is appropriate that the Sea Grant Review Panel be established as an advisory body to the Director.

Contracts and Grants

The distribution in Sec. 204(c) between applications of contracts and grants may prove to be both artificial and unduly restrictive. The provision is new for writing contracts that allow full funding of projects considered to meet "specifically identified national needs and problems." If adequate funds are allocated, this provision should enhance the significance of such projects and permit formation of broad based teams that include industrial and public agency participants. On the other hand, national needs in science and technology frequently are well served by very localized efforts that may well be motivated by "needs and problems of individual States." The Director, with advice from the Sea Grant Review Panel and concurrence of the Associate Administrator, must be allowed broad discretion in making distinctions between "local" and "national" needs. Certainly for a project to be "national" it need not simultaneously involve all 50 states; neither should a local project be restricted to only one State.

Sea Grant Regional Consortia

I do not see that the provision in Sec. 206 for designation of Regional Consortia serves any purpose. On the contrary, encouragement of cliques that are to be supported indefinitely by Sea Grant to study a region may become a burden and tend to discourage attention from competent investigations outside the consortium. Joint efforts have been and should continue to be encouraged between Sea Grant institutions for regional studies. Such relationships should be ad hoc subject to initiation, expansion or termination in accordance with

mutual interests and merit of the arrangement. No formal designation is required so Sec. 206 should be deleted from the bill.

Funding

The authorization levels for Title I and Title II are marginally adequate. One major difficulty with Sea Grant in the past is that funding has been grossly inadequate as well as below the authorized level. Of necessity, the Director must make decisions in anticipation of predictable long term stability. Funding limitations, compounded by short term uncertainties, have caused institutional programs to recede and competent personnel to turn elsewhere. This is particularly disastrous after an institution is designated as a Sea Grant College.

CONCLUDING REMARKS

Passage of the "Ocean and Coastal Resources Act of 1976" would be in the national interest. Passage of "The Marine Science, Engineering and Resource Development Act of 1975," S. 709, would be of little benefit and could be counterproductive. I appreciate the opportunity to express my views on the proposed legislation.

STATEMENT OF DR. JACK R. VAN LOPIK, DIRECTOR, LOUISIANA SEA GRANT PROGRAM, AND THE CENTER FOR WETLAND RESOURCES, LOUISIANA STATE UNIVERSITY

The National Sea Grant College and Program Act of 1968 is an important piece of legislation that has led to the establishment of a much-needed and significant program of marine-oriented research, training and advisory service. However, improvements can be made and inadequacies do exist—both in the act and in the administration of the program. A major conceptual omission of the act is illustrated by the fact that the word "state" is mentioned only once in the existing legislation. In truth, however, the program is widely described as being directed toward solving practical problems of local and state concern and public and private sources at these levels must provide one-third of the total program cost. This glaring conceptual omission should be remedied in any new or amended legislation. Along the same line, firmer directives should be provided Sea Grant institutions to work with state and local agencies in the definition and conduct of research and advisory service programs. The existing legislation also gives inadequate recognition to the importance of coastal resources. In the act, marine resources are not defined in a manner to include many of the coastal and estuarine problems that are of paramount importance today. It seems obvious that greater recognition must be given (1) the state/state agency role in defining and meeting Sea Grant goals and objectives and (2) the need for coastally-oriented as well as marine research, education and training. I am cognizant of proposed revisions in the Coastal Zone Management Act of 1972, but strongly believe there is still need for increased Sea Grant emphasis in this area.

Several aspects of administrative doctrine should also be evaluated to assess the need for possible procedural change and/or inclusion of specific guidelines in new legislation. Appropriate actions should be taken based on responses to the following questions:

1. What is the "business" of Sea Grant?
2. Is the present geographic distribution of Sea Grant funds an effective mix for solving important marine and coastal problems,
3. Are state Sea Grant activities being forced into a stereotype perceived by national office personnel?

Personal response to each of these questions would seem to indicate needed change in each topical area. At the national office level, the program is attempting to be all things to all people and—within present budgetary constraints—this is an impossibility. The only logical solution to this problem is to let the states design programs that will satisfy local needs and interests. Oddly enough the trend seems to be directly opposite, i.e., more and more emphasis on having the total Sea Grant network respond to Washington-perceived needs and problems. This trend is jeopardizing carefully established funding arrangements and rapport at state and local levels. In my opinion, the primary "business" of Sea Grant must be to solve marine and coastal resource problems of state and local concern.

The current distribution pattern of Sea Grant funds leads many people to believe that the dollars go where capabilities exist and not where the problems are. The Congressional mandate given Sea Grant was not to support existing marine-oriented institutions, but to solve practical problems and develop capabilities for problem solving in geographic areas where the expertise was not available. Louisiana has more coastal wetland acreage than the entire Atlantic seaboard of the United States, produces more tonnage of fisheries catch than any other state, has more coastal oil and gas production than any other state and is in desperate need of increased state-based technology for dealing with marine-related problems. In spite of these facts, less than three per cent of the total Sea Grant budget for FY 1976 was awarded to the Louisiana program. Other states could undoubtedly use different criteria and make reasonable cases for increased support. The important point is that criteria should be established to at least provide a state-by-state base level of funding that recognizes the magnitude of their respective marine and coastal resource problems.

A stereotype of a Sea Grant College has unfortunately evolved that often thwarts programmatic concentration on practical problems of state and local concern. This is specially frustrating to developing programs in tight budget situations. An institution aspiring to become a Sea Grant College is repeatedly evaluated in terms of "successful" programs at existing Sea Grant Colleges—regardless of the true needs or problems in the aspirant's locale.

CONGRESSMAN ROGERS' BILL (H.R. 12108)

This bill provides an authorization level for the national Sea Grant Program of \$40,000,000; \$45,000,000 and \$50,000,000 over the next three years. A national program at the \$5,000,000 per year level is authorized, and an international program authorization of \$3,000,000 per year is also included. My concern with the proposed national and international program authorizations rests on two points. First of all, I believe that a further negative impact will be imposed on newly developing programs. These programs do not have the personnel or facility resources to compete with long-established oceanographic/marine institutes. The national programs and international programs will undoubtedly be structured so that there will be competition among the various institutions to obtain funding under these activities. Thus, such authorizations may well jeopardize the basic program and development of new areas of competence and expertise. The other point, closely related to the first, involves the fact that these new authorizations could directly reduce funding of the basic program. Although this is not intended it seems obvious that it may well occur. Authorization of new \$5,000,000 and \$3,000,000 programs could simply be deducted from the basic Sea Grant activities. If these authorizations can be structured so that there is assurance that the basic program appropriation will not be reduced below \$30,000,000 per year I would certainly have no objection to national or international program development.

NATIONAL OCEAN POLICY STUDY BILL

(Staff Working Draft #2)

Although the concept of developing an Office of Marine Science and Technology within NOAA to better focus and centralize marine and coastal research responsibilities is probably a valid one, the mechanism proposed in this bill is completely misguided, inappropriate and inadequate for achieving this purpose. The establishment of another level of bureaucracy for review of advisory service programs in the Sea Grant network is not needed. Furthermore, the problems that would be created at the local level in administering such an advisory service program would completely destroy existing relationships and rapport established between many Sea Grant institutions and state natural resource agencies. Many state resource agencies are already fearful of conflicts between Sea Grant field agents and the fishing community and personnel of the natural resource agency of the state. Many resource management problems are brought to the attention of Sea Grant advisory field personnel, and in spite of good intentions on both sides conflicts do arise. These conflicts can best be resolved at the local level through cooperation between personnel of the state natural resource agency and Sea Grant Program advisory service agents. An advisory service directed by a group in Washington would not be

amenable or acceptable to natural resource agencies in many states. It certainly would not be acceptable in Louisiana regardless of how the money flowed through the system to the local Sea Grant network.

The establishment of Sea Grant fellowships mentioned in the bill is probably a good idea. However, the award of these fellowships should not be at the discretion of the Sea Grant Program director in Washington, but should be made at the local level to assure that students would conduct research or other activities that would directly support state and local needs.

The distinguished research award proposed in the National Ocean Policy Bills seems to be "icing" for a cake we do not have. When we are fighting for a basic program budget to adequately meet pressing needs I don't believe that this honor can be afforded. A strong and innovative program with adequate funds will attract qualified scientists more effectively than cash awards.

The national program concept mentioned in the bill again has the same problems and reservations previously mentioned under the H.R. 12108 discussion. I have no objection to the development of a national program concept or the authorization of funds for such a program if adequate assurances can be made that the existing state and locally developed programs will be maintained and not reduced by such an activity.

Sea Grant is a good, solid program that should be encouraged, focussed on a state-by-state basis, and its progress and contributions carefully monitored. If this is effectively accomplished it can be of continuing and growing benefit to the nation.

STATEMENT OF ROBERT A. RAGOTZKIE

My name is Robert A. Ragotzkie and I am Professor of Meteorology and Environmental Studies at the University of Wisconsin-Madison and Director of the University of Wisconsin Sea Grant College Program. I am pleased to be invited to submit testimony to you on the Ocean and Coastal Resources Act of 1976 and to share with you a few thoughts on the National Sea Grant Program and our nation's marine future.

I feel that the Ocean and Coastal Resources Act is an important 10th year anniversary recognition of the Sea Grant Program. It not only extends the program, but upgrades it. As director of one of the original Sea Grant Programs, it is highly gratifying to me that this committee recognizes the achievements of Sea Grant and its rapidly increasing potential and is taking this program as one of its major building blocks in creating a broader national ocean program.

This last point is crucial. At present, Sea Grant and a number of miscellaneous oceanic pieces are scattered around the government and the broader marine community. Each of these pieces is fairly isolated, small and vulnerable. Each suffers from the lack of a significant national commitment to the oceans and the coasts.

I believe this country will benefit from an expanded Sea Grant effort, one that maintains and builds upon its existing strengths while also insuring that there is a significant Sea Grant effort in every coastal state. At the same time, Sea Grant is only one of the pieces. It is not a substitute for a national ocean commitment, nor can it long prosper in the absence of such a commitment. This is why the legislation before this committee is so important. The strengthening of NOAA and the formulation of a coherent national policy are critical. I am pleased that the Congress is taking the necessary leadership to accomplish this.

The unique strengths and capabilities of the Sea Grant Program are well known. Dr. Stanley Murphy, Director of the University of Washington Sea Grant College Program, has summarized them well in his testimony before this committee. Therefore I will limit my comments to several provisions of the new Ocean and Coastal Resources Act.

One goal of this Act—to strengthen and upgrade ocean and coastal advisory services—is an important step forward and one which I endorse. I am pleased that under Title I of the Act, the new director of ocean and advisory services will recognize and provide support for the advisory services program in the Sea Grant network. Developing a truly national program of advisory services will succeed only if state and local perspectives are maintained.

By building on the established credibility and experience of university people, a really effective national ocean and coastal advisory service can be created. Direct access to the research and education activities being carried out by the universities is crucial to advisory services personnel. It is difficult, if not impossible, to provide a strong advisory service without the resource and information base to back it up. I would point to the success of the nation's Land Grant Colleges' extension services as one example of this. They have succeeded on two counts—first, because they have focused on local and state problems; and second, because they have had the research base to solve these problems and back up their services.

At the same time, advisory services guides the application of research. Many of our successful projects at the University of Wisconsin, like growing yellow perch in aquaculture operations, investigating the effects of PCBs on primates and humans, or developing techniques for better salmon management in the Great Lakes and oceans—all have been successful because they have involved a strong advisory services component to carry the research through to the application and implementation phase.

Therefore, I feel the existing capabilities of Sea Grant institutions to carry out this essential advisory services function should be used to their fullest extent and allowed to realize their potential. Where strong Sea Grant advisory service programs do not already exist, universities should be strongly encouraged to develop them.

I am pleased to see the continuation of the one-third matching requirement for the main portion of the Sea Grant Program. The continued real commitment of states and industry to Sea Grant is essential to maintain its vitality and responsiveness to state and regional problems. At the same time, this matching support is one of the best national measures of the real effectiveness of Sea Grant. Most programs are already matching at well above the required 1:2 ratio (in Wisconsin, our match capability is 1:1), thus demonstrating partnership, responsiveness and vitality is the most tangible way possible—hard dollars.

However, for activities of a national nature I believe the exemption from the matching requirement is appropriate.

I endorse the concept of encouraging Sea Grant Colleges and institutions to focus on problems of a national nature. By building on the work already going on in Sea Grant institutions, large national grants could enable a more comprehensive study of the scientific and public policy aspects of major marine resource problems.

Take the Great Lakes, for example. Thirty million Americans or fifteen percent of our population live around the Great Lakes. Recently, it has come to light that these residents are facing a major health problem, posed by the contamination of Great Lakes fish by toxic chemicals such as PCBs—polychlorinated biphenyls—dieldrin, vinyl chlorides and other such compounds. Since over four billion gallons of Great Lakes water are used every day as drinking water, the contamination problem may be even more significant.

I can envision an interdisciplinary program by one or several Sea Grant institutions that would tackle this problem of Great Lakes contamination. It would address such issues as the original sources and the transport by air and water of these substances to the lakes, their concentration and longevity in the aquatic ecosystem, and their effects on man. Such a program could build on five years of research which we at Wisconsin have already done on these problems in Lake Michigan. Our investigators are far ahead in tackling the problem of a Great Lakes-wide basis. A national program would make it possible to combine these studies and to focus on the broader policy problems. Furthermore, results from these studies are directly applicable to coastal estuaries and rivers of the nation, like the Hudson, which are also experiencing similar problems with these contaminants.

There are two additional pieces of legislation before this committee which I would like to comment upon briefly.

S. 709, to establish a National Council on Marine Science, Engineering and Resource Development, appears to be consistent with the draft bill and its prescriptions for the Sea Grant Program and the proposed new Office of Marine Science and Technology in NOAA. It also seems consistent with the efforts of the National Ocean Policy Study to upgrade this country's ocean program. A predecessor council under then-Vice President Humphrey played

a seminal role in developing the current program. A new office, working closely with those efforts already underway in Congress and the marine community, would greatly enhance the possibilities of establishing a truly meaningful ocean policy. I would suggest that (on page 4 of the bill) you consider adding the Chairman of the Council on Environmental Quality to the membership.

As to the executive communication on the extension of the Sea Grant Program, it seems to be a prescription for failure. It would neither change nor build on the program, but would only serve to gradually strangle it. I do not believe that anyone interested in the future of the nation's ocean program, much less in the Sea Grant Program, can find much comfort in this communication.

Finally, I would like to congratulate this committee on its ambitious and pioneering efforts to provide this country with a coherent national ocean policy and to upgrade the marine community. I would also like to express my thanks to the NOPs staff for their openness and receptivity in handling the legislation currently under consideration. They have had a difficult task and have been working under heavy pressure of time; I feel they have proceeded with fairness and the utmost consideration to all parties. This type of cooperative venture promises well not only for the National Sea Grant Program but for the broader marine efforts of this country.

Thank you.

STATEMENT OF ALFRED M. BEETON, DIRECTOR DESIGNATE OF THE GREAT LAKES
AND MARINE WATERS CENTERS, THE UNIVERSITY OF MICHIGAN

I am Alfred M. Beeton, Associate Dean (Research Administration) of the Graduate School at The University of Wisconsin-Milwaukee and Senior Scientist in the Center for Great Lakes Studies. I recently was appointed Director of the Great Lakes and Marine Waters Center at The University of Michigan, Ann Arbor. In my position in Milwaukee I have been involved in research on the St. Lawrence Great Lakes as well as in the Bahamas area of the Atlantic Ocean, and on tropical reservoirs in Africa and southeast Asia. I have been actively involved with the University of Wisconsin Sea Grant Program, since its beginning in 1968, and assisted in preparing the first proposal. In my position at the University of Michigan as Director of the Great Lakes and Marine Waters Center, I will also be Director of the University of Michigan Sea Grant Program. I am not presenting this statement as a spokesman for either the University of Michigan or the University of Wisconsin, but as a concerned citizen.

I fully agree with the statement, "The resources of the oceans and of the coastal zone would, through the development and wise applications of marine science and technology, satisfy many human needs and contribute to the achievement of national and international objectives." Wise use should be emphasized in this statement, however, since beneficial use is already reduced or severely threatened through pollution and poorly conceived physical alteration of the shore. It is a national disgrace that people must be warned against eating fish from the Great Lakes because of high levels of PCB and pesticides.

A successful marine resources, science, and technology program should include a strong research capability at the federal and state level, in industry, and in the universities. In order to have an effective research program there must be a continual appraisal of research needs and setting of priorities. A very important aspect of an effective program is the dissemination of the research information to potential users. To realize these objectives there must be cooperation and coordination of effort and because of the scope and importance of the program the federal government must provide the leadership.

International communication and cooperation in scientific and technological ventures are included as aspects of the program under Sec. 101 (2) (2). Inclusion of this international aspect has merit, but it should not have the same priority as the items mentioned above.

In order to have an effective marine resources, science, and technology program for the nation we need to develop a national ocean policy. Establishing an Office of Marine Resources, Science, and Technology within NOAA is dealing with the mechanics and not with the need for a national policy. Nevertheless, establishment of such an office with the charge of developing a national ocean policy certainly is an acceptable beginning. Until we have such

a national ocean policy it will be difficult to determine what is a proper balance between local and nationally oriented projects.

Emphasis has been placed on coordination of programs. Such coordination is especially difficult because of the diversity of disciplines and variety of agencies, industries, and other institutions involved. Nevertheless, coordination is needed not merely because of cost-effectiveness, but because coordination can lead to overall higher quality of the programs.

A balance should be realized between research, education and advisory services. Applied and basic research go hand in hand with an effective educational program. Advisory services cannot develop into a sound program unless it has a good foundation in research and education. There is a real danger that the kinds of research funded is determined more by how the information will be used by advisory services rather than by what needs to be done. For this very reason I am opposed to establishment of a National Ocean and Coastal Advisory Service. Establishment of this service would remove advisory services too far from research and education. It would be more effective to strengthen advisory services within the existing Sea Grant Program structure.

Present funding for the Sea Grant Program is inadequate because 1) the older Sea Grant Programs have been level funded and inflation has eroded base funding, 2) few new programs and projects can be started and those that are must be funded at the expense of the existing programs, 3) universities in general are facing severe financial problems which preclude committing additional resources to assist Sea Grant Programs.

The recent information in Science Indicators—1974 (National Science Board) shows that the lead the United States has in science and technology is narrowing as a result of inflation and a tapering-off of federal support for research and technology. Support per scientist and engineer in doctorate-granting institutions declined 30 percent in "constant" dollars 1968-1974. This decrease in funding is very critical in view of the data which show that universities account for 54 percent of the country's basic research. The level funding of the Sea Grant Program during this period of inflation is a good example of the problem. Despite this decrease in dollars the Sea Grant Program has been maintaining its productivity, but because of the importance of the program to the nation, allocations should be \$50 million per year.

Another change in legislation which would help the Sea Grant Program would be to remove the prohibition on purchase of ship time. Most universities are finding it increasingly difficult to underwrite the ever-increasing expenses involved in operating research vessels.

U.S. SENATE,
COMMITTEE ON THE JUDICIARY,
Washington, D.C., March 22, 1976.

HON. ERNEST F. HOLLINGS,
*Chairman, Subcommittee on Oceans and Atmosphere,
Committee on Commerce, U.S. Senate,
Washington, D.C.*

DEAR FRITZ: I am very sorry that a prior commitment precludes my attendance and participation at the March 23, 1976 hearings on the proposed Ocean and Coastal Resources Act of 1976 (S. 3165). However, I would like to express my strong interest and support for this important legislation. I believe that it is essential to our national interest to expand and coordinate the entire spectrum of applied marine research projects in order to promote the efficient development and allocation of ocean resources.

As you know, the Senate Commerce Committee has long recognized that science and technology are major vehicles for utilizing the resources of the ocean and coastal zone. In order to meet national objectives in the oceans, the Federal Government continues to be the major patron of marine research and development. Within this context, the National Sea Grant Program was created on October 15, 1966, with the signing of Public Law 89-688, The National Sea Grant College and Program Act. Since the authorization for the Sea Grant Program expires this year, the Commerce Committee in conjunction with the Committee on Labor and Public Welfare must review the Program's ten-year history. My own preliminary analysis of the accomplishments of the Sea Grant Program indicates to me that the Program has produced a wealth of informa-

tion about the development potential for various ocean resources. The Program has also provided many important insights into the fragile ecology of the land-sea interface.

Although the many different Sea Grant projects that have been undertaken throughout the coastal regions of the United States have generated a great deal of valuable information, there is a great deal yet to be learned.

For this reason, I believe that termination of the Program would be a very serious mistake. Therefore, I have chosen to cosponsor S. 3165 because it re-authorizes and improves the National Sea Grant Act by orienting the program in a balanced way to meet national, state and regional needs. In addition, Title I of S. 3165 will establish a national policy for the wise development, application and dissemination of knowledge in the disciplines of marine science and engineering.

Mr. Chairman, I have a very personal interest in the extension and expansion of marine research and the Sea Grant Program. As you may know, the State of California has been a leader in promoting the Sea Grant Program and developing innovative projects under its auspices. Since the Program's inception in 1966, a total of \$2,602, 948 Federal dollars have been awarded to 75 different Sea Grant projects in California.

I am looking forward with great anticipation to the opportunity to review the testimony which is being offered at the joint hearings on the Ocean and Coastal Resources Act. Please extend my appreciation to the witnesses for the time and effort they have used to bring their comments and suggestions on S. 3165 to the attention of the Senate. Once again, I apologize for not being able to participate directly in the hearings. Thank you for permitting me to bring my views to your attention.

Sincerely,

JOHN V. TUNNEY,
U.S. Senator.

RICHMOND HILL, GA., March 22, 1976.

Senator ERNEST F. HOLLINGS,
National Oceans Policy Study,
Russell Senate Office Bldg.,
Washington, D.C.

DEAR MR. HOLLINGS: We understand that your committee is studying the re-authorization of the National Sea Grant Program. We are a group of independent commercial fishermen from the State of Georgia who got together to express our opinion on this matter. We request that the enclosed statement of support be read into the record of your hearing.

If there is anything else we can do to see that the Sea Grant Program continues to operate, please let us know.

Sincerely yours,

W. H. (RUSTY) BUTLER, JR.
LEONARD W. CROSBY, JR.
FULTON LOVE
DINKY MINOR
GEORGE C. NIXON, JR.
ELLIS PHILLIPS.

Enclosure.

We are commercial fishermen from the State of Georgia who would like to go on record as strong supporters of the Sea Grant Program.

Our local Sea Grant Program has already helped the independent fisherman in Georgia in many ways. We need their help now more than ever as the industry gears up to meet the challenges of the 200-mile limit. Farmers get help and the dairy industry gets help. If a big industry like Lockheed gets in trouble the government is ready to help them. The fishing industry is just as important.

As tax-payers, too, we feel that Sea Grant is the kind of program that helps make jobs, increases productivity, and pays off in more tax dollars for government in the long run. Understanding is the main thing, and Sea Grant people understand the problems of the fishing industry. Here in Georgia the Sea Grant people are on the job all week, working to help fishermen.

The introduction and development of the twin trawl rig for shrimping has meant an increase in production of up to 50% for boats hauling the rig. For

some of us during the disastrous fishing year of 1974, the twin trawl was the difference in making it and going broke. This is a good example of the kind of help Sea Grant gives the fisherman in bringing in new ideas and helping to adapt them to local conditions. We do not have the money to risk in the development of new gear.

Fishing is no easy business. We discovered in '74 that catching the product is still only half the ballgame. Just because a man is a good fisherman does not necessarily mean he is a good businessman. Sea Grant is supplying a legal advisor to help us in setting up a fisherman's cooperative which will make our marketing a more efficient and profitable operation. This is an area we are not experienced in and we will need help in this for some time to come.

Sea Grant people have provided instruction in net repair, in navigation techniques, and the uses of other equipment, such as depth sounders and fish locators. They are now involved in helping us develop a fin fishery in a state where shrimp fishing has been the main industry. Shrimpers may be idle for up to six months during the off-season. A fin fishery would mean steady employment all year. Already as we just begin to get into going further out for fin fish our success is such that we are able to make boat payments this time of year, which is something we have not been able to do before.

We feel that we are part of a developing industry and that Sea Grant has an important role to play with us in that development. We not only recommend the continuation of the program, we would like to see the program expand. We will need more information and more instruction as we gear up to harvest both shrimp and fish.

Most of us are young shrimp boat captains and we are trying to make a good living at it. All overhead items have gone up—fuel, ice, cable, webbing. Boats are costing a lot more than they once did. One area that we definitely need help in from government is in the area of financing. We need some financing made available by people who understand the fishing industry. A new boat with proper electronic equipment requires an investment of about \$100,000. We need reasonable interest rates, a reasonable down payment requirement, and we need to have financing long term enough that the fisherman can live with it. A loan of \$150,000 for three years at monthly payments is unrealistic for a fisherman. We don't want any give-away programs, but we would like to see some understanding loans made available from some agency.

We also suggest that the program consider funding short-term research projects by commercial fishermen. Many of us have good ideas for research projects, but they require equipment and time we cannot afford. With a little encouragement and help, some very valuable research could be done by the commercial fisherman to aid the industry.

We appreciate the opportunity to go on record for the Sea Grant Program. We would be glad to answer questions before the committee about the benefits of our local program or about the needs of the Georgia fishing industry in general.

ABBOT,
AGRICULTURAL AND VETERINARY PRODUCTS DIVISION,
North Chicago, Ill., March 23, 1976.

HON. WARREN G. MAGNUSON,
*Chairman, U.S. Senate, Committee on Commerce,
Dirksen Senate Office Building,
Washington, D.C.*

HON. CHAIRMAN AND COMMITTEE MEMBERS: I have received and reviewed the above material and wish to comment thereon as follows:

It is my opinion that the Sea Grant Program has been one of the best thought-out and most successful of all the government oceanography programs. It has been woefully underfunded throughout its existence, yet it has done wonders with what little it had. I think that the staff of the program is to be commended; from Dr. Robert Abel, at the top, to the workers in the field.

As a member of industry, I am interested in the expansion of activities in this area. The interest of my company is in the area of aquaculture and the attendant diseases of aquaculture animals. Our goal is to cut down on the heavy losses due to these diseases in all phases of the commercial farming of aquatic animals. I notice that aquaculture has been deleted as a separate entity within the bill. I assume that the traditional interest of Sea Grant in this area

will not be diminished as the help given to aquaculture projects has been most productive. I have reviewed and commented on "The NOAA Aquaculture Plan" that John Glude of NHFS and others have put together. I feel this is an excellent document and deserves implementation.

An area of strong interest to organizations such as Abbott Laboratories lies in the clearing of chemicals and antibiotics for the use in the treatment of specific diseases entities in aquatic animals. At present, joint jurisdictions of FDA, EPA, and USDA all result in making the clearance of these agents very costly and time-consuming. This is translated into expensive losses to the farmer at pond or raceway-side as well as being costly to the drug company involved while the process is on-going.

Commercial aquaculture in the United States is, in the main, carried on by small farmer-entrepreneurs. Entry into the business is expensive. Land acquisition, pond construction, pumping costs, and processing equipment add up to high original capital investment. Like all farming operation, aquaculture is at the mercy of nature—only more so. Storms, predators, heat waves, and disease all take their toll. In 1975, losses to disease, expressed in terms of delivered adult fish, are estimated in Table I.

TABLE I

Specie	Estimated annual sales	Estimated disease loss (percent)	Dollar loss (in millions)
Trout.....	\$27,000,000	28.7	7.79
Salmon.....	7,000,000	35	2.45
Catfish.....	53,000,000	25	13.50
Baitfish.....	175,000,000	50	75.00
Total.....	252,000,000		98.74

(Figures compiled from: "Aquaculture in Idaho and Nationwide," March 1975, Idaho Department of Natural Resources; "A Proposed Aquaculture Plan," November 1975, NMFS, NOAA; Internal Marketing Studies, Abbott Laboratories, Agricultural and Veterinary Products Division.)

In addition to the above losses to the 3,337 commercial fish farms must be added the losses in the 515 state and federal hatcheries which are not estimated here. Loss figures are averages. In extreme cases, losses are 100% and additional costs are involved in clean up and disposal, loss of pond production time, and loss of customer goodwill.

This is not to suggest that clearance is not necessary or desirable, only that some order be put into the process so that a fairly set procedure is delineated for such clearance and release. Having to clear agents for not only minnows, but for each different specie of minnow, adds greatly to the time and money necessary for clearance. This is true for all other fin fish, as well as crustaceans and shell fish. The National Marine Fisheries Service has been assigned some mission in this area, and the LaCrosse, Wisconsin Laboratory has done some excellent work to this end.

It would be my hope that industry could participate in the grant programs for basic research. While the problem remains that information gained would be public knowledge and, therefore, not exclusively retainable by the company involved, much useful work needs to be done in the areas of clearance and ecology that would not be of a proprietary nature in any case. Basic ecological problems solved are useful to all.

The topics in Title I adequately cover the basic needs of the oceanographic community. Strong research capability is basic. I have already commented on the need of industry to be included in this effort. The dissemination of acquired knowledge from many diverse projects is always a necessary function as well as the preliminary planning to eliminate, as much as possible, the duplication of effort that too often results from lack of such planning. The focusing of leadership to bring some order out of many conflicting programs spread over many agencies is essential. Since the early days of the resurgence in interest in the oceans, all recommendations have been for a strong central administrative leadership.

In the main, I feel that the act, as stated, is a step in the right direction. The proposed funding level for Sea Grant is at a reasonable level, and I think rep-

resents a feasible spending rate contrasted to the present under-funded condition. Anything that will strengthen Sea Grant must strengthen the national program as a whole.

Thank you for your interest,

GEORGE F. GREENE, JR.,
Coordinator, Aquaculture Products.

ESTUARINE RESEARCH FEDERATION,
BELLE W. BARUCH INSTITUTE
FOR MARINE BIOLOGY AND COASTAL RESEARCH,
UNIVERSITY OF SOUTH CAROLINA,
Columbia, S.C., March 24, 1976.

HON. WARREN G. MAGNUSON,
Dirksen Senate Office Building,
Washington, D.C.

DEAR SENATOR MAGNUSON: This letter relates to the proposed bill cited as the "Ocean and Coastal Resources Act of 1976" (Staff Working Draft No. 2) which is under active consideration by the Senate Committee on Commerce. I am writing in my capacity as President of the Estuarine Research Federation (ERF), a nonprofit society devoted to promote research in estuarine and coastal waters. This organization consists of four affiliate societies (Atlantic Estuarine Research Society, Gulf Estuarine Research Society, New England Estuarine Research Society, and Southeastern Estuarine Research Society) and represents approximately 1100 estuarine and shallow water ocean scientists. Our members are from education institutions and private, state, and federal laboratories and agencies.

ERF is concerned with coastal water problems and desires to see established a coherent national marine policy which would be based on input from industry, federal and state agencies, the private sector, and the scientific community. Because ERF represents most of the estuarine scientific constituency along the East and Gulf coasts, we would be happy to cooperate and assist in developing a national plan as described in Section 102(d) (1) page 9.

In addition ERF recognizes the need to strengthen and expand the present National Sea Grant College and Program Act of 1966. This program has had an impact on certain segments of the marine community, and it is hoped that these proposed amendments would provide a broader base of support in the future. There is a continuing need to recognize that coastal environments are complex and that some problems cannot be answered on a short-term rapid "pay-off" basis; they require coordinated long-term investigations.

The establishment of a National Ocean and Coastal Advisory Service Office will give a clearer focus to this service than currently exists. However, it is hoped that the creation of another administrative level will hasten and not hamper the vital reciprocal flow of information between users and scientists. If this office is established, the references in Title II to the Sea Grant Program and advisory services should be re-evaluated; for example see page 23, (12) and (13) and page 24, Sec. 204.

The awarding of National Oceanic and Atmospheric Administration Distinguished Research Awards is heartily endorsed by ERF.

The definition of a sea grant regional consortium raises a question in my mind. Is this consortium to be a legally constituted arrangement between consenting entities or can this consortium be established merely by two or more entities agreeing by letter to act together?

On page 24, Sec. 204(c) Contracts and Grants—(1), it would seem more appropriate to modify this sentence to reflect both national and regional needs. Some problems are of regional importance and are greater in magnitude than the needs of a state, but less than an overall national need.

Will the fellowship program be administered by the director on a national competition or will separate grantee institutions be awarded funds and they will select the fellows?

Provisions for the rotation of members on the Sea Grant Review Panel are important to permit new viewpoints to be expressed and a greater degree of flexibility.

The concept of the Sea Grant Program is excellent, and ERF wants to cooperate with this program in order to develop a meaningful program which will serve the needs of the Nation.

Sincerely yours,

F. JOHN VERBERG,
President.

DEPARTMENT OF MARINE RESOURCES,
Augusta, Maine, March 24, 1976.

HON. WARREN G. MAGNUSON,
*Chairman, Committee on Commerce,
Dirksen Senate Office Building,
Washington, D.C.*

DEAR SENATOR MAGNUSON: It is gratifying that your committee is considering the reauthorization and improvement of the National Sea Grant Act, since this would also provide the opportunity to include needed amendments.

My testimony is, of course, based on my acquaintance during the past thirty years with the problems of the commercial fisheries in the Gulf of Maine and its adjacent waters and in the management problems of renewable marine resources in the northeastern United States. My testimony is based solely on these geographic areas and my responsibilities as Marine Research Director for the State of Maine.

It is my recommendation that the Sea Grant authorization should be amended to provide block funding to the responsible and accountable marine fisheries agencies in the several states. Since these state agencies are responsible for marine fisheries management within their territorial waters, they are in the best position to identify research needs and management problems. Such funding amendments would provide means for the responsible state management agencies to contract with private or public research institutions and agencies to provide supplementary research to that being carried on by state agencies. Unfortunately, most academic institutions have demonstrated their inability to provide meaningful research in terms of developing management programs for marine and estuarine species and areas. Also, the euphemism "Sea Grant" as a companion concept to the land grant programs of the early 20th Century is not factually sound. Land grant management programs were comparatively easy to apply without the need of complicated legislation, coordination, and application because management control of the land was in the private sector. The marine area is in the public domain and the renewable marine resources are considered to be common property. This difference in attitude makes management of marine resources much more complicated. Therefore, governmental agencies responsible and accountable for resource management must spell out research needs in order to provide adequate and meaningful management. To achieve these management objectives, governmental agencies must exercise close control over the research programs required for management, and the only way this control can be adequately exercised is to make the governmental agencies the depository of Sea Grant funding.

As specific recommendations on amendments to The Ocean and Coastal Resources Act of 1976, I would enumerate the following:

1. On page 14, line 10, after "industry" insert *IV state agency responsible and accountable for marine resource, research, management, and conservation.*

2. Continue with: *V and interested public*

3. Page 30, line 9, add after the word "panel" *and the concurrence of the state agencies responsible for marine resource, research, management, and conservation.*

4. Line 20 after "panel" *and the concurrence of the state agencies' responsible for marine resource, research, management, and conservation.*

With extended jurisdiction in the process of realization, it is even more important that responsible state and federal agencies be given this control over marine and estuarine research.

The need for applied and practical research has long been recognized by governmental agencies. This is a type of research which is really not compati-

ble with academic institutions. There is little evidence that the capability of solving problems and answering questions can be done under the present program; yet academic institutions can play a very vital role in marine research, but this role should be one of support and of augmenting existing governmental programs.

Although the Maine Department of Marine Resources has benefited financially from the Sea Grant program in the development of a Marine Fisheries Extension Service, many of my colleagues and I are convinced that the Sea Grant program has not been effective in doing what it was intended to do. The contrast, of course, between the research concepts of management agencies and of academic institutions has been transposed by the philosophy of the Sea Grant program. The academic philosophy has traditionally been to do "pure" research as opposed to "practical" research. The latter has been the primary role of state and federal governmental agencies.

The Sea Grant participants have written voluminous reports glorifying their research endeavors. A review of these publications does not disclose very much of practical value nor of constructive application to the marine fisheries either by way of management or by way of commercial utilization. The recent proliferation of marine related programs has certainly tended to confuse rather than inform the general public of the current problems related to both commercial and recreational fisheries in the marine environment.

Sincerely,

ROBERT L. DOW,
Research Director,

BEAK CONSULTANTS INC.
Atlanta, Ga., March 25, 1976.

Hon. WARREN G. MAGNUSON,
*Chairman, Committee on Commerce,
U.S. Senate,
Washington, D.C.*

DEAR SENATOR MAGNUSON: Thank you for the opportunity of commenting on the bills before your Committee dealing with the Sea Grant Program, the National Oceanic and Atmospheric Administration, and marine science and technology.

There are two policy level questions that the legislation should address. The first is the proper role of NOAA. The second is the relationship between Coastal Zone Management and Sea Grant. The legislation recognizes the first question but appears to ignore the second.

The Staff Working Draft No. 2 on page 5 declares the purpose of the Congress "to recognize the National Oceanic and Atmospheric Administration as the Central focus . . . of a successful marine resources, science and technology program." The Report to the Congress by the Comptroller General entitled, "The Need for a National Ocean Program and Plan," however, in Appendix I shows that in Fiscal Year 1974 NOAA was allocated only 7.7 percent of the federal dollars related to marine science activities and ocean affairs. Clearly without control of the resources, NOAA can never be the "central focus." Rather than internal reorganization of NOAA as the bills contemplate, a reorganization of the entire marine science program appears to be in order. This more massive reorganization obviously is not contained in the present legislation.

The relationship between Sea Grant and Coastal Zone Management at either the Washington or operational levels is not specifically addressed in the proposed legislation. However, one effect of the legislation may well be to hamper efforts to have these two federal programs linked in Washington to produce the maximum benefits. The linkage in the states, of course, vary by state. But by enhancing the federal bureaucracy I fail to see how the two programs are more closely related.

The final point I wish to make is that the separation of advisory services from the remainder of Sea Grant create at a minimum the potential for a Washington based advisory service that is not sensitive to local needs. I am attaching a letter from Dr. Edward Chin, Director of the Sea Grant Program in Georgia, that expands on this point.

Again, I appreciate the opportunity to comment. The Sea Grant Program has been vital to the rejuvenation of the economy of the Georgia coast based upon

utilization but not abuse of our natural resources. I wish to see it continued and strengthened.

Very truly yours,

JOSEPH B. WATERS.

Enclosure.

GEORGIA SEA GRANT PROGRAM,
UNIVERSITY SYSTEM OF GEORGIA,
Athens, Ga., March 16, 1976.

HON. ERNEST F. HOLLINGS,
U.S. Senate,
Committee on Commerce,
Washington, D.C.

DEAR SENATOR HOLLINGS: Thank you for sending me a copy of the staff working draft of the "Oceans and Coastal Resources Act of 1976," the accompanying explanation, and the subsequent memorandum of February 20 which further explains the "National Ocean and Coastal Advisory Service" proposed in the Act. I appreciate the opportunity to review the bill and to submit comments.

Although I am pleased with the intent of the authors to strengthen the National Sea Grant Program, I have doubts that the bill, as written, will fulfill that intent. As both memoranda point out, marine research programs are being conducted by 21 offices in 11 federal agencies. Considering the large sums being expended by the Bureau of Land Management, the National Science Foundation, the Corps of Engineers, the Office of Naval Research, and other agencies, it is difficult to see how NOAA can carry out responsibilities of being lead agency to implement national policy for marine research without a drastic reorganization effort at top federal levels. If NOAA, with its broad mandate, could not achieve this, I fail to see how establishment of an Office of Marine Science and Technology (OMST) under NOAA would help; particularly since the proposed OMST would take under its wing only the present Office of Sea Grant (OSG) and the proposed National Ocean and Coastal Advisory Services. If NOAA is to use the the OMST and Sea Grant to be a "spearhead of a new national effort in the oceans and coastal zone," then the role of OMST in relation to NOAA's Office of Coastal Zone Management, Office of Marine Minerals, National Marine Fisheries Service, and other units must be clearly defined and described in the bill.

I think that everyone involved with Sea Grant ought to be pleased that this bill would recognize the accomplishments of its advisory services by wanting to establish a NOAA-wide advisory services system along similar lines. However, I am disturbed by the National Ocean and Coastal Advisory Service (NOCAS), as proposed. As the second memorandum states, NOAA's Marine Advisory Service was established in 1972 with a set of excellent directives. If there is a genuine need for a NOAA-wide advisory service, it would seem more logical for NOAA to obtain the necessary funds to enable this unit (which already exists) to perform its function rather than to create another administrative unit.

I am also concerned about the mechanism for NOCAS to handle the advisory services portion of our Sea Grant proposal. According to the second memorandum, our proposals would be submitted to OSG following the usual procedure. OSG would review only those portions on research and education; NOCAS would review the portion on advisory services, make such award as it deems appropriate, and transmit the funds through OSG. In the first place, I feel that it would be a mistake to separate the evaluation of advisory services from the research and education components of the program. In analogous programs supported by the Department of Agriculture, the research segment (Agricultural Experiment Stations) and the extension segment (Cooperative Extensions Service) were separated many years ago. In many institutions this cleavage has resulted in the two groups being in such poor communication that unhealthy competition, dilution of effort, and lack of responsiveness to problems have resulted. It is distressing to think that the Sea Grant Program should start down this same path.

Secondly, the bill and both memoranda state clearly that NOCAS has authority to initiate and support advisory service programs at NOAA headquarters and field offices, and to staff such programs with federal employees.

I am doubtful that the Sea Grant advisory services now based at universities can continue to do as well as they have if they must undergo review and have their funding levels established by a federal unit that has authority to develop an in-house advisory services program. Rightly or wrongly, I have felt for some time that the Office of Sea Grant has suffered by being in an agency which has its own in-house marine programs. If NOCAS is established with the authority as proposed, it would not be difficult to foresee gradual erosion of support for university-based advisory service programs and increased development of federal programs at the various NOAA stations throughout the country.

If I felt that the programs could be handled better and more effectively through the federal stations, I would not hesitate a moment in seeing the bill go forth in its present form. However, the record speaks against this suggestion. Along our Georgia coast, the National Marine Fisheries Service and its predecessor agency had a station for many, many years. Despite this, it was not long after Sea Grant appeared on the scene that we started to hear from third parties what many of our fishermen thought of Sea Grant. The comment most frequently heard was that "in 30 years, this is the first time that any agency, state or federal, has given us a hand."

I recognize that the proposed bill is intended to strengthen the National Sea Grant Program, and I appreciate sincerely the effort. In its present form, however, I think that the bill will weaken the Program and cause more long-range problems than it will solve. I hope that the concerns I have expressed will aid in preparing the second draft. However, I think that the development of an Office of Marine Science and Technology is so complex and has so many ramifications that it ought to be done with great deliberation. I should like to suggest that the authorization for the National Sea Grant and College Program Act be extended for one year to allow time to develop a bill that will accomplish the apparent intent of the current bill.

If I can be of any assistance, please feel free to call on me.

Sincerely yours,

EDWARD CHIN,
Director.

CALIFORNIA SEAFOOD INSTITUTE,
Sacramento, Calif., March 25, 1976.

HON. WARREN G. MAGNUSON,
*Chairman, Senate Committee on Commerce,
U.S. Senate,
Washington, D.C.*

DEAR SENATOR MAGNUSON: We wish to acknowledge receipt of your letter of March 17, 1976 together with copies of S. 709, Staff Working Draft No. 2 and the executive communication on Sea Grant extension.

We are unable to provide you with a comprehensive review of the above subjects and still comply with the deadline of March 26th.

One of our problems is occasioned by the fact that we do not have a copy of the Conference Committee bill on extended jurisdiction. Without this copy we are unable to compare the provisions contained within S. 709 and Working Draft No. 2 as those provisions "may" relate directly or indirectly to the provisions of the extended jurisdiction legislation. Our concern would be with that of proposed Departmental Authority overlapping or conflicting with the authority of the Regional Councils established under extended jurisdiction legislation.

While we can support, at least in principal, the provisions of S. 709 a cursory examination reveals the following:

Sec. 2 (a) establishes policy and specifically relates to "resource development" and "rehabilitation of our commercial fisheries and to increase the responsible utilization of these and other resources." Subsection (b) (1) and (11) of the act also relates to marine resources. Sec. 4 (2) of S. 709 deals with a "comprehensive long-range program of marine activities." Do these sections supercede or preempt the present programs to be granted the Regional Councils and that of the Secretary of Commerce?

We are seriously concerned with the likely economic impact which will be created by the imposition of Federal regulations through Regional Council administrative order. Sec. 4 (6) of S. 709 seems to be directed to this problem. Most assuredly this is needed.

One of the obvious questions posed by the introduction of S. 709 is—are we building one bureaucracy on top of another.

Working Draft No. 2 poses some of the same questions as noted above.

From what we can gather, and again without proper comparison, it appears that Working Draft No. 2 simply proposes creation of a new office under NOAA. However particular interest is expressed in (c) Duties (9) and (f) (3) (c).

We are concerned that proposed legislation, the extended jurisdiction act, S. 709, Draft No. 2 among others all seem to be vesting unlimited authority in the Federal government without proper or "specific" recognition of States rights and those of industry operation under the free enterprise system. The extended jurisdiction act, as we understand it, downgrades the opportunity for states to work together with regional councils in the management of marine resources within the territorial sea. Can this be corrected within Draft No. 2? The same question would apply to management of fish stocks predominantly in the contiguous area.

To repeat we are seriously concerned that these proposals all seem to remove the activities of the Federal government further and further from those who actually utilize our marine resources.

As you know I, in company with other members of this Institute, attended three (3) two to three day seminars conducted by Pacific Marine Fisheries Commission on behalf of the National Marine Fisheries Service.

The purpose of these seminars was to assist in the drafting of a proposed National Fisheries Plan. As far as we can tell this effort was largely wasted in that numerous conclusions were not reflected in the extended fisheries legislation as amended.

We are unanimously in support of those provisions of Working Draft No. 2 which extends the National Sea Grant program.

With your kind permission we would like to conclude our studies on the proposed legislation (S. 709 and Draft No. 2) forwarding our findings to you at the earliest possible date.

We recognize the problems the Congress is encountering in formulating new legislation necessary to cope with the proposed extended jurisdiction act. We wish to be of assistance when and however possible.

Thank you for your courtesies and consideration.

Respectfully,

JOHN P. GILCHRIST,
Secretary-Manager.

U.S. DEPARTMENT OF AGRICULTURE,
EXTENSION SERVICE,
Washington, D.C., March 26, 1976.

HON. WARREN G. MAGNUSON,
U.S. Senate

DEAR SENATOR MAGNUSON: We appreciate the opportunity to review the "Ocean and Coastal Resources Act of 1976," Staff Working Document No. 2; the "Marine Science, Engineering, and Resource Development Act of 1975," S. 709; and the executive communication to extend the Sea Grant program.

We believe that the "Ocean and Coastal Resources Act of 1976," Staff Working Draft Document No. 2, has the potential for greatly improving the utilization and conservation of ocean and coastal resources in this country. The establishment of an Office of Marine Resources and Technology with an Associate Administrator and Directors responsible for the advisory service and the National Sea Grant Program should permit the government to focus properly on objectives related to development and conservation of its ocean and coastal resources.

We believe the provisions for a comprehensive plan for "the production and delivery of advisory services regarding ocean and coastal resources" together with the strategy for implementation and continuing review will contribute importantly to building strong advisory capabilities and permitting the establishment of advisory services based on important long-range objectives.

Based on the experience of this Department and its cooperators in the Land-Grant Universities, inclusion of advisory services along with research, education, and training as a part of the National Sea Grant Program should contribute importantly to building a highly competent staff and a relevant program to meet the needs of clientele and the Nation. If the program is developed

with the people it is designed to serve and has a strong research base, its potential for serving the Nation in developing its marine and coastal resources is great.

The ES-USDA has maintained a working relationship with the Sea Grant program staff responsible for advisory services. A memorandum of understanding has been signed by representatives of ES-USDA and the Sea Grant offices regarding cooperation on the advisory program. We have enjoyed a good working relationship with this staff and have encouraged cooperation between the Sea Grant staff responsible for advisory services and Directors of State Cooperative Extension Services in several states. The Director of Cooperative Extension Services is responsible in many of the states for the Sea Grant advisory program. Many of their staff have Schedule A appointments with this Department. We believe the proposed bill will provide for the continued cooperative effort we have enjoyed with the Sea Grant staff in the past, and you can be assured that we shall continue to provide assistance and support to the extent possible within the resources available to us.

We believe that S. 709, "Marine Science, Engineering, and Resource Development Act of 1975" can contribute importantly to the ocean and coastal resources through the development of a "comprehensive, long-range, and coordinated national program in marine science." We have only one question with regard to this proposed bill. We believe it would be logical to include the Secretary of Agriculture as a voting member of "The National Council on Marine Science, Engineering, and Resource Development." This Department has responsibility for food; it has a long history of experience in biological sciences; it has a formal agreement on advisory services with the Sea Grant office; and many Sea Grant advisory staff members hold cooperative appointments with this Department. In light of this and the expected continued relationship between representatives of this Department and its cooperating state agencies, and the staff of the Department of Commerce responsible for carrying out the program under this Act, we recommend including the Secretary of Agriculture as a voting member of the council.

We appreciate the opportunity to react to this proposed legislation. You can be assured that we will closely follow deliberations of your committee and will cooperate, to the maximum extent possible, in assisting in the implementation of this important legislation if it is passed by the Congress and signed by the President.

Due to the shortage of time, this letter has not been reviewed by the Department or by the Office of Management and Budget, and represents the views of the Extension Service only.

Sincerely,

CHARLES W. MCDUGALL,
Acting Administrator.

THE MARINE BIOMEDICAL INSTITUTE,
THE UNIVERSITY OF TEXAS MEDICAL BRANCH AT GALVESTON,
Galveston, Tex., March 29, 1976.

HON. ERNEST F. HOLLINGS,
*Chairman, Subcommittee on Oceans and Atmosphere,
Commerce Committee, U.S. Senate,
Washington, D.C.*

DEAR MR. CHAIRMAN: It is my understanding that you are now holding hearings jointly with the Committee on Labor and Public Welfare examining the need for a National Council on Marine Science, Engineering and Resource Development (Senate Bill 709) and are also investigating modification of the national Sea Grant College Program (Senate Bill 3165). This is a subject of very great interest to the University of Texas Medical Branch's Marine Biomedical Institute. May we, therefore, request that you make available to us copies of this legislation and if you publish the proceedings before this committee, that you also make these available to us. If there is additional legislation and committee reports bearing on these topics, we would also appreciate abstracts of them.

We would be most appreciative of your favorable response.

Cordially and sincerely,

A. D. SUTTLE, JR., PH.D.,
Professor and Deputy.

UNIVERSITY OF CALIFORNIA,
INSTITUTE OF MARINE RESOURCES,
La Jolla, Calif., March 29, 1976.

HON. WARREN G. MAGNUSON,
*Dirksen Senate Office Building,
Washington, D.C.*

DEAR SENATOR MAGNUSON: I am pleased to have the opportunity to provide written testimony for the Senate Committee on Commerce joint hearings with the Committee on Labor and Public Welfare on several introduced bills and draft working papers dealing with the Sea Grant Program, the National Oceanic and Atmospheric Administration, and marine science and technology.

THE MARINE SCIENCE, ENGINEERING, AND RESOURCE DEVELOPMENT OF 1975—S. 709

It is my opinion that this bill, introduced by Senator Humphrey, is a much needed piece of legislation that will provide the high government level involvement and visibility that is essential to see that marine science and technology receive proper attention, priority, and funding. With the world population now at four billion persons, and continuing to increase rapidly, no nation can afford to have less than the highest levels of government involved in ocean policy, science, and technology on a regular and high priority level. I would strongly encourage that this bill be enacted promptly.

THE OCEAN AND COASTAL RESOURCES ACT OF 1976—STAFF WORKING DRAFT 2

Since this working draft addresses both the reauthorization of the National Sea Grant Program and a reorganization of the National Oceanic and Atmospheric Administration, I will provide comments on each part separately.

NATIONAL SEA GRANT PROGRAM

As a Sea Grant College Director, I have rather strong, and what might be considered biased, opinions about the manner in which the national and local Sea Grant programs should be conducted. To me, the strength of the Sea Grant Program is the foundation of scientific and technical store of knowledge and expertise of the universities and colleges upon which it is attempting to build a national network in order to respond better to, not only the immediate, but the longer term coastal and marine resource needs of this country. Its unique approach of allowing a diversity of local approaches to a multitude of seemingly unrelated problems, yet attempting to discover the underlying and unifying fundamental principles that will lead to their common resolution, is without parallel in ocean programs today. Rather than reiterate what has been well said by others, I submit Enclosure A, which is the testimony of UCSD Chancellor William McElroy before the Oceanography Subcommittee of the House Merchant Marine and Fisheries Committee on March 2, 1976, as an integral part of my testimony.

In Chancellor McElroy's testimony, he stressed and summarized the benefits of the Sea Grant Program that have simultaneously accrued at the state (or local) and national levels. His summary was based upon a thorough familiarity with what the Sea Grant Program has been able to accomplish within the State of California that has benefited, not only the people of California, but those of the rest of the Nation as well. Enclosure B, which is a detailed description of the benefits of the several Sea Grant Programs in California, is also submitted as an integral part of my testimony.

As a Sea Grant College Director, it is most encouraging to me when I receive publicly expressed support of the program, and especially when this support appears in the form of an editorial in what is well known to be a fiscally conservative newspaper. Enclosure C, an editorial from the San Diego Tribune entitled, "Sea Grant Pays Off," is also submitted as part of my testimony.

The specific changes in the legislation for the operation of the National Sea Grant Program will, on balance, strengthen the program and allow the Nation to take full advantage of the capabilities that it has been building under severe funding restrictions for the last several years.

However, the rather sharp distinction that this draft makes between "national" and "state" coastal and marine problems may not be justified. For example, the need for a better understanding of the fundamental processes

underlying the long-shore transport of sand to prevent further erosion and to provide for the possible restoration of California beaches would certainly seem to provide information that is of use nationally. The development of a more rapid and sensitive test for saxitoxin in shellfish to alleviate a problem of the California seafood industry certainly has applications beyond the State of California. The development of the dynamic breakwater to protect beaches from erosion, and moored ships from wave damage in California waters, will certainly have benefits far beyond the State of California. The development of genetically selected strains of commercial crops that can be commercially raised with seawater irrigation in arid regions of California will certainly be beneficial in similar areas not only nationally, but also internationally.

If the basic approach to problem solving is to not only alleviate an immediate local problem, but is also to discover and understand the underlying principles, this apparent dichotomy should disappear. This approach, I maintain, is the basic approach of Sea Grant and therefore, a sharp distinction between "state" and "national" problems is extremely difficult to identify except possibly in terms of the scale of the problem and the needed effort to resolve it.

Therefore, I am concerned about the requirement for "the director of the program [to] identify such specific needs and problems of the national nature and fields related to ocean and coastal resources." As I stated above, the strength of the Sea Grant Program is its evolutionary approach, building upon the novel and diverse local approaches to coastal and marine resource problems. To move now to large federally directed projects that may have rigidly established objectives and goals would seem to me to be counter productive on the basis of the experience of the Sea Grant Program to date. If some mechanism can be established to ensure that "national" projects without rigid objectives and management, considerably distant from the activities undertaken, can be established, most of my concern would be eliminated.

The need to involve the broad based scientific talent that has been the foundation of the Sea Grant Program in a national consortium to address large scale problems is desirable. Possibly the mechanism should be to involve the collective of university scientists and engineers in setting the goals and objectives of "national" projects. Such an interactive approach with policy makers in Washington should result in a mutual education of both that would thereby benefit all of our citizens in the conduct of coastal and marine science activities. If such a mechanism can be established, I would strongly support the inclusion of an appropriately limited amount of "national" projects within the National Sea Grant Program, with full federal funding. Participants in such projects should be exempt from the fifteen percent state funding limit.

I am pleased to see that this draft returns the coastal and marine advisory service within the coastal states to its existing university base. The importance of the marine advisory services being based on university campuses cannot be stressed enough. It is only in this fashion that all segments of the broad coastal and marine community, from users to managers, can obtain independent and soundly based scientific and technical advice and training. I think this working draft recognizes the value of basing marine advisory services at the universities and colleges participating in the National Sea Grant Program.

The recognition of the importance of independent graduate studies, as evidenced by the provision for Sea Grant fellowships, is also encouraging. Since the inception of the University of California Sea Grant College Program, we have provided "Traineeships" to selected graduate students to allow them to conduct independent research on practical coastal and marine resource problems in connection with approved Sea Grant projects. We continue to believe that this is the best approach for training the future operating marine scientists of industry and government, and the teachers of future marine scientists. The provision for Sea Grant fellowships strengthens our commitment to continue this sound and viable approach to graduate student training and education.

REORGANIZATION OF NOAA

In the time available to prepare these comments, I have not been able to carefully compare how S. 709 and this portion of the working draft would interface operationally. Furthermore, I believe others, more knowledgeable than myself about the operations of the Federal government, could provide more helpful comments on this point.

I can see the need, as well as the desirability, to involve a broad spectrum of governmental entities in the provision of advisory services. This has been successfully accomplished in Agricultural Extension through the use of "co-operators" on an as needed basis depending on the problems at hand.

However, even though I am supportive of new and innovative mechanisms for the establishment of effective coastal and marine science, technology, programs and information programs, I do not fully understand why a new focus of responsibility for the broader based dissemination of information through advisory services will be more beneficial. Conceptually, I support the objectives of increased access to information proposed in this working draft.

In summary, I think the proposed funding levels contained in the working draft are adequate and realistic. If I can answer specific questions, please contact me and I thank you for the opportunity to provide this testimony.

Sincerely,

JAMES J. SULLIVAN,
Program Manager.

Enclosures.

STATEMENT OF W. D. McELROY, CHANCELLOR, UNIVERSITY OF CALIFORNIA, SAN DIEGO PRESIDENT, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Mr. Chairman and members of the Committee: I am happy for this opportunity to comment on the National Sea Grant Program and to report on the University of California Sea Grant College Program. I know how seriously this committee takes its oversight and authorization responsibilities, and I am pleased to be of assistance to you.

The Sea Grant Program is close to my heart, both as a scientist and administrator. As a marine biologist, I am not only deeply interested in my specialty, but also in the contributions of others to the understanding and wise use of our oceans. As an administrator, I was Director of the National Science Foundation in 1970 when the Sea Grant Program was transferred from NSF to NOAA. At NSF I became acquainted with the thrust of the Program, its basic goals and its Director, Bob Abel, whom I was sorry to lose to NOAA. Today, the University of California, San Diego campus, of which I am Chancellor, is the headquarters for the California Sea Grant College Program, the largest in the county. With me today I have Dr. James J. Sullivan, Director of the California Sea Grant College Program, who has detailed knowledge of our operations.

Before proceeding to specifics, let me state my fundamental opinion on the National Sea Grant Program. In my view, it is an excellent, much needed, highly beneficial program which has justified the expectations of its founders and should be funded at a higher level in the future. This is a very positive statement and I think I can more than adequately back it up.

The National Sea Grant Program, as I understand it, is an applied, inter-disciplinary marine resource program which seeks, in an innovative and co-operative fashion, to link together the efforts of universities, industries and government. Typically, the Sea Grant Program involves action oriented marine projects that:

- Involve highly qualified scientists, engineers and others;
- Are of strong interest to user industries and local and state governments;
- Are best accomplished under college and university auspices.

The primary goal of these activities is the accelerated development of marine related resources and policies through applied research activities, the professional and vocational training of manpower, and the effective dissemination of research results.

Sea Grant is a unique federal program. Because it is user-oriented and involves the active participation of its beneficiaries, the Sea Grant Program approach provides feedback between theory and practice in the solution of specific problems, and thereby leads to the discovery of fundamental principles that will have broader applications. And, because it is inter-disciplinary, because it has an applied cast, it builds upon the vast federal investment in project science and engineering.

Sea Grant is also unique in another way. In contrast to the typical federal grant or contract in science and engineering, the Sea Grant Program allows—indeed requires—local decision making on the projects to be undertaken. In effect, the participating educational institutions have a high degree of autono-

my, within a national perspective, in matching problems to their research and training capabilities, subject, of course, to quality review at both the local and national level.

Furthermore, Sea Grant insures non-federal participation by insisting (through the founding legislation) that one-third of the cost comes from non-federal sources—state, local, industrial, university, and other. This wise provision, in my opinion, is responsible for the program's unusual responsiveness to a broad range of practical problems. It also injects reality into our education and research programs, and encourages active participation by non-federal sponsors.

Since Sea Grant was established, its success in addressing the important coastal and marine problems of this country, when measured against the financial resources available to it, has been extraordinary. Its flexible yet coordinated approach to the development and dissemination of useful information between the broader marine community and university scientists, its cooperation with other governmental agencies and private industry—all directed toward the mutual exchange of knowledge necessary to develop and wisely use marine resources—is without parallel among ocean programs. Its basic approach and mode of operation establish a local focus of responsibility for a broad range of activities and novel approaches through a single grant and allow a natural, managerially sound approach to the diverse practical problems and potentials in the realm of marine resources.

Now let me give my views on some of the chairman's specific questions. You ask about the Program's contributions to topics of public and national interest, and, in a related question, inquire as to how well the Program is attuned to national priorities.

Certainly, the intelligent utilization and management of the vast resources of this nation's coastal areas occupies a position of high national importance and public interest. In California, the experiment in coastal planning and management, begun in 1972, has now moved to the legislative stage. Throughout this period, our Sea Grant Program has been extremely responsive to the State by providing information for planning and policy decisions. A good example is the recently published book entitled, *Governing California's Coast*, which is the result of Sea Grant supported research. We will continue this study to analyze and report on the legislative phase, and then will summarize the entire experience for the benefit of other states.

An adequate supply of food for human consumption is a major issue of national and international concern. In California, Sea Grant has funded projects to develop the mass culture potential of diverse marine animals and plants, and through support of fisheries' development studies. Aquaculture activities include the American lobster, abalone, scallops, surfperch, crabs, and shrimp; we feel we have developed the finest crustacean research group and capabilities in the Nation. Our studies in the genetic selection of salt-tolerant commercial crops could have obvious major national and international ramifications. Our Advisory Service informs the user industry about new fisheries products and the consumers about methods of preparation. Research staff, working with the marine advisors, are developing the information base upon which to intelligently harvest underutilized marine food sources. Students are being trained in practical marine matters including the development and management of new fisheries, the socio-economics of the tuna fishery, the legal and regulatory issues surrounding the establishment of commercial culture ventures and the complex issues involved in managing an extended economic zone on a coastwide basis.

Coastal engineering, and the resultant understanding of the fundamental shore processes, makes important contributions for those who manage, preserve, or utilize the ocean-land interface. The development and utilization of the "Shelf and Shore" stations provide for better measurements of the physical systems underlying the long shore transport of sand and are contributing to the establishment of a new sand management program. Ocean engineering, as it relates to structures, platforms and submersibles, also enables man to work far from shore and in deep water. Because of the diminishing terrestrial supplies of economical sources of minerals of all types, the search for them in the sea has taken on a sense of urgency. Innovative ways to protect shore installations and offshore structures from the ravages of waves, to understand and design for resistance to earthquakes, and the development of new techniques and equipment for man to work in the marine environment are moving forward

with success. The successful development and implementation of the "Dynamic Breakwater" is a major engineering breakthrough in low-cost, environmentally sound protection of beaches, structures and moored ships from wind wave and ship wake damages. This year we will commence studies to determine the response of large gravity-type offshore structures to earthquake excitation, since preliminary studies show that earthquake loading may be the controlling factor along the coast from Alaska to California. The interdepartmental Applied Ocean Science Curriculum continues to provide for the education of the students who will carry the knowledge of these advances with them into government service and private industry. In all these examples, state priorities are also high national priorities and cannot be separated.

You inquire about the Program's relationships and coordination with other federal agencies concerned with marine research. We have established cooperative and joint efforts with appropriate NOAA groups, the Coast Guard, the Department of Agriculture, the Geological Survey, the Navy, and the Park Service. Because Sea Grant tends toward the applied research, there are not many instances, at least as we have seen in California, for detailed programmatic coordination with NSF. In this regard, let me state an important concept of Sea Grant. That is, this Program not only has the ability to exploit a basic research discovery for a practical purpose, but also to empirically test theory in the real world simultaneously. With our program located on the several California campuses—representing the largest marine research effort—our Sea Grant staff has an unusual opportunity to form informal contacts with principal investigators on NSF, NIH, ONR and other basic science grants. This daily contact, from my experience, is worth a ream of outdated research reports.

Another question from the chairman asks about the effectiveness of the Sea Grant organization on the various campuses. In California, I believe we have a very effective organization.

The University of California is a multi-campus system, one of a limited number of national research universities, and the primary academic research agency of the State. To be able to tap the vast educational and scientific talents of the several universities—public and private—throughout the State, we have followed a somewhat decentralized approach to allow us to span our 1,100 miles of coast—the equivalent distance from Marblehead, Massachusetts to Savannah, Georgia.

Within the University, the responsibility for the management of Sea Grant matters is fixed in the Office of the President. The President appointed a Council to advise him on Sea Grant matters, appointed the Director of Scripps Institution of Oceanography as his representative in the administration of Sea Grant matters and chairman of the Council, and assigned the responsibility for the important role of administering the Sea Grant Program to the statewide Institute of Marine Resources. Within the Institute, the position of Sea Grant Program Manager was established and assigned responsibility for the conduct of the program. The Sea Grant Committee, composed of representatives from University of California and California State University campuses, has the responsibility to provide administrative advice and to review the program within the policy guidance provided by the Council. In this review, the Committee is assisted by scientific and technical review panels nationwide.

On several campuses throughout the State, we have Campus Coordinators who are responsible for the local administration of Sea Grant matters, and more importantly, for the development of new campus programs. To insure a programmatic approach, we have appointed Subject Area Coordinators for the major program areas. These individuals serve as catalysts to develop new programs statewide and hold meetings of persons involved in the respective research areas, regardless of whether or not they have Sea Grant support. This structure has proved workable and quite effective. It has allowed us to involve the best talents from throughout the State to work on important problems whose resolutions will have important ramifications well beyond the State. In California, the Sea Grant Program presently involves six campuses of the University of California, an equal number of State College and University campuses, California Institute of Technology, Stanford, University of Southern California, the University of San Diego, the California Academy of Sciences, and the Moss Landing Marine Laboratory Consortium—plus several community colleges.

We have achieved active participation in our program by local and State agencies, as well as user industries. For example, our squid fishery development project is jointly directed by a California State University faculty member and a staff member from the Department of Fish and Game. The Council that advises the University President on Sea Grant matters is composed of 15 members drawn from government, industry and the public, and 10 members from California universities. Several industrial advisory committees provide advice and counsel in selected program areas. The broader marine community and commercial consumers throughout the State are integrated into the program through townhall meetings, workshops, and training sessions conducted by the Advisory Service staff.

Through such institutional mechanisms and person-to-person interactions, the program has been effective in making its services and products known to potential users. The public education program of our Scripps aquarium provides a marine experience for 60,000 primary and secondary students this year and for over 300,000 other persons annually through displays and outreach programs. Nationally, new approaches, such as the experimental national marine industry advisory project (MIDAS) at the Massachusetts Institute of Technology, are being developed. The preceding comments are an answer to your questions about the program's relationships to the various interest groups, including the general public, in our activities.

The chairman also raises the question of programmatic balance—the balance between local and nationally oriented projects, and the balance between research, education, and advisory services. For me, this is a hard question to answer, one that in the final analysis is almost certainly judgmental. My view is that the basic Sea Grant approach of marshaling the talents necessary to address specific local problems yet searching for broader applications, provides local and national benefits simultaneously. As new problems arise and national priorities change, the existing legislation and oversight committees like this one insure a proper balance. Compared to the regular NIH and NSF programs, which do not have the practical, participatory, and other unique Sea Grant features, this program is extraordinarily well balanced. Although it is true that most Sea Grant investigators are faculty members, I believe there is little risk of the program overemphasizing its research function.

Your invitation letter, Mr. Chairman, asked for recommendations concerning any changes in the Program. Subsequently you sent me a committee print of a bill entitled the "Ocean and Coastal Resources Act of 1976." Unfortunately, these hearings following so closely after the receipt of the bill have not allowed me adequate time to study it carefully. My initial impression is negative toward the insertion of a management layer between the head of the Sea Grant Program and the chief NOAA administrator. From my experience at NSF, I just don't think this is necessary. Furthermore, my colleagues and I are entirely content with the present provision for advisory services which are integral to the Sea Grant Program. For these reasons, we cannot endorse the proposed changes. On the other hand, I fully endorse the bill's continuation of the important requirement for non-federal cost sharing.

Now let me comment on your general question as to recommendations for the Program. With the limited financial resources available to the National Sea Grant Program in recent years, a healthy period of reevaluation and consolidation is taking place. It has allowed the National Program to take a hard look at its components, assess strengths and weaknesses, achieve a higher level of maturity, and set the stage for further growth. Given these developments the existing broad statutory authority which adequately provides for the effective conduct of the Sea Grant Program, its level of authorized funding, I have only a few recommendations to make.

1. The basic approach and mode of operation of the National Sea Grant Program should be maintained and strengthened.
2. Within the existing granting structure, provision should be made to accommodate better cooperative activities among Sea Grant programs on a regional, national, and international scale.
3. To provide for more effective development and transfer of results, some provision should be made within the Program, and the appropriation augmented, to undertake large scale yet appropriately limited engineering and demonstration projects between Sea Grant Colleges, industry, and government.
4. Over the next three years, the appropriations for the Program should be raised to the authorized level of fifty million dollars.

Let me conclude, Mr. Chairman, by reaffirming my support of the National Sea Grant Program. By itself, the Program is an entirely worthwhile activity. But in conjunction with the enormous federal basic research and engineering activity, this Program takes on extraordinary importance for the wise development of our marine resources. For a relatively small investment, we extend that other federally sponsored research in a way which grapples with specific, pragmatic coastal and marine resource problems of our citizens. Sea Grant should be looked at as a high leverage operation, one which extends and magnifies the fruits of our basic research through practical applications for the benefit of all concerned with coastal and marine resources.

I would be happy to answer your questions.

CALIFORNIA SEA GRANT PROGRAMS—BENEFITS

The Sea Grant Program is an applied, interdisciplinary coastal and marine resources program which seeks, in an innovative and cooperative fashion, to link together the efforts of universities, governments, and industries. Research, advisory, and educational projects have sought and are continuing to promote the wise utilization, conservation and management of the coastal and marine resources in the State of California. Selected examples of these efforts of Sea Grant supported staff follow, listed in separate paragraphs, by contribution. Geographical sections help illustrate where the projects' results have contributed to the enhancement of California's resources.

NORTHERN CALIFORNIA REGION

The Sea Grant program is developing displays and other informational materials for visitor interpretive programs in four coastal parks in the North Coast region including parks at Saulph Point and Mendocino Headlands. Management guidelines for underwater and intertidal park lands in northern California will also be formulated. This information will enhance the knowledge base on the ecology of the coastal area for agencies charged with the management of marine resources and will help educate the public about the marine environment.

Age, growth, and diet studies on adult salmon captured off the northern California coast were completed in 1972. The information generated helped provide the basis for lowering size limits and extending the fishing season by two weeks. The project has had a significant and positive economic impact for the commercial salmon fishing industry by increasing catch and profits and extending existing jobs for several weeks.

The gaper clam is an important sport species along the Pacific Coast with extensive beds in Humboldt Bay. This project provided necessary information for sound management of gapers. A final report was given to the Department of Fish and Game, and a research report was published in the January, 1976, issue of California Fish and Game.

Humboldt Bay is an important spawning area for herring, and each summer large numbers of anchovy move into the bay. In 1973 a commercial anchovy fishery was proposed by albacore fishermen who use anchovy for bait. In 1974 a commercial herring fishery was begun with the assistance of the Sea Grant Marine Advisory Service. Controversies concerning the effects of both of these fisheries on existing stocks and on salmon stocks arose, and an anchovy fishery was disallowed by the Department of Fish and Game. This Sea Grant project has been designed to gather necessary biological information on both species in Humboldt Bay in order that the Department of Fish and Game can properly manage a commercial harvest. Establishment of new commercial fisheries of anchovies in Humboldt Bay would be of significant benefit to the local economy. The potential expansion of the present herring fishery to meet a higher Fish and Game quota would allow more fishermen to enter the market with profit.

Squid and razor clam pieces are preferred baits for crab pots in northern California, but both are unavailable at times, require refrigeration, and have a limited effective fishing time. It was felt that a bait consisting of a binder into which a slowly-released attractant was incorporated would be economically useful to the crab fishing industry. A polyacrylamide gel binder has been developed and has been partially successful when used with razor clam extract as an attractant, thus enhancing crab fishery catch. Continuing efforts are being devoted to investigating additional efficient attractants which will further increase fishing time and potentially, subsequent catch.

Pacific hake is an abundant but currently underutilized ocean fish. Large numbers are harvested by Russian and Polish ships off the Pacific Coast, and some of the product apparently enters the country via Polish ships offloading at Ensenada. This research project is currently undertaking a test marketing program for this species to determine if a domestic fishery is feasible. Hake will be offloaded at Eureka, processed into frozen blocks of minced flesh (and possible fillets), and marketed through brokers in Los Angeles. A cost analysis from fishermen to retail outlets will be done. The project is being carried out in cooperation with local seafood processors, local fishermen, and the National Marine Fisheries Service. The potential result is a new commercial fishery in northern California with benefits to the fisherman, processor, and consumer.

Dungeness crabs molt in late summer and early fall and require two to four months to recover to a meat-content point high enough for value as a market product. This project has determined that crabs captured just prior to molt could be held under controlled conditions and fed a diet based on fish wastes in hopes of speeding the recovery process. The objective was achieved—captive crabs reached market readiness fully one month before their wild counterparts. Market conditions to date have not justified a commercial venture, but should conditions change, we anticipate that the information generated by this project would be used to start such a venture. Additionally, continued efforts by other institutions to rear crabs from eggs will probably succeed in the near future. Success in those attempts will allow application of techniques developed under this project to be applied in a complete aquaculture enterprise. Results have been widely disseminated, particularly to aquaculturists on the Pacific Coast.

Kraft Pulp Mill Effluent (KME) contains large amounts of toxic chlorinated lignins, and two pulp mills in Eureka discharge approximately 50 million gallons per day of KME directly to the ocean. The bacteria which break down toxic components of KME have potential applications in biological filtration system. Research supported by this project has resulted in isolation of over 30 strains of anaerobic bacteria and over 130 strains of aerobic bacteria, all of which are involved in the breakdown of lignins. More importantly, the researchers have shown that detoxification of the Kraft Pulp Mill Effluent occurs only when an anaerobic digestion process is followed by an aerobic process. In parallel with the bacteriological work, a new and rapid bioassay, using embryos of a marine worm, was developed. Results of the project have been given to Louisiana Pacific and Crown Simpson corporations, both of which cooperated and contributed in the research, and techniques are being developed in utilizing this research to reduce the toxic effluents.

Bioassays of the marine environment typically employ finfish as test subjects and require 96 hours for completion. They lack sensitivity, and the time and space requirements preclude rapid, on-site tests. A new 12 hour rapid and sensitive bioassay for toxic pulp mill effluent in ocean outfalls has been developed. This assay requires less equipment as well as less time; consequently, there has been a reduction in overall cost of the tests. Eggs of a marine worm, *Urechis caupo*, are exposed to various dilutions of effluent for a predetermined time period on the order of minutes. The eggs are then exposed to sperm, then preserved in a formaldehyde solution. The percentage of successful fertilizations is the index to toxicity. The test has wide application for pollution studies of marine environments; inquiries about the technique have already been received from workers in the state of Washington, and details of the technique have been presented by the Marine Advisory Service to local processors.

The Marine Advisory Extension Service exists to ensure that the results of Sea Grant (and other) research reaches, in useable form, those for whom it is intended. This service is not restricted to disseminating the results of research. Marine advisors also seek out problems or questions that can be answered by Sea Grant and other public agencies. In essence, the advisory service is the interface between users of the marine environment, and its resources, and the academic and governmental communities.

A partial list of the activities of the Marine Advisory Extension Service over the past six years in the Eureka, Fort Bragg and Crescent City areas follows. Workshops, conferences, and townhall type meetings on the following topics have been held, and commercial fisheries, seafood processors, and planners have been represented.

- Refrigeration systems for fishing boats.
- Use of new survival equipment for fishermen.
- First aid for the fisherman.
- Methods for financing capital construction.
- New developments in trawling.
- Fishing business management.
- Limited entry into the commercial fishery.
- Improving methods for gathering weather information.
- Economic potential of North Coast marine resources (a symposium).
- Coastal Zone management problems (a symposium).

The advisory program has made a promotional move on the Dungeness crab; published a recreational map of Humboldt Bay; set up a Marine Electronics course for fishermen in a local community college in the Humboldt area; published a quarterly newsletter for fishermen, processors, and sportsmen; and developed sea surface temperature charts, utilizing infrared imagery from NOAA satellites, to aid salmon and albacore fishermen in locating favorable fishing areas. In addition Sea Grant staff coordinated a meeting of the United States-Soviet Fisheries Claims Board in Eureka so that local fishermen could file damages claimed. Since the meeting, one claim estimated at \$30,000 has been processed for a northern California fisherman.

SAN FRANCISCO REGION

Sea Grant investigators have provided assistance to the California Department of Fish and Game in developing standard guidelines and procedures for the evaluation of proposals to introduce exotic species into the state and serve as part of an advisory group to this agency, which will assist in evaluating future proposals for exotic species introductions.

University personnel with Sea Grant support have assisted the California Coastal Zone Conservation Commission (CCZCC) and other appropriate governmental bodies in effectively meeting their responsibilities relating to the planning and management of California's coastal resources by having explored the basic considerations needed in adopting an initial set of governing policies with respect to the problems and potentials of the seaward side and by having developed a methodology to assess the economic impacts of using coastal lands for public parks in the Monterey area.

University investigators have been working with the State Water Resources Control Board to assess long term effects of toxicants and biostimulants of waters of San Francisco Bay and have established an ongoing monitoring system.

Publications such as "State Involvement in the California Coastal Zone" and "Federal Involvement in the California Coastal Zone," topical indices to agency responsibility, help resolve a major problem in managing California's coastal area, that of understanding the nature and extent of Federal, state, and local government involvement. The publication of *Governing California's Coast*, by Scott is most timely for the legislative deliberations of the Coastal Plan. The Marine Advisory Program's conference on "Marine Resource Problems" has helped achieve more understanding among industries, government agencies, and scientists to better define the problems and solutions more effectively.

A review of past studies of the benthic fauna of the San Francisco Bay-Delta System, and resulting attempts to assess the "health" of the Bay, have indicated that nearly all such studies have been of limited value because of a series of problems related to the taxonomy of the Bay fauna. Scientific literature for Bay-Delta fauna is limited, many organisms cannot be identified by presently available keys, and there is no facility for the deposition of collected material. Therefore, a joint effort of the California Academy of Sciences, San Francisco State University, and Sea Grant is resolving these problems by providing a reference collection of all the benthic and intertidal invertebrate fauna; background information and bibliography on the taxonomy and biology of the various species; general information on the geology, hydrology, and history; a series of simplified, annotated, illustrated identification keys to the various invertebrate groups of the Bay-Delta System; a program to train students; and a specimen repository.

Research on saxitoxin, which is a paralytic poison sometimes present in shellfish and red tide organisms, has devised a thirty minute assay method

about one hundred times as sensitive as the methods presently used and which has been applied to clams and mussels with reliable results.

Research conducted by Sea Grant-supported investigators has elucidated the basic biology and ecology of gaffkemia caused by the pathogen *Aerococcus viridans*, and has developed procedures for immunizing adult American lobsters, *Homarus americanus*. Monitoring and culture systems have been perfected to reduce incidence of infection of all types, including *Leucothrix*, in the American lobster. The investigators, acting in cooperation with the California Department of Fish and Game, have checked induction of gaffkemia to California Spiny lobsters, *Panulirus interruptus*, and are continuing to assist in monitoring for disease and developing guidelines for the importation of exotic species.

The research results helped minimize lobster mortality in holding tanks, which should aid wholesale and retail dealers in minimizing losses due to disease. Some wholesale dealers estimate, on an average, a 10 percent loss for all seafood. Considering this, 2,613,000 pounds of American lobster, and 5,409,000 dollars could have been saved in 1973 through gaffkemia immunization, proper handling, and water quality monitoring.

Immunization procedures will permit the protection of breeding stocks and juveniles of lobsters in aquaculture systems, thus minimizing the mortality of the organisms and reducing costs due to losses. This is in collaboration with commercial and university aquaculturists. A potential cost-savings from the growing, care, and feeding for approximately 30 percent of the lobster larvae may result. It is estimated that 30 percent of larval lobsters are lost, mostly due to disease.

Through the studies on protective measures, better environments conducive to growth and longevity will exist for lobsters. This is being utilized directly by industry and other research projects. Also, the systems and techniques developed may be used for shellfish other than lobster, thus lowering losses and costs in other areas of aquaculture.

In the long run, gaffkemia immunization may help reduce mortality rates of lobsters up to 10 percent of the total catch. This could result in a savings of close to 2,903,000 pounds of lobster, and 4,191,000 dollars in 1973.

A guesstimate of approximately 5,600,000 pounds and 9,500,000 dollars for the United States' 1973 landings, could have been saved by the lobster industry because of implementation of research-generated techniques.

In future years 19 percent annually of the total landings of American lobster could be saved through the techniques developed in this project.

A methodology for reducing the discoloration in frozen tuna loins has been developed by vacuum packing. The cooked loins are sealed in a plastic wrap that is impermeable to water and air, and then frozen. This is an economical means for the tuna industry to enhance marketability. The resulting loins do not show the brown discolorations when subsequently thawed and canned. This information has been presented to the National Cannery Association and the United States Food and Drug Administration at their request.

Research has established a previously unrecognized mechanism for the action of numerous antioxidants, including some in fish meal. The reactions elucidated involved the conversion of nitrogen-containing antioxidants into nitroxide derivatives, which are, in fact, the active antioxidant forms. Means of synthesis of stable nitroxides of some amino acids were also established, providing the basis for possible manufacture and use of these highly effective antioxidants. These developments will greatly reduce potential spoilage which presents a public health hazard and an economic loss for the food packing industry.

Knowledge of the effects of thermal effluents on benthic marine organisms is being sought by various agencies, (e.g., California Fish and Game, California State Water Quality Control Board, EPA, Nuclear Regulatory Commission, Energy Research and Development Administration) which are involved in setting environmental protection standards.

Although standards are based entirely on biological considerations, they profoundly affect design and siting considerations of power companies. Studies on the biological effects of waste-heat effluents from coastal power plants of Southern California Edison, San Diego Gas and Electric, and Pacific Gas and Electric supply data directly applicable to evaluation of these standards and may help reduce costs of locating, construction, and effluent monitoring and cleaning.

To help assess the "health" of San Francisco Bay, a low-cost towed submerged environmental monitor has been developed and has monitored the distribution and dispersal of environmental "pollutants" for continuing assessment of the Bay.

A major Sea Grant advisory program effort, now in its third year, has been the initiation and coordination of the introduction of silver salmon in San Francisco Bay. The National Marine Fisheries Service-Tiburon Laboratory, the California Department of Fish and Game, and the Tye Club of San Francisco cooperated in obtaining 8,000 juvenile coho salmon from the State's Mad River Hatchery at Arcata to be placed in floating pens at Tiburon in San Francisco Bay for growth and release as a limited sportfishing resource which did not previously exist. Survival was excellent and growth exceeded expectations based on similar work at Puget Sound, Washington. The initial batch has been released. There have been enthusiastic responses from sportfishermen and the record so far indicates a success. Forty thousand more fingerlings are presently being raised in this continuing effort to enhance Bay sportfishing.

SANTA CRUZ REGION

University personnel with Sea Grant support have assisted the California Coastal Zone Conservation Commission (CCZCC) and other appropriate governmental bodies in effectively meeting their responsibilities relating to the planning and management of California's coastal resources by having identified and mapped the inland boundary of coastal lands that are deemed to have a significant view of the ocean (viewshed) and the viewshed associated with coastal highways that extend inland beyond the ocean viewshed. They have also given assistance by estimating and analyzing the local fiscal impacts of several potential alternative land uses in the Half Moon Bay area.

Public and private owners of beach and dune areas could benefit from the study that indicates that management of beach and dune vegetation will reduce erosion, promote sand stability, and increase community stability that might permit increased human use of the land. Those who live just inland from such areas will similarly benefit because shifting sand invades adjacent inland areas. Bodega Bay, Morro Bay, and San Diego communities, for example, have recurring dredging expenses because of sand movement. National, state, and local parks on beach and dune land will benefit if we can indicate how they might reclaim severely disturbed areas and maintain them in some state approaching natural diversity of plant cover and landscape indigenous to that region of the state. This work is a cooperative effort with the California Department of Parks and Recreation.

Investigations are being conducted to gain precise information on the effects of the so-called "waste-heat" released into the vicinity by coastal, water-cooled power plants, of which the large fossil fueled Pacific Gas and Electric Plant at Morro Bay is a good example. To date we have not identified any major disturbances in the biology of the animals in the thermal outfall at Morro Bay which suggest that power plant outfalls should be modified. Fear of adverse ecological impacts resulting from possible thermal pollution has caused strict regulation of the temperature regime of outfalls. These regulations are costly to the builder of power plants and in turn have their impact on the cost of power production. Our studies imply that the regulations may be unnecessarily restrictive and, if this is accepted, could result in reduced costs for power plant construction and eventually the cost of power.

Furthermore, such studies have potential applicability to the utilization of "waste-heat" in aquaculture projects adjacent to power plants and thus are of importance in promoting energy conservation and improvement of local food production.

The creation of salt-tolerant crops able to use seawater or brackish water would be a revolutionary development for crop development—using less costly, naturally rich in mineral nutrient saltwater and rendering useful immense resources that are not only useless for crop production but actual threats to it (coastal areas, wetlands, etc.). Research investigations have developed barley and tomato strains having salt-tolerant as well as commercially marketable characteristics.

Seawater contains high concentrations of most of the major plant nutrients—potassium, calcium, magnesium, and sulfur. Only nitrogen and phosphorus will have to be added, and with further development even that limitation may per-

haps be overcome. Seawater also contains adequate concentrations of all micro-nutrients (trace elements). But both the water and the nutrients it contains are useless for crop production on account of the high salt content of seawater and the sensitivity of existing crops to that salinity.

The creation of salt-tolerant crops would tap that immense resource of water and nutrients and would do so with large savings of energy (pumping of irrigation water and use of fertilizer). For crops on small areas (like tomatoes), seawater or brackish water hydroponics would be suitable.

In view of the world food and energy situation on the one hand, and of existing and impending scarcities and skyrocketing costs of fertile land, good water, and fertilizers on the other, this project represents a timely, even an urgent enterprise.

SANTA BARBARA REGION

Working closely with Kelco Company and Ocean Labs, Inc., commercial kelp harvesting and carrageenan production firms in California, seaweed research programs have carried out studies of benefit to industry and the State. The standing crop of *Macrocystis* and its rate of growth and plant mortality have been estimated; a resource utilization model for this most valuable California marine crop plant is being developed. It is estimated that the annual value of some 122,447 metric tons (wet) harvested in 1968 was worth between 1.6 and 2.6 million dollars. This model will serve as a methodology for maintaining the optimal sustainable yield and may be used by the California Department of Fish and Game for conservation purposes as well as by the commercial kelp industry to enhance and continue harvesting of *Macrocystis*.

A new artificial reef was built in the coastal waters off Ventura County. A local Cooperative Extension advisor, guided by a marine specialist, directed a community effort which constructed an artificial reef for sportfishing. This project has involved the Ventura County Fish and Game Commission, the Port Commission, Explorer Scouts, Sunrise Optimist Club, Kiwanis Club, California Department of Fish and Game, California Wildlife Conservation Board, community-minded citizens young and old, and sportsfishermen.

The Marine Advisory Staff directed the assembly and placement of tons of concrete-weighted auto and truck tires. The reef is expected to last forever compared to those made from steel car bodies, and diving examinations show that fish have found a new haven. This is also evident in the increased catch and in the enthusiastic responses of sportsfishermen. The Marine Advisory Staff have prepared a 7½ minute slide-tape presentation of the artificial reef project. It has been requested widely and has been shown at the 1974 National Artificial Reef Conference.

Silver salmon rearing is now taking place in the waters of Point Mugu. Extension and Advisory Service personnel, in cooperation with the local "Trout Unlimited" company, are pen-raising 1,000 salmon fingerlings to be released and to enhance sportfishing catch in the area.

Standing crop and economic estimates of natural populations of *Porphyra nereocystis* were studied and some management guidelines for improving yield were established. This marine plant previously had never been harvested in California, yet it is estimated that \$40,000 worth of *Porphyra* seeds itself, grows, and dies yearly on the 55 miles of coastline in the study area that attracts no commercial interest whatsoever. It is further believed that increasing this natural crop by a factor of 15 is a distinct possibility, indicating a potential value exceeding one half million dollars. Distribution of *Porphyra nereocystis* along the 55 mile stretch of California coastline was determined and preliminary harvests made. Evaluation of the feasibility of a small-scale harvesting operation and commercial "nori" sheets were done, and it was determined that 390,000 nori sheets could be produced from this study area, with a value in excess of \$23,000 (1970). Now, the California Department of Fish and Game is considering leasing areas for extensive *Porphyra* harvest.

Research investigators have developed a microscope for use by underwater divers which has since been used in Japan, on the underwater habitat by the Puerto Rican International Undersea Laboratory Facility, and by university researchers studying kelp in California.

Extensive resource management studies on the agar weed *Gelidium* have been conducted. The consumption of agar in the United States is in excess of one million dry pounds per year, with about 40% of this going to laboratory, pharmaceutical, and medical uses, 30% to bakery and confectionery industries,

10% to meat packing, and the rest to other uses. In 1973 the *Gelidium* harvest in California was approximately 800 metric tons (wet), the value being \$360,000. In 1969 the Japanese harvest was 15,700 metric tons (net weight), the value being 3.49 million dollars. We import (through San Francisco) approximately 600 dry tons of *Gelidium* per year (1973). The infant *Gelidium*-harvesting industry in California is only marginally profitable—if that—at the present time. Mismanagement of the resource could easily lead to industry failure. It has been urged that the plant be harvested with great care. The *Gelidium*-harvesting program model which has been developed incorporates elongation rates, seasonal agar contents, and the seasonal variation of harvesting efficiency—and other factors—to arrive at an optimal harvest policy. According to this model, a natural population will have about 500 grams per square meter as a standing crop. If this is harvested and the population is allowed to recover for 14 quarters, the standing crop will be 900 grams per square meter and can be harvested again with minimum effects on the survival of the population. A shorter time between the initial and subsequent harvests will produce significantly smaller yields. Changes in variables and functions allow one to use the model to predict yield under various management schemes. This management tool can be used extensively by California agencies regulating marine resources, as well as by the kelp industries to optimize management and harvesting of *Gelidium*.

Advisory staff, assisted by Cooperative Extension and the Costagola Fish Company, held a seafood seminar to familiarize consumers with fish species, selection, handling and cooking; more than 250 local consumers attended. To help continue this rapport with and service to the local citizens, newsletters by the Advisory Service are devoted to helping educate the public on a local, day-to-day basis.

Other courses which have been prepared and presented by University researchers have been held to assist Ventura County school teachers in developing courses about the ocean, and the Department of Harbors enhance the coastal and recreational potential of the region.

LOS ANGELES REGION

A study of Los Angeles area coastal zone design planning by Sea Grant investigators has been incorporated into the South Coast Regional Coastal Commission's plan and the State Coastal Zone Plan.

University personnel with Sea Grant support worked with the County of Los Angeles Department of Beaches. Researchers have inventoried underwater resources and have assisted in the formulation of a coastline recreation plan and the citing of a future underwater park. The report on the underwater inventory has been widely used in the county of Los Angeles by groups involved in the planning and development of the coastal zone including the California Department of Parks, the regional and state Coastal Commissions, Standard Oil of California, Southern California Edison, real estate developers and contractors.

The Department of Harbors of Orange County has been aided. Sea Grant supported researchers have developed planning and management methodologies to enhance the area's coastal and recreational potentials.

A diving safety research project conducted by Sea Grant investigators is improving the understanding of the requirements for safe, effective diving via systematic research. This research encompasses training, equipment, adaptation responses, emergency procedures as well as development of instrumentation and methodology for the evaluation of diving equipment. By consulting with diving manufacturers, new, safer equipment is being developed. Results of this study are interfaced directly with concerned agencies such as instructor organizations, national life saving groups, emergency services personnel, health and safety advisors, equipment manufacturers and retail organizations with programs involving SCUBA diving. The County of Los Angeles, Department of Parks and Recreation, the U.S. Navy's Experimental Diving Unit, and the Undersea Medical Society have been closely cooperating in this research to reduce accidental deaths from diving.

Acquisition and collation of oceanographic data on southern California for EIR preparation has been conducted for the Federal Power Commission and California Regional Water Quality Control Boards. Marine baseline data was developed for Pacific Lighting Service Company to utilize in filing for a Federal Power Commission permit and cooperative research is ongoing.

Oil and tar seeps off southern California have been analyzed for the State Lands Commission in order to determine natural and man-made oil slicks and potential petroleum locations.

The Sea Grant program, in cooperation with the California State Lands Division, has initiated an assessment of offshore sand and gravel potential of the southern California coastal zone. Reports by various state and local agencies have articulated the fact that on-shore deposits of sand and gravel aggregate will be in short supply in the major southern California metropolitan areas within the next 10-20 years. Environmental and urban pressures are combining with the high-cost economics of transportation to increase this problem. Aggregate is vital to the construction industry which is already beset with depressed economics. Alternate sources of supply which are environmentally and economically acceptable must be explored.

Part of the Sea Grant effort has been centered in San Pedro and Santa Monica Bays. Potential sources of aggregate, free of Holocene overburden, may occur at the mouths of Ballona Creek and the San Gabriel River in the form of relic channels and Holocene discharge and/or backfilling concomitant with eustatic sea-level rise. An estimate of the extent of the Ballona Creek deposit is 1 square mile by 30 feet thick (30,000,000 cubic yards), which makes it potentially of economic importance. As an example, in terms of onshore economics, this deposit might be roughly 50,000,000 tons which would be equivalent to \$100,000,000 and about 25 years of continuous operation.

Potential sources of sand for beach replenishment exist 2 to 3 miles offshore in Santa Monica Bay. For example, one deposit is about 3 square miles, is an average of about 30 feet thick, and is covered with less than 20 feet of Holocene material. This would be an ample sand supply for Santa Monica Bay beaches for several decades—perhaps indefinitely.

The Tuna Research Foundation summed up very nicely the importance of Sea Grant work on effluent discharges into the harbor from the local canneries. Research has assured them that they are meeting existing water quality standards. Agencies involved in regulation required an objective third party to do the monitoring, for the results meant either the closing or continuance of the canneries in the harbor.

Based on the data from this research, there is an excellent chance that the cannery wastes may be a significant and positive input to the nutrient level of the harbor if properly regulated. It was this fact that presented the canneries from being shut down. Since the cannery business is international in scope, the results from the research, either positive or negative as they reflect on cannery wastes, will be of importance to several developed as well as developing areas of the world.

If the data continues to show a positive nutrient input to the harbor ecosystem, this may save the canneries from 1 to 1½ million dollars for the initial hook-up to a special sewer arrangement. This is not even considering steep monthly charges for its continued use.

The Cannery Steam Company estimated that because of this data which gave water quality officials positive input on cannery wastes, a two-week shut-down was avoided. In dollars, this adds up roughly to \$25 million in sales and employment for that two-week period, based on sales of approximately \$2 million/day with 5,000 employees out of work. Because Sea Grant is considered reliable, the water quality people are more lenient on the canneries since they know that an objective third party is monitoring the wastes. Because of testimony made by the investigator of this Sea Grant project, a shut-down at Star Kist Tuna was avoided which would have put approximately 2,300 employees out of work for an indefinite period of time.

Sea Grant research and education programs have benefited the people of Orange, Los Angeles, and Riverside Counties. The "California and the Ocean" curriculum course has assisted Orange County school teachers in developing classes about the ocean environment. Local adult education and post-professional legal education courses have presented material taught and prepared by the University of Southern California on coastal zone environmental management.

SAN DIEGO REGION

A data acquisition system for making measurements in the nearshore environment, the shelf and shore instrumentation system (SAS), and sensors, has been developed. The basic unit of the instrumentation system is the shelf

station, which is a buoyant, tilting spar which provides a platform for sensors and has a telemetering transmitter for data transfer to shore. This system has helped obtain meaningful data for coastal zone planning. Wave measurements have been undertaken for a long period of time to determine wave climate for the San Diego area. Coastal zone problems, such as beach erosion of Silver Sand and Oceanside, a proposed second channel at San Diego Bay, and maintenance of tidal inlets for coastal lagoons, have been studied and advice given to the San Diego County Planning Division. Much of this information has been contributed to the California Coastal Zone Conservation Plan, the regional commission, and to the planning criteria for the report of Comprehensive Planning Organization for San Diego on the coastline.

Research staff supported by Sea Grant provided and developed the data base and information concerning optional harvesting strategies for maintaining a sustained yield fishery to the urchin industry and to the regulatory agencies charged with protecting the marine resources, California Department of Fish and Game. The effective utilization and management of sea urchins will help optimize kelp bed ecology, kelp production, and management. This program for gathering life history data for urchin species enables us to suggest reasonable fisheries management practices to maximize the yield of sea urchins while minimizing the disturbance such as a fishery may cause to the kelp bed community.

Research has been conducted on the alga, *Sargassum muticum*, which has colonized and fouled many of Southern California's harbors and marinas. Information on the ecology and techniques for reducing potential fouling, developed by the project, will lead to a reduction of a pest and contribute to free circulation and navigation in the area. Positive investigation results have been reported to the Mission Bay Associates, San Diego.

The evaluations of growth, survivorship, and accumulation of pollutants in American lobsters, *Homarus americanus*, cultured in thermal effluent from three coastal power plants, San Diego Gas and Electric, Encina Plant, and Southern California Edison, have been performed, and no problems have been found to be associated with the effluent. Lobsters grow at three to four times that rate found in the temperatures in the natural environment.

These findings have not only implications for faster and, therefore, more economical aquaculture of lobsters, but for culture of many marine organisms. The information generated from the research is of considerable practical value to the emerging aquaculture industry in developing commercially viable aquatic farming operations. Through the utilization of power plant thermal effluent, an estimated \$5.68 per pound of lobster is saved by an aquaculturist. It is of environmental concern, and may offer an alternative to conservation and environmental groups concerned with the placement of power plants. Power companies have an alternative source, with a positive environmental influence of effective land utilization and re-use of heating effluent, with a possible reduction in the degree of heat sent into the ocean. Cost-saving in decision time to the power companies, may result from reduced controversy over the environmental impacts of plant siting.

The indigenous California Spiny lobster, *Panulirus interruptus*, has been drastically overfished, so that an aquaculture farming operation using the east coast American lobster could provide an alternate source of shellfish for the seafood industry in California.

Sale or lease of thermal effluent use rights could provide an additional source of revenue to the power industry, which currently is unable to utilize about 50% of the energy in the fossil fuels which they burn to produce electricity. This energy is presently lost as waste heat in cooling water, but if the goal of large scale thermal effluent is realized, a significant portion of it can be utilized for beneficial purposes with positive environmental effects.

Basic research on the metamorphosis of the barnacle led to the discovery that barnacles, like their terrestrial cousins the insects, can be prevented from settling by introducing very small quantities of a hormone into their environment. As little as ten parts per billion of a "juvenile hormone mimic" in seawater caused precocious metamorphosis (metamorphosis from juvenile to adult) before settling had occurred, thus causing the death of the barnacle through incorrect development. Field studies showed that this could be successfully applied to the prevention of fouling only where barnacles were the sole, or at least the major fouling organism. This situation occurs in some

offshore situations and will be of us in reducing fouling of offshore drilling platforms.

Sea Grant investigators have been exploring the marine environment for new natural products which can find applications in controlling algae (to combat eutrophication), in controlling shrimp bacterial pathogens, and in agriculture. This project is specifically aimed at developing new and environmentally safe substances to replace existing algicides, herbicides, insecticides, and antimicrobials which are dangerous to aquatic life. Working with pharmaceutical and agricultural industries, including Stauffer Agricultural Research Laboratory and Searle Company, we have developed three potent new herbicides and two compounds which show insecticidal activity against agricultural pests. The results of basic research on chemical communication between marine organisms have been applied to the finding of useful products from these organisms. Many organisms use chemicals to deter other, predator, organisms. The chemicals used for chemical defense are often biologically active. For example, chemicals exuded by "parasite-free" organisms are often active against marine bacteria and may be used to treat bacterial diseases in shellfish.

The first functional tethered-float breakwater was installed for evaluation tests in San Diego Bay, and showed that it is very effective in both wind waves and ship wakes, and offers the potential for construction at a much lower cost than that of conventional breakwaters. It will be redeployed at the completion of these experiments to another permanent site where it will provide ship-wake protection to fishing boats. The installation showed that a smallscale breakwater, suitable for harbors, lakes, and marina protection, could be installed easily and economically. The performance of the breakwater also showed that the predictive model developed in previous work is equally effective in predicting performance at this scale. Use of low-cost wave monitoring hardware has been established and verified. Cost projections are \$7,500 per year, per station as compared with Corps of Engineers experience of \$23,000-\$28,000 per year. (UC Sea Grant College Proposal 1975-76, Volume I, p. 135).

Investigations on shelf sand and gravel deposits of Southern California are of importance to the general public and governmental agencies. Utilization of offshore sand and gravel, the interrelationships between offshore sand and gravel deposits and the sediment on coastal beaches are the primary issues this research is addressing.

Government agencies need this data to decide whether it is more economical to exploit offshore sand and gravel sources or find and develop new deposits onshore. The potential effects that exploitation of offshore sand and gravel will have on contiguous beaches in particular and on the system of longshore sediment transport in general must be carefully considered. Southern California citizens are concerned about the price of sand and gravel (and attendant general construction costs), about the unsightly growth of sand and gravel pits, and about maintaining the beauty and usefulness of the beaches (both as a source of income and pleasure). Data and information from this Sea Grant project are of value to local, state, and federal agencies. Sediment isopach maps for the continental shelf off San Diego County are being used by the County of San Diego, the State Division of the Lands and the U.S. Geological Survey in response to their requests. Other data which relate sediment deposits to oil-seep activity have been supplied to the California Division of Oil and Gas.

Investigations have shown that marine species produce halogenated organics similar in structure to the pollutants DDT, PCB's, etc. This research showed that current analytical techniques cannot distinguish "natural" molecules from "pollutants" (electron-capture GC analysis) and helped determine more accurate methods for precise analysis of chlorinated hydrocarbons in the marine environment. Greater precision will enable more effective identification of manmade pollutants and the health of the natural environment.

Laboratory investigations on rearing marine fish larvae showed that larval fishes can be used to detect pollutants in seawater at concentrations which could not be detected by other means. Further investigations, using the techniques devised under Sea Grant, are now part of a larger effort by National Marine Fisheries Service to determine the recruitment of fishes in the sea as well as to further research on the detection of pollutants.

The Scripps Aquarium-Museum provides wider availability of marine sciences information through exhibits and education programs centered around this exhibit. Over 350,000 people, including 58,000 students in study programs—many from the San Diego region—visit the Aquarium-Museum annually. Greater support of environmental considerations and conservation measures can be gained through better understanding of marine resources. Conservation, with particular reference to California's intertidal animals, is stressed for our visiting general public and students. This educational experience will have implications for the present generation and generations to come in their understanding and respect for the marine environment and its related research.

[From the Evening Tribune, Mar. 5, 1976]

SEA GRANT PAYS OFF

Pressures for budget austerity increase during periods of economic stumbling, but some federal programs promise such a high return to more than justify the investment.

The Sea Grant Program administered statewide by the Scripps Institution of Oceanography is an example of research that has found prompt practical solutions to immediate problems.

And program performance in California justifies the recent plea of Dr. William D. McElroy, chancellor of the University of California at San Diego, for funds to expand the effort.

The world food supply has become an issue of international concern. Sea Grant has funded aquaculture activities to increase the potential harvest of marine animals and plants. Coastal engineering projects have brought answers to beach erosion problems and increased security for ships moored in less-than-adequate harbors.

As McElroy testified before a House subcommittee, "For a relatively small investment, we extend . . . research in a way which grapples with specific, pragmatic coastal and marine resource problems of our citizens." Most national programs cost. Sea Grant pays.

NATIONAL SCIENCE FOUNDATION,
Washington, D.C., April 2, 1976.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
Washington, D.C.

DEAR MR. CHAIRMAN: I welcome the opportunity to comment on S. 3165, the "Ocean and Coastal Resources Act of 1976." Earlier this month, I testified before the Oceanography Subcommittee of the Committee on Merchant Marine and Fisheries of the House of Representatives with respect to the first decade of Sea Grant. As I stated at that time, my association with Sea Grant dates to the spring of 1966, at which time I was loaned by the National Science Foundation to Senator Claiborne Pell's office to help prepare for hearings on the original legislation. Later, I headed a task force within NSF to develop a plan for initiating the program.

These comments, therefore, arise from this personal perspective as well as from the ten years of interaction between the Ocean Sciences programs of the Foundation and Sea Grant and other marine science programs of NOAA. In addition to the extensive formal and informal coordination with our counterparts in NOAA, we have observed the development of Sea Grant programs in the field and share many common contacts within the marine science community in the Nation's academic institutions.

Our overall impression is that the Sea Grant Program has fulfilled the intent of the original legislation to a remarkable extent. In its first decade, it has succeeded in introducing a new and different dimension of marine science activities, and in evoking the kind of "grass roots" commitment necessary to make the Program effective. We assume that all the proposed amendments and alterations of Program directions are aimed at strengthening and extending these already considerable achievements.

In this context, we find it difficult to comment specifically on many of the provisions of S. 3165. Our vantage point is not necessarily the best one from

which to assess the implications of organizational changes within NOAA. We must, therefore, focus on what we perceive to be the particular strengths and unique capabilities of the present structure, especially with respect to the Sea Grant Program.

To the extent that any of the proposed changes would dilute these capabilities, we would urge caution in implementing them.

The particular strengths of Sea Grant, in our view, are the following:

Its flexibility, an absolutely vital characteristic in a program which seeks to establish new institutional relationships as well as new programs;

Its strong local and regional flavor, achieved not only by the financial participation of State and local entities, but by their involvement throughout in developing programs responsive to real needs and requirements;

Its versatility, arising in large measure from its ability to apply the components of research, training, and advisory services in the mixture called for by each situation.

The original legislation was written in a fashion that allowed Sea Grant the necessary degree of freedom to adapt to different program requirements in different sectors of the Nation; the Program will need no less freedom than in the years ahead. A declared National program that is nonetheless essentially local and indigenous in its specific applications, Sea Grant is another demonstration of the viability of the Federal principle.

This focus on past achievements may appear unduly negative toward the introduction of new capabilities. It is, of course, entirely appropriate that Sea Grant venture into new activities. Hopefully, however, any new ventures will not be at the expense of the basic programs which have been eminently successful.

There are other respects in which the focus of Sea Grant activities might be altered in the years ahead. The goal of practical results, a laudable aim in itself, has at times been pushed to the point of over-emphasis on the short-term, quick payoff efforts to the detriment of longer term efforts which may ultimately yield bigger payoffs. Greater emphasis on longer term projects may be desirable. For example, despite all the attention now being focused on the continental shelf, there are gaps in marine research programs with respect to resource-related geological work and certain types of fisheries-related studies. Sea Grant appears to be well-suited to identify and fill those gaps: its affiliations are well established both in Washington and locally, and its mission is sufficiently broad to allow it to do so. These programs represent, in our view, a natural re-direction of the institutional capabilities so successfully developed during the first decade of the program.

Sincerely yours,

MARY K. JOHRDE,

Head, Office for Oceanographic Facilities and Support.

STATE OF DELAWARE,
EXECUTIVE DEPARTMENT,
Dover, Del., April 2, 1976.

HON. WARREN G. MAGNUSON,
*Chairman, Committee on Commerce,
U.S. Senate,
Washington, D.C.*

DEAR MR. MAGNUSON: I am writing to lend my support to S. 3165 which will extend and amend the National Sea Grant College and Program Act of 1966 as amended.

In Delaware, the Sea Grant Program has played an increasingly important role in guiding our marine resource development since 1968 when the University of Delaware received its first Sea Grant award. I am particularly pleased with the operating philosophies and practices of the program for several reasons.

First, the Sea Grant Program has encouraged University researchers to attack many problems which, when solved, will be of substantial economic value to Delaware and the United States.

Second, the program encourages universities to interact extensively with both industry and government, thus opening new channels for development.

Third, the Sea Grant Program maintains the desirable goal of allowing problems of state and regional interest to be solved without allowing unnecessary duplication of effort in other states.

And, fourth, the program supports a marine advisory element which is absolutely essential to maintain effective two-way communication between the user in the field and the university researcher.

Delaware has derived many direct benefits from the Sea Grant Program. Some have been in the form of timely information on which to base policy decisions. Others are in research which is increasingly attracting industrial interest. Of special note is the commercial potential for chitin which uses as its basic raw material the waste exoskeletons of shrimp, crabs, lobsters and other marine animals. A variety of commercially valuable products may be made from chitin while simultaneously solving a bothersome waste disposal problem.

I am also excited about the progress we are making toward commercially viable closed-system aquaculture for shellfish.

There are innumerable additional aspects of the Sea Grant Program of value to Delaware and I should like to comment on possible effects of S. 3165 as it relates to that Program.

Specifically, advantages include:

1. The reauthorization of the National Sea Grant Program at an adequate funding level,
2. Provisions for federal Sea Grant funds to pay for ship time, and
3. Provision for funding projects of national importance at 100% of their cost from federal sources.

Areas of concern to us include the fact that:

1. Sea Grant will be "demoted" in NOAA.
2. The Marine Advisory Service is apparently being divided into a "federal" component and a Sea Grant component. (The Sea Grant Marine Advisory Service is developing as a quality organization which is responsive to state and local needs. It should be strengthened by increased funding and remain the only federally supported marine advisory service.)

I urge that these concerns be taken into account when the final version of a Sea Grant reauthorization bill is agreed upon by the House and Senate. We in Delaware are proud of our Sea Grant Program, and we support it because of its contribution to the State and its citizens.

While it is still a young program, I believe it is well conceived and well managed. As a result, I urge you to see that it is continued, with improvements, and to guard against actions which will weaken it or make it less effective.

Sincerely,

SHERMAN W. TRIBBITT,
Governor.

STATE OF ALASKA,
OFFICE OF THE GOVERNOR,
DIVISION OF POLICY DEVELOPMENT AND PLANNING,
Juneau, April 7, 1976.

Senator ERNEST F. HOLLINGS,
*Senate Commerce Committee,
Dirksen Senate Office Bldg.,
Washington, D.C.*

DEAR SENATOR HOLLINGS: In reference to the "Ocean and Coastal Resources Act of 1976" bill, the Alaska Coastal Management Program offers the following comments.

The draft bill, responsible for the extension and restructuring of the Sea Grant Program within NOAA appears to be, overall, a worthwhile piece of legislation.

The establishment of the Office of Marine Science and Technology to handle the administration of the Sea Grant Program should provide a valuable strengthening of the Sea Grant role in NOAA activities. Since research and education are crucial components of the ongoing management of coastal resources, often receiving inadequate attention, a strengthening of the program would be useful.

The need for a National Ocean and Coastal Advisory Service can be questioned in such states as Alaska where research programs are involved with active state advisory committees. Indeed in the Alaska situation, overlap and duplication would probably occur unnecessarily.

It is important for legislation extending the Sea Grant program to emphasize its role in education and information dissemination. These functions often

receive only minimal attention in coast-related activities and are gaps which need to be filled to produce a cohesive and comprehensive approach to marine and coastal problems. We might suggest a stronger emphasis on these functions by including them not only in the Congressional Findings, but also in the National Principles section of Declaration of Policy.

We appreciate having the opportunity to provide comments for consideration by the Commerce Committee.

Sincerely,

GLENN AKINS,
Coordinator.

NEW YORK SEA GRANT INSTITUTE,
STATE UNIVERSITY OF NEW YORK,
Albany, N.Y., April 9, 1976.

Senator ERNEST F. HOLLINGS,
Chairman, Subcommittee on Oceans and Atmosphere,
U.S. Senate,
Washington, D.C.

DEAR SENATOR HOLLINGS: I appreciated receiving staff working draft No. 2 dealing with a National Marine Science and Technology Policy and to extend the National Sea Grant Program.

This revision does incorporate major changes in Section 2 suggested by many in New York and thus is a significant improvement over staff working draft No. 1.

While I am not qualified to speak to most of the elements in Section 1, Section 2 if passed, and if the authorized funds are appropriated, would be helpful in continuing the important contributions Sea Grant has made in New York and throughout the country.

We appreciate you and your staff's willingness to make the many, and major, changes suggested. If we can be of further assistance as this Bill moves through the legislative process we would be pleased to do so.

Sincerely,

BRUCE T. WILKINS,
Acting Director.

STATE UNIVERSITY OF NEW YORK,
Stony Brook, N.Y., April 13, 1976

Hon. ERNEST F. HOLLINGS,
Chairman, Subcommittee on Oceans and Atmosphere,
U.S. Senate,
Washington, D.C.

DEAR SENATOR HOLLINGS: On behalf of the Governing Board of the New York State Sea Grant Program, I want to extend appreciation for the leadership you are providing in the development of national policy in marine and coastal research and services, and for the care you have taken in seeking the views of those active in this work.

I'm pleased to note that your staff's working draft no. 2 for a National Marine Science and Technology Policy and extension of the National Sea Grant Program reflects a number of the suggestions made by the National Sea Grant Association, and would like to express my general support for this bill.

The Sea Grant Program has significantly strengthened systematic attention to this region's marine and coastal problems in the few years of its existence in New York by the faculties of Cornell and State University and at other institutions that have joined us in the Sea Grant work. Especially Section 2 of the current working draft would assist the continuation of these promising efforts. If the authorized funds are appropriated, I believe the achievements in New York State and around the country would be extremely valuable.

We are grateful for the interest you and your staff have shown in the Sea Grant Program. If we can be of assistance as the Congress considers this bill, please do not hesitate to call on us.

Yours truly,

T. A. POND,
Executive Vice President.

STATE OF NEW JERSEY,
DEPARTMENT OF ENVIRONMENTAL PROTECTION,
Trenton, N.J., April 13, 1976.

HON. WARREN G. MAGNUSON,
Chairman, Committee of Commerce,
Dirksen Senate Office Building,
Washington, D.C.

DEAR SENATOR MAGNUSON: I have your letter of March 17, 1976, requesting comments on staff working Draft, No. 2, "The Ocean and Coastal Resources Act of 1976" and S. 709, "The Marine Science, Engineering, and Resource Development Act of 1975". Both bills are necessary and appear consistent with the goals of the "Stratton Commission Report", Our Nation and the Sea, and the objective of formulating a coherent national ocean policy.

Senate 709 appears directed toward formulation of a national ocean policy. A positive feature of this bill is the involvement of states and other non federal organizations in the formulation of a "comprehensive long range program of marine activities."

Draft 2 of the proposed Ocean and Coastal Resources Act of 1976 presents a problem with respect to state coastal zone management programs and sea grant research funds. Section 203(12) defines a Sea Grant Program as involving education, training, advisory services or research. No distinction is made between basic and applied research in this definition or in all of Title II. Coastal Zone Management programs need the results of applied not basic research programs. The Stratton Commission recognized this need when it recommended the transfer of the administration of Sea Grant from the National Science Foundation to the National Oceanic and Atmospheric Administration and noted that with the transfer, Sea Grant could sponsor a wide range of highly useful applied marine science and training activities in cooperation with universities and industry.

I recommend that Working Draft No. 2 be redrafted to reflect the distinction between basic and applied research and the need of coastal zone management for the results of applied research. Additionally, Section 204(c) (2) of this draft states that the national Sea Grant program shall include the awarding of grants in accordance with the needs and problems of the individual states. A more positive requirement of coordinating these grants with approved state coastal zone management plants pursuant to Section 307(c)1 of the federal Coastal Zone Management Act is a necessary feature to effectuate the broad purposes of both the federal Coastal Zone Management program and Sea Grant.

The State of New Jersey appreciates this opportunity to comment on this proposed legislation.

Faithfully,

DAVID J. BARDIN,
Commissioner.

NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE,
Washington, D.C., April 21, 1976.

HON. ERNEST F. HOLLINGS,
U.S. Senate,
Washington, D.C.

DEAR SENATOR HOLLINGS: NACOA has followed the development of S. 3165, the "Ocean and Coastal Resources Act of 1976" with great interest. We feel that it is important and timely and represents a step towards more effective use of the sea at a time when more sweeping and wholesale organizational changes proposed for the Executive Branch are unlikely to succeed.

Accordingly, the Committee discussed the March 17 version of S. 3165 at its most recent meeting on April 12, and since we understand from your staff that it is still undergoing revision, asked me to forward to you our comments and suggestions.

First, we heartily endorse the bill's major thrust in Title I to assign to the Executive Branch a clear and explicit responsibility for the planning and development of a coherent marine resources, science and technology program for the United States. Lacking a suitable higher level body in the Executive

Branch for this responsibility, it is logical to assign it to a "lead" agency. We concur that at present NOAA is the appropriate focus for such an effort.

We do not believe that a "lead" agency can actually implement or manage the whole Federal program, however, involving as it must some 12 or so other Departments and agencies, although it can and should monitor and report on progress being made towards this end for higher level Executive and Legislative Branch review and action. Accordingly, we recommend that present wording assigning implementation responsibility to NOAA be removed in Section 101(b), and where needed elsewhere to provide consistency.

With regard to the scope of the national planning effort in question, we believe the inclusion of marine and coastal resource management programs should be made explicit in Sections 101(a) (H), 102(d) (1), and 103(a), for example. The present still brings in the word "resources" in its title, in Section 101(b), and elsewhere, and the intent seems clear to go beyond mere scientific and technology programs or program components. We think this is right and care should be taken to remove the present ambiguity.

The interagency planning function for marine resources, science, and technology is a new responsibility and must, of course, be established by statute as proposed. Also, it is fitting that such a statute authorize the resources needed to carry out this responsibility. Whether legislation should go so far as to specify the organizational details for execution of the duty, as S. 3165 does in its present version, is a question which can be argued either way. We believe that, in any case, the Administrator of NOAA should be left enough flexibility to use his judgment regarding details and alternatives for carrying out his responsibility in the light of circumstances and change.

This problem emerges strongly with regard to the second objective of the bill, to provide for the function of drawing together, in an overall coherent NOAA plan, the plans NOAA does develop for individual marine programs and offices. The authority to carry out this function is inherent in the Administrator's role, and does not need legislation to establish it. At the same time, it is a function which has not been fully carried out, and we would agree that this is a deficiency which the Administrator should be encouraged to remedy. Linking it to the interagency planning function is logical, since the same staff skills, concepts, and information needed will be similar and overlapping. Among other requirements, funds to make grants and let contracts for studies related to its planning responsibilities will be needed by NOAA.

The new Associate Administrator's Office, whether established by legislation or by executive action, should not be required to manage two of the many programs to which it might turn for such studies, namely the Sea Grant program and a NOAA advisory service program, whose relationship to the Sea Grant Program advisory service is still unclear in the bill. The mixing of line and staff functions, i.e. program management versus policy, planning and program analysis, is generally undesirable and we would advise against making it mandatory by legislation. The policy and planning office, however established, should, of course, have the same responsibility for bringing Sea Grant and NOAA advisory services into a coherent and coordinated relationship with the overall NOAA marine programs plan that it exercises for other NOAA programs.

Our recommendation would be accomplished by eliminating in Section 204(a) the sentence, "the national Sea Grant program shall be administered by the Office of Marine Resources, Science and Technology," and in Section 205(a) the phrase, "within the Office of Marine Resources, Science and Technology" and the phrase, "who shall be subject to the supervision of the Associate Administrator." This would, in addition, leave the Sea Grant program reporting directly to the Administrator, an arrangement which we strongly recommend.

We particularly endorse the concepts in Section 204(c) (1) regarding program purposes and contracting and grant provisions, in Section 204(d) (1) regarding limitations, in Section 208 regarding the Sea Grant Review Panel, and for the 3-year extension of authorization in Section 209. These will all strengthen Sea Grant where strengthening is needed.

We are aware that your joint committee hearings on S. 3165 included hearings on S. 709, to establish a National Council on Marine Science at the cabinet level to be chaired by the Vice President. As we have said earlier,

we concur that a high level interagency body for policy development, planning, coordination, and management of the Federal programs in marine affairs is needed, since not all these functions can be exercised by a "lead" agency, such as is specified in S. 3165. There are many forms such a body could take, the proposed Council being only one. It could be a cabinet level body chaired by one of the Cabinet officers, for example, or a council like the Domestic Council or the National Security Council chaired by a White House official who might be designated Marine Affairs Advisor to the President. Any of these would be effective, given the President's commitment to the purpose involved and selection of a competent and determined individual with appropriately high status for the job. Without these conditions none will work. Accordingly, we hope that, whether established by legislative or executive initiative, and whatever the details of its precise make-up, it will reflect a conviction of its importance shared by both Branches. We sense that such a conviction may be developing.

I am sending an identical letter to Senator Pell. I hope you will find these suggestions helpful. We stand ready to discuss them further at any length and degree of informality you may wish.

Sincerely,

WILLIAM J. HARGIS, JR.,
Chairman.

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