The original documents are located in Box 36, folder "Transition Reports (1977) - Commerce Department: National Oceanic and Atmospheric Administration (1)" of the John Marsh Files at the Gerald R. Ford Presidential Library.

U.S. DEPARTMENT OF COMMERCE

BRIEFING HANDBOOK

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

November 24, 1976

NOAA GOALS

GOAL A - OCEAN RESOURCE MANAGEMENT: To ensure the wise development and rational conservation of ocean resources for the economic and social good of the Nation, while assisting the private sector in effective development of these resources. To provide those ocean and environmental services necessary for effective ocean resource management.

GOAL B - COASTAL ZONE MANAGEMENT: To ensure the wise and beneficial planning and management of the land and water resources of the Nation's coastal zones.

GOAL C - ENVIRONMENTAL MONITORING, PREDICTION AND CONTROL: To develop and operate a national system to monitor and predict environmental conditions for protecting life and property, and for increasing the efficiency and productivity of the Nation's business and industry. To explore the feasibility and; where warranted, develop the national capability for the beneficial modification of environmental conditions, and to understand the consequences of inadvertent environmental modification.

NEW STATUTORY AUTHORITIES

o THE 92nd CONGRESS

THE COASTAL ZONE MANAGEMENT ACT (1972)

- Charges DOC/NOAA with administering Federal guidelines and grants to assist the states in coastal zone planning and management.

THE MARINE MAMMALS PROTECTION ACT (1972)

- Charges DOC/NOAA with Federal functions required to insure that marine mammals are protected and directs a moratorium on the taking and importation of marine mammals.

THE MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT (1972)

- Charges DOC/NOAA with monitoring and research on ocean dumping, as well as further research on the possible long-range effects of pollution, overfishing, and man-induced changes of ocean ecosystems. The Act also authorizes designation of marine sanctuaries.

THE WEATHER MODIFICATION REPORTING ACT (1972)

- Charges DOC/NOAA with the responsibility for recording all nonfederally supported weather modification activities in the United States.

o THE 93rd CONGRESS

ENERGY RESEARCH AND DEVELOPMENT ACT (1974)

- Charges NOAA with reactivating and operating three vessels to conduct baseline studies and assessments in support of offshore oil and gas development.

THE ENDANGERED SPECIES ACT (1973)

- Charges Departments of Commerce/NOAA and Interior with conservation, protection, and propagation of species and subspecies of fish and wildlife that are presently threatened with extinction, which are endangered, or are likely to become endangered. NOAA is responsible for most marine species of mammals and fish, reptiles, and invertebrates.

OFFSHORE SHRIMP FISHERIES ACT (1973)

- Charges DOC/NOAA with the responsibility for implementing United States participation in the Brazil shrimp fishing agreement which establishes a conservation zone off the coast of Brazil, within which the activities of United States shrimp vessels will be regulated.

DEEPWATER PORT ACT (1974)

- Charges DOC/NOAA with review of environmental consequences of deepwater ports.

o THE 94TH CONGRESS

FISHERY CONSERVATION AND MANAGEMENT ACT (1976)

- Extends the U.S. exclusive fishery zone from 12 to 200 nautical miles. DOC/NOAA charged with establishing management system for the fishery conservation zone.

- Beginning March 1, 1977, foreign fishing within the zone, will be controlled by the U.S. through a permit system to be administered by NOAA.

COASTAL ZONE MANAGEMENT ACT AMENDMENTS (1976)

- Amends the 1972 Act to extend and expand the basic Coastal Zone Management Program through fiscal year

1980. The Act establishes a new, ten year, $1.2 billion energy impact program to provide financial assistance to coastal states and communities affected by coastal energy activity. Establishes new requirements for State Coastal Zone Management Programs as well as interstate coordination grants, research and technical assistance programs. A program for acquiring access to public beaches and other public coastal areas is established.

THE SEA GRANT IMPROVEMENT ACT (1976)

- Amends the Sea Grant College and Program Act of 1966 to extend and expand the scope of the Sea Grant Program at a $50 million authorization level through fiscal year 1977. Adds several new programs, including a new international cooperation assistance activity for which $3 million is authorized for 1977.

WEATHER MODIFICATION POLICY ACT (1976)

- Authorizes and directs the Secretary of Commerce to develop a national policy on weather modification. The Department of Commerce, through NOAA, is to conduct a comprehensive investigation and study of the state of scientific knowledge concerning weather modification, its technology, any problems associated with that technology, and other related matters. The Act requires the Secretary to submit to Congress by October 13, 1977, a report describing the findings, conclusions, and recommendations of the study.

THE WHALE CONSERVATION AND STUDY ACT (1976)

- Requires the Secretary of Commerce to conduct comprehensive studies of all whales found in waters subject to the jurisdiction of the U.S., including the 200-mile fisheries conservation zone established under P.L. 94-265 and report to Congress by January 1, 1980.

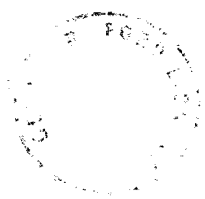
BACKGROUND

PRESIDENT LYNDON JOHNSON'S COMMISSION ON MARINE SCIENCE, ENGINEERING AND RESOURCES RECOMMENDED IN JANUARY 1969 THAT A NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION BE ESTABLISHED.

> The Commission found that programs related to the oceans, the atmosphere, and certain aspects of the solid earth should be joined. The purpose was to create a civil center of strength for expanding effective rational use of ocean resources, for monitoring and predicting the state of the air-sea environment, and for exploring the feasibility and consequences of environmental modification.

NOAA WAS ESTABLISHED OCTOBER 3, 1970, IN THE DEPARTMENT OF COMMERCE.

> The President created NOAA in 1970 through Reorganization Plan No. 4. In the process, the following entities were brought together:
>
> - Commerce's Environmental Science Services Administration
> - Interior's Bureau of Commercial Fisheries, Marine Game Fish Research Program, and Marine Minerals Technology Center
> - Navy's National Oceanographic Instrumentation Center and National Oceanographic Data Center
> - Coast Guard's National Data Buoy Development Project
> - National Science Foundation's Sea Grant Program
> - Army Corps of Engineers' Great Lakes Survey



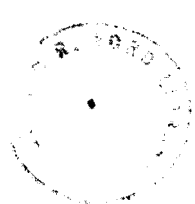
PURPOSE

THE PRESIDENT OUTLINED HIS RATIONALE TO THE CONGRESS:

OCEAN RESOURCE MANAGEMENT: "We face a compelling need for exploration and development leading to the intelligent use of our marine resources. Food from the oceans will increasingly be a key element in the world's fight against hunger. The mineral resources of the ocean beds, and of the oceans themselves, are being increasingly tapped to meet the growing world demand. We must understand the nature of these resources, and assure their development without either contaminating the marine environment or upsetting its balance."

ENVIRONMENTAL HAZARDS WARNING: "We face immediate and compelling needs for better protection of life and property from natural hazards and for a better understanding of the total environment--an understanding which will enable us more effectively to monitor and predict its actions and, ultimately, perhaps to exercise some degree of control over them."

ENVIRONMENTAL PROTECTION: "The oceans and the atmosphere are interacting parts of the total environmental system upon which we depend, not only for the quality of our lives but for life itself. I expect NOAA to maintain continuing and close liaison with the new Environmental Protection Agency and the Council on Environmental Quality, as part of an effort to ensure that environmental questions are dealt with in their totality, and that they benefit from the full range of government's technical and human resources."



NEED FOR A UNIFIED APPROACH: "Establishment of ... NOAA within the Department of Commerce would enable us to approach these tasks in a coordinated way. By employing a unified approach to the problems of the oceans and atmosphere, we can increase our knowledge and expand our opportunities not only in those areas, but in the third major component of our environment, the solid earth, as well.

"I expect that NOAA would exercise leadership in developing a national oceanic and atmospheric program of research and development. It would coordinate its own scientific and technical resources with the technical and operational capabilities of other government agencies and private institutions. As important, NOAA would continue to provide those services to other agencies of government, industry and private individuals which have become essential to the efficient operation of our transportation system, our agriculture and our national security."

THE NEED FOR NOAA: "Scattered through various Federal departments and agencies, we already have the scientific, technological and administrative resources to make an effective, unified approach possible. What we need is to bring them together. Establishment of NOAA would do so."

ORGANIZATION IN THE DEPARTMENT OF COMMERCE

NOAA IS UNIQUE IN THE COMMERCE DEPARTMENT'S ORGANIZATION STRUCTURE.

As shown in the accompanying charts, it is headed by an Administrator who reports directly to the Secretary and holds a rank equivalent to that of Under Secretary.

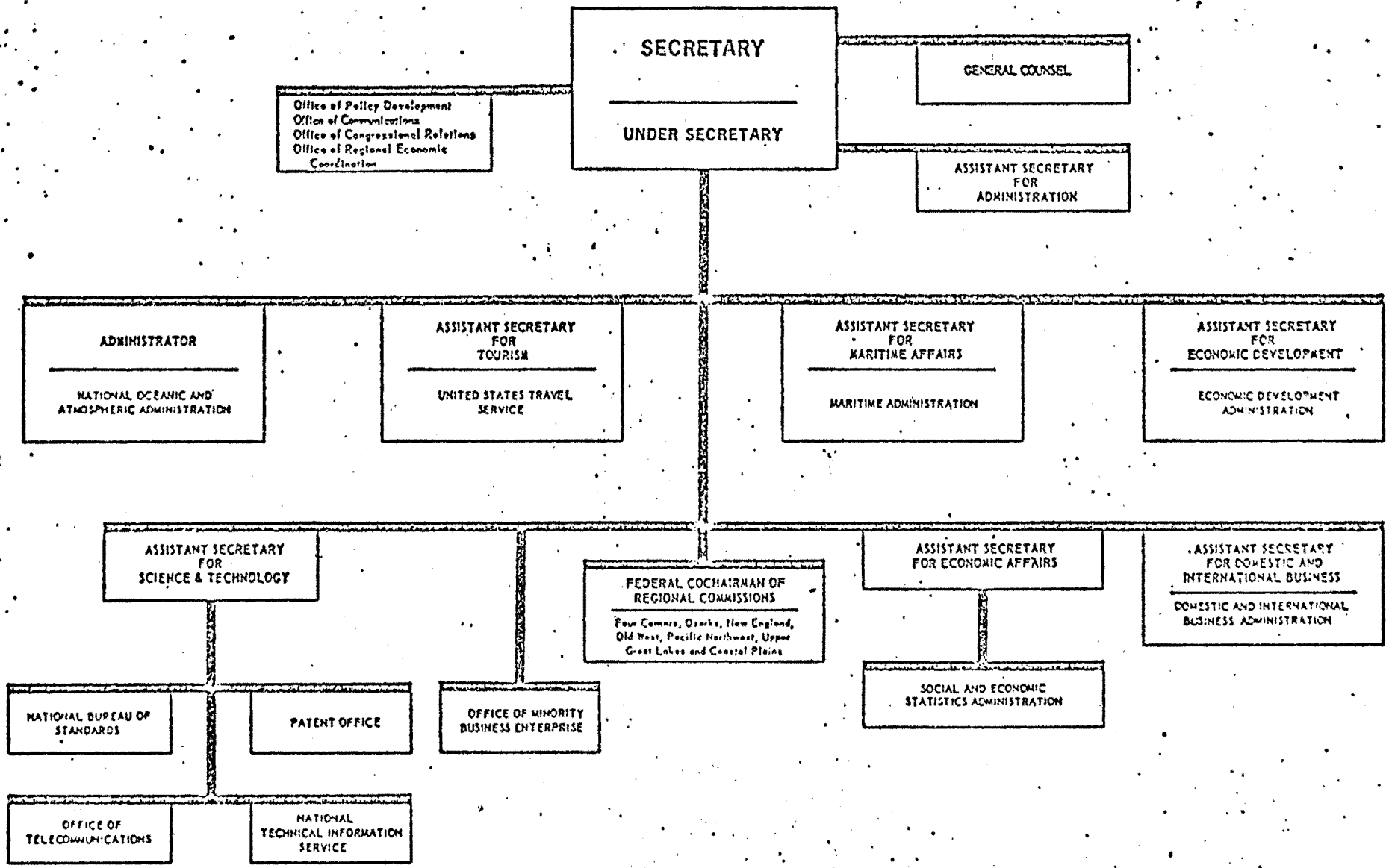
NOAA PROVIDES UNIFIED MANAGEMENT FOR THESE EIGHT MAJOR OPERATING UNITS:

National Marine Fisheries Service
National Ocean Survey
National Weather Service
Environmental Data Service
National Environmental Satellite Service
Environmental Research Laboratories
Office of Coastal Zone Management
Office of Sea Grant

Unified management of these major line components enables NOAA to plan and conduct effective multi-discipline and multi-organizational programs and projects directed at attaining its goals.

U.S. DEPARTMENT OF COMMERCE

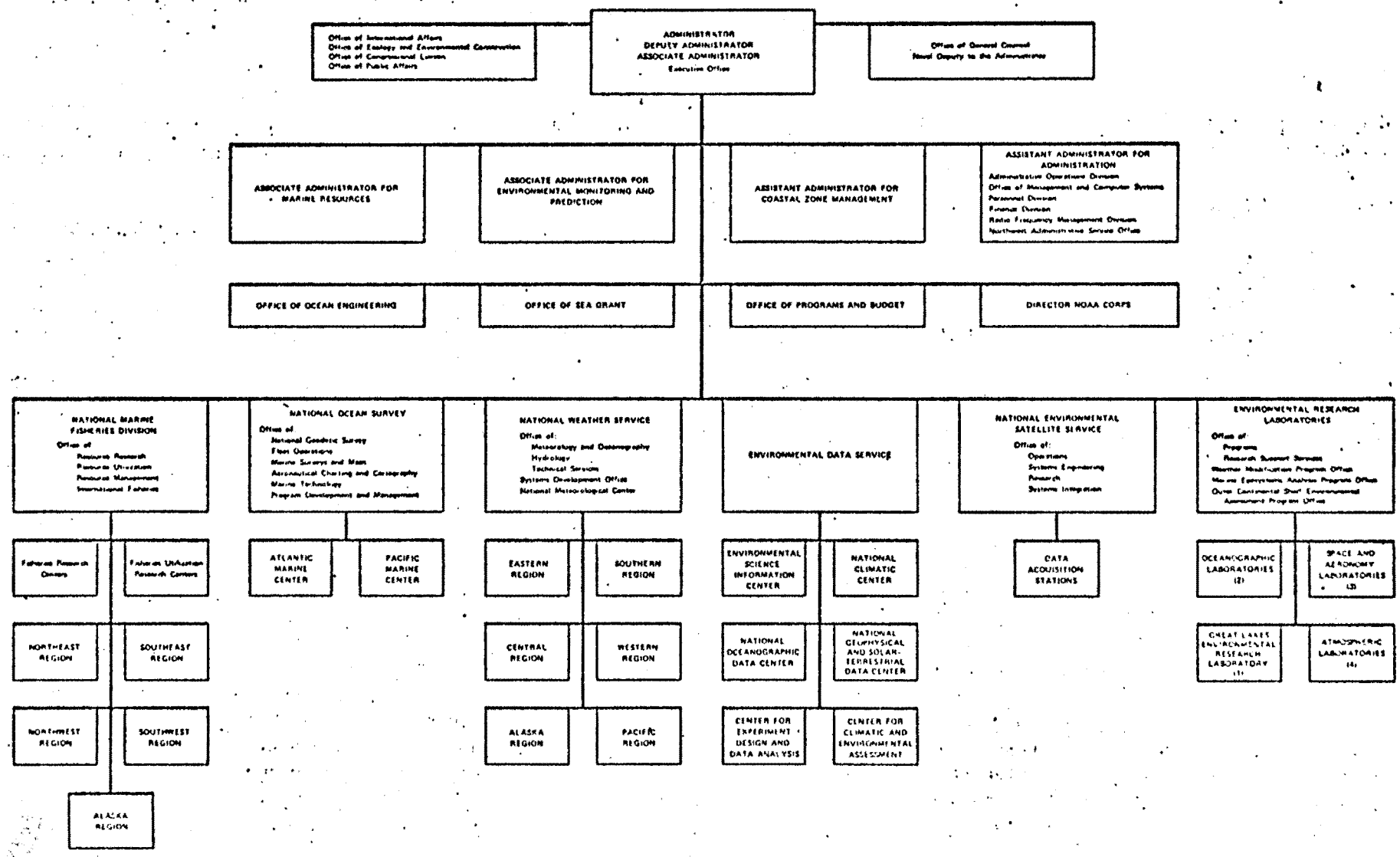
ATTACHMENT 0001-1



AMENDMENT 8
October 18, 1974

U.S. DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



SEPTEMBER 7, 1976

DR. ROBERT M. WHITE, Administrator
National Oceanic and Atmospheric Administration, Department of Commerce

Dr. Robert M. White was appointed Administrator of the Commerce Department's National Oceanic and Atmospheric Administration (NOAA) in February 1971.

NOAA provides unified management for eight major Federal organizations: the National Marine Fisheries Service, the National Weather Service, the National Ocean Survey, the Environmental Data Service, and the National Environmental Satellite Service, Environmental Research Laboratories and the Offices of Coastal Zone Management and Sea Grant.

From 1965 until the establishment of NOAA on October 3, 1970, Dr. White had been Administrator of the Environmental Science Services Administration in the Department of Commerce.

He was appointed Chief of the U.S. Weather Bureau (now NOAA's National Weather Service) in 1963 and served in this post until the Environmental Science Services Administration was formed.

Born in Boston in 1923, Dr. White received a B.A. degree in geology from Harvard University in 1944. While attending Harvard, he worked as a weather observer at the Blue Hill Observatory. He was a weather officer during World War II, serving as a Captain in the U.S. Air Force. Continuing his studies in meteorology at Massachusetts Institute of Technology, he earned his master's degree in 1949 and his doctorate in 1950.

From 1952 to 1959, Dr. White was a research scientist and laboratory director at the Air Force Cambridge Research Center.

He joined The Travelers Insurance Companies at Hartford, Conn., in July 1959, as head of The Travelers Weather Research Center. Later, he was Associate Director of the Research Department of The Travelers Insurance Companies. When The Travelers Research Center, Inc., was established in 1960, Dr. White became its first President.

Dr. White is married to the former Mavis Edwina Seagle. They have two children, Richard and Edwina.

SCIENTIFIC SOCIETIES

American Geophysical Union
American Meteorological Society (Councillor)
American Association for the Advancement of Science
Marine Technology Society (Vice President)
Royal Meteorological Society

HONORS

National Academy of Engineering
Cleveland Abbe Award, American Meteorological Society, 1969
Godfrey L. Cabot Award, Aero Club of Boston
Jesse L. Rosenberger Medal, University of Chicago, 1971
1974 Rockefeller Public Service Award for the Development and Protection of Physical Resources
1975 David B. Stone, from the Trustees of the New England Aquarium, for contributions to the environment and the community.
1976 Matthew Fontaine Maury Award, from the Smithsonian Institution, for distinguished Federal service and for fostering ocean science research on the national level.
Honorary Doctor of Science Degree, Long Island University at South Hampton, 1976

GOVERNMENT COMMITTEES

President's Commission on Marine Science, Engineering and Resources (1967)
Federal Council for Science and Technology, Committee on Water Resources Research (Department of Commerce representative)
Interagency Committee on Marine Sciences and Engineering
Marine Fisheries Advisory Committee (Chairman)

INTERNATIONAL

World Meteorological Organization (Permanent U.S. representative)
International Whaling Commission (Commissioner)
Joint U.S./U.S.S.R. Commission on the Exploration of the World Oceans (U.S. Chairman)

OTHERS

Visiting Committee, Departments of Meteorology and Earth and Planetary Sciences, MIT
Visiting Committee, College of Engineering University of Oklahoma

SELECTED PUBLICATIONS

"The Meridional Flux of Heat Over the Northern Hemisphere," Tellus, 1951.

"On the Energy Balance of the Atmosphere," Trans. Am. Geophys. Un., 1951.

"Schemes for The Study of Hemispheric Exchange Processes," Quart. J. Roy. Meteorol. Soc., 1952.

"On the Forecasting Possibilities of Empirical Influence Functions," J. Meteorol., 1955.

"Hemispherical Prediction by Statistical Techniques," J. Meteorol., 1957.

"A Preliminary Study of the Potential to Kinetic Energy Conversion Process in the Atmosphere," Tellus, 1960.

"The Organization of the Environmental Sciences in the Federal Government," American Geophysical Union/American Meteorological Society, Washington, D.C., Apr. 23, 1964.

"Responding to Environmental Challenge," IBM Scientific Computing Symposium on the Environmental Sciences, Yorktown, N.Y., Nov. 15, 1966.

"Meteorology on a New Threshold," Centenary Celebration of the Norwegian Meteorological Institute, Oslo, Norway, Dec. 2, 1966.

"The World Weather Program," Symposium on the World Weather Watch, American Association for the Advancement of Science, Washington, D.C., Dec. 28, 1966.

"Ocean Exploration and the Environmental Sciences," Symposium on Marine Science, American Association for the Advancement of Science, New York, N.Y., Dec. 27, 1967.

"Geophysical Data Management--Why?" Marine Technology Society, Washington, D.C., Oct. 31, 1968.

"Getting From Here to There," Conference on Planning for U.S. Participation in the Global Atmospheric Research Program, Boulder, Colo., Oct. 17, 1969.

"Past, Present and Future of Meteorological Satellites," Sixth Annual Meeting, American Institute of Aeronautics and Astronautics, Anaheim, Calif., Oct. 21, 1969.

"The Weather For Tomorrow," U.S. Weather Services Centennial Symposium, Washington, D.C., Feb. 12, 1970.

"Global Environmental Monitoring: A Time To Take Stock," Law of the Sea Institute, University of Rhode Island, Kingston, R.I., June 17, 1970.

"Weather Management--A Forecast," 12th Annual Interagency Conference on Weather Modification, Virginia Beach, Va., Oct. 27, 1970.

"Ocean Exploration," Society of Exploration Geophysicists, Houston, Tex., Nov. 10, 1971.

"Fisheries Management--Its Scientific and Economic Imperatives," Governor's Fourth Conservation Congress on Marine Fisheries Resources, Portland, Oreg., Dec. 13, 1971.

"NOAA's Role in the Nation's Ocean Program," American Association for the Advancement of Science, Philadelphia, Pa., Dec. 29, 1971.

"The Changing National Needs for Meteorologists," American Meteorological Society, New Orleans, La., Jan. 10, 1972.

"Sea Grant—A Stimulus to Economic and Technological Growth," Texas Sea Grant Day, College Station, Tex., Apr. 6, 1972.

"Of Whales and Men," New Bedford Whaling Museum, New Bedford, Mass., Apr. 23, 1972.

"Another Kind of Sea Power," United States Merchant Marine Academy, Kings Point, N.Y., May 5, 1972.

"Grappling With Our Coastal Future," Marine Resources Center Dedication, Charleston, S.C., May 19, 1972.

"American Fisheries In Transition," National Fisheries Institute, Los Angeles, Calif., May 11, 1973.

"Marine Environmental Management - A State-Federal Partnership," South East States Environmental Management Conference, Charleston, S.C., May 18, 1973.

"Sounding Our Ocean Future," NOAA Conference on the Oceans and National Economic Development, Seattle, Wash., July 17, 1973.

"The Marriage of Agencies," dedication of the U.S. Geological Survey's John Wesley Powell Building, Reston, Va., July 11, 1974.

"The Environmental Satellite: What It Means for Man," The Impact of Space Science on Mankind, Nobel Symposium, Oslo, Norway, September 8-12, 1975.

"An Ocean Renaissance," New England Aquarium, Boston, Mass., November 3, 1975

November 1976

DR. HOWARD W. POLLOCK, Deputy Administrator
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

The Deputy Administrator of the National Oceanic and Atmospheric Administration is a man of unique talents and unusual background, with executive, administrative, legislative, and diplomatic experience in government, coupled with years of experience in the private sector in the practice of law and in business; author, lecturer, distinguished public servant. Chosen one of the ten Outstanding Young Men of the United States (1955); recipient, George Washington Honor Medal from the Freedoms Foundation at Valley Forge; former territorial and State legislator and United States Congressman for Alaska; recipient of the degrees of Doctor of Jurisprudence from University of Houston, and Master of Science in Industrial Management from Massachusetts Institute of Technology; an Alaskan homesteader, sportsman, scuba diver, and aquanaut. Personal emissary for President at the inauguration of Costa Rican President Figueres (1970). International advisor and negotiator; Alternate United States Representative on U.S. delegation to the United Nations Law of the Sea Conference; Department of Commerce representative on Executive Group of National Security Council interagency LOS Task Force, on the interagency Committee on International Ocean Affairs, on the Federal Committee on Ecology, and on the interagency Arctic Policy Group; chairman, Department of Commerce Marine Petroleum and Minerals Advisory Committee; on the Advisory Council of the American Oceanic Organization, and the Board of Directors of the Marine Technology Society.

Howard W. Pollock was appointed by the President as Deputy Administrator of the National Oceanic and Atmospheric Administration (NOAA), when it was established in the Commerce Department on October 3, 1970.

He is Director of the Commerce Department Task Force on Law of the Sea; an Alternate United States Representative on the U.S. Delegation to the international Law of the Sea Conference (and formerly to the UN Seabed Committee); Commerce representative on the Executive Committee of the National Security Council interagency LOS Task Force, on the interagency Committee on International Ocean Affairs, on the Federal Committee on Ecology, and on the interagency Arctic Policy Group; chairman of the Department of Commerce Marine Petroleum and Minerals Advisory Committee; and chairman of the LOS interagency Working Group on Micronesia.

Dr. Pollock served as the Congressman for the State of Alaska from 1967 to 1971. In Congress, his committee assignments included service on the House Committee on Merchant Marine and Fisheries (on the Subcommittees on Fisheries and Wildlife Conservation and Oceanography) and on the Interior and Insular Affairs Committee (on the Subcommittees on Indian Affairs, Public Lands, and National Parks and Monuments). He also served on the Republican Policy Committee. In 1970, he was Chief Negotiator of the International Fisheries Agreements at Seoul, Korea, concerning protection of anadromous fisheries in the Northeast Pacific off Alaska.

Dr. Pollock received a Doctor of Jurisprudence degree from the University of Houston in 1955 and a Master of Science degree in industrial management from the Massachusetts Institute of Technology in 1960.

He served in 1936 and 1937 with the U.S. Merchant Marine. In 1941, he enlisted as a seaman in the U.S. Navy, and retired in 1946 as a Lieutenant Commander.

An Alaskan homesteader in the late 1940's and early 1950's, Dr. Pollock has had a varied career in business, law, and government. In 1960, he was admitted to practice before the United States Supreme Court, and from 1960-66 was senior member of the law firm of Pollock, Josephson & Associates. He is the only Alaskan and the only living American to serve in a territorial legislature, state legislature, and the United States Congress.

In 1955, Dr. Pollock was named one of the Ten Outstanding Young Men of the United States by the U.S. Junior Chamber of Commerce. He is a recipient of the George Washington Honor Medal from the Freedoms Foundation at Valley Forge, Pa. He is the author of the books "Selection of Top

Corporate Executives" (1960), "The State of the '70's—An Action Plan for Alaska," and "The Illegal Trial of Christ."

Civic and Public Service:

President, Alaskan Prospectors Society, 1950
House of Representatives, Alaska Territorial Legislature, 1953-1955
First President, Anchorage United Nations Association, 1956
Director, Operation Statehood, and Operation Statehood Hawaii, 1958-1959
Alaska State Senator, 1960-1962; 1964-1966
Director, Alaska World Affairs Council, 1960-1965
Elected the lone Congressman for Alaska in the U.S. House of Representatives, November 1966
Re-elected to the 91st Congress, November 1968
Congressional Committee Assignments: Committee on Merchant Marine & Fisheries, Subcommittees on Fisheries & Wildlife Conservation and on Oceanography; Committee on Interior & Insular Affairs, Subcommittees on Indian Affairs, on Lands and on National Parks & Monuments; Republican Committee on Committees, Policy Committee and National Congressional Committee
Official Congressional Assignments to Japan, Hong Kong, Korea, Thailand, Shanghai, Australia, New Zealand and Antarctica, 1968
Lecturer, Arctic Institute of North America International Conference, Montreal, Canada 1968
Congressional Observer aboard historic Arctic voyage of S.S. Manhattan through Northwest Passage, 1969
Congressional Observer, Alaska-Siberia inaugural flight by Alaska Airlines, 1970
Secretary, then Vice President, Congressional Prayer Breakfast Group 1968-1970; Joint Committee for Presidential Prayer Breakfast, 1969-1970
Congressional Advisor to the Secretary of the Treasury David M. Kennedy, Third Annual Meeting, Board of Governors, Asian Development Bank, Seoul, Korea, 1970
Chief Negotiator of International Fisheries Agreements at Seoul, Korea with Korean Ministers and Congressman concerning protection of anadromous fisheries in the Northeast Pacific off Alaska, 1970
Special Presidential Envoy to the Inauguration of President Jose Figueres, San Jose, Costa Rica, 1970
Keynote Speaker, Presidential Prayer Breakfast, (official part of inaugural ceremonies), San Jose, Costa Rica, 1970
Lecturer, Conference on Development of the Arctic, the Admiral Richard E. Byrd Polar Center, Harvard University, 1970
Lecturer, Industrial College of the Armed Forces (DOD)
Visiting lecturer, MIT, University of Virginia, Armed Forces Industrial College, William & Mary, UCLA

Awards and Honors:

National President of Phi Theta Kappa, Junior College Honorary Scholastic Society, 1940-1941
Outstanding Student, University of Houston, 1955
Graduate of the Year, Phi Delta Phi Legal Fraternity, 1955
National Vice-President, then National President and Chairman of the Board of Governors, American Law Student Association, 1954-1955
Sloan Fellow for advanced study in Industrial Management Techniques and Executive Development, MIT, 1959
Awarded George Washington Honor Medal, Freedoms Foundation at Valley Forge, 1966
Outstanding Alumnus of the Year, 1968, University of Houston
Honorary Doctor of Humanities, Los Angeles College of Chiropractic, 1970
Elected to 49er Hall of Fame, by Alaska Press Club
Elected to Hall of Fame of Gulf Coast Junior College, Perkinston, Miss., 1972
Chosen the Distinguished Alumnus, University of Houston, 1975

Memberships:

Life Membership in Jaycees (U.S. Junior Chamber of Commerce) Anchorage and Alaska Chambers of Commerce, Knights of Columbus, B.P.O. Elks, Kiwanis International, American Legion, Veterans of Foreign Wars, Disabled American Veterans, Alaska Native Brotherhood
President, Sea Space Symposium (S3), 1973-1974; Director, 1971–
Founder, and Chairman Emeritus of the Board of Governors, Congressional Underwater Explorers Club, 1973–
Founder and President, Diplonauts (Diplonautic scuba divers in UN Law of the Sea Conference), 1973–
Board of Directors, Former Members of Congress
Board of Directors, National Conference on Citizenship
Board of Directors and Executive Committee, National Rifle Association
Alaska State Society, President, 1971-1972
Advisory Council, American Oceanographic Organization
Board of Directors, Marine Technology Society
Explorers Club
African Safari Club of Washington, D.C.
International Platform Association
Certified NOAA Diver and NOAA Aquanaut
Member Undersea Medical Society

Dr. John W. Townsend, Jr., Associate Administrator
National Oceanic and Atmospheric Administration,
Department of Commerce

Dr. John W. Townsend, Jr., was appointed Associate Administrator of the National Oceanic and Atmospheric Administration on October 3, 1970, when the Commerce Department agency was established under a Presidential Reorganization Plan.

Dr. Townsend had served for two years as Deputy Administrator of the Environmental Science Services Administration which was abolished with the creation of NOAA.

Dr. Townsend was born in Washington, D.C., in 1924. During World War II, he served as an Air Force officer, with overseas duty at Guam, Tinian, and in the Philippine Islands.

He was graduated from Williams College in 1947, cum laude and with highest honors in physics. He received his master's degree in physics from Williams in 1949, and an honorary degree from that institution in 1961.

Dr. Townsend joined the Naval Research Laboratory's Radio Division in 1949. He became head of the Rocketsonde Branch and Deputy Science Program Coordinator of Project Vanguard in 1955. During his service with NRL, he participated in programs of basic research in the very high atmosphere. He developed a radio frequency mass spectrometer for use in rockets, and obtained the first mass spectra of the upper atmosphere above 90 kilometers. He was the scientific officer for the Navy's development of the Aerobee-Hi rocket. As Deputy Science Program Coordinator for Project Vanguard, he directed preparation of scientific instrumentation for two of the four approved original earth satellites.

Dr. Townsend transferred in 1958 to the National Aeronautics and Space Administration and was appointed Chief, Space Sciences Division . The following year, he became Assistant Director of Goddard Space Flight Center, and was appointed Deputy Director in July 1965. At Goddard, he planned, directed, and conducted a broad program of space research. He was responsible for the day-to-day management of most of NASA's scientific and applications satellites, operation of its global tracking and data acquisition network for unmanned satellites, and the manned Gemini and Apollo spacecraft. He directed field groups at Cape Kennedy and the Pacific Missile Range that were responsible for the launching of all NASA Delta, Thor-Agena, Atlas-Agena, and Centaur vehicles, and supervised the Goddard Institute for Space Studies in New York.

Among the honors Dr. Townsend has received are the Navy's Meritorious Civilian Service Award, 1957; the NASA Medal for Outstanding Leadership, 1962; the Arthur S. Flemming Award as one of the Ten Outstanding Young Men in the Federal Service, 1963; and the NASA Distinguished Service Medal, 1971.

Dr. Townsend is married to the former Mary Lewis, and they have four children — Bruce, Nancy, John, and Megan.

Affiliations and Committee Memberships

National Academy of Engineering

International Academy of Astronautics of the International Astronautic Federation

American Meteorological Society

American Institute of Aeronautics and Astronautics

American Geophysical Union

American Physical Society

Sigma Xi, The Scientific Research Society of North America

American Association for the Advancement of Science

Technical Publications

J. W. Townsend, Jr., "Presentation of Mass Spectra with a Cathode-Ray Oscillograph", *Physics Review*, Vol. 76 (1949), p. 465.

John W. Townsend, Jr., "Radio-Frequency Mass Spectrometer for Upper Air Research", Upper Atmosphere Research Report No. XIV, NRL Report 3928, January 15, 1952. Also published in *Review of Scientific Instruments*, Vol. 23 (Oct. 1952), p. 538.

John W. Townsend, Jr., Edith B. Meadows, Eleanor C. Pressly, "A Mass Spectrometric Study of the Upper Atmosphere", *Rocket Exploration of the Upper Atmosphere*, ed. by R. L. F. Boyd and M. Seaton, pp. 169-188, Interscience Publishers, N. Y. (1954).

E. C. Pressly, C. P. Smith, and J. W. Townsend, Jr., "Aerobee-Hi Report Number 1, The RTV-N-10b Firing", Upper Atmosphere Research Report No. XXIV, NRL Report 4576, Sept. 8, 1955.

Edith B. Meadows, John W. Townsend, Jr., "Neutral Gas Composition of the Upper Atmosphere by a Rocket-Borne Mass Spectrometer", *Journal of Geophysical Research*, Vol. 61 (1956), p. 576.

E. C. Pressly and J. W. Townsend, Jr., "Aerobee-Hi Report Number 2, The NRL-37 Firing", Upper Atmosphere Research Report No. XXV, NRL Report 4727, Apr. 6, 1956.

E. C. Pressly and J. W. Townsend, Jr., "Aerobee-Hi Report Number 3, The NRL-38 Firing", Upper Atmosphere Research Report No. XXVI, NRL Report 4757, June 6, 1956.

J. W. Townsend, Jr., and R. M. Slavin, "Aerobee-Hi Development Program", *Jet Propulsion*, Vol. 27, No. 3 (Mar. 1957), p. 263.

E. C. Pressly and J. W. Townsend, Jr., "Aerobee-Hi Report Number 4, The NRL-39, NRL-42, NRL-46, and NRL-50 Firings", Upper Atmosphere Research Report No. XXVII, NRL Report 4899, Mar. 12, 1957.

E. B. Meadows and J. W. Townsend, Jr., "Diffusive Separation in the Winter Night Time Arctic Upper Atmosphere 112 to 150 km", *Annales de Geophysique*, 14, No. 1 (Jan.-Mar. 1958), p. 80.

J. W. Townsend, Jr., and E. B. Meadows, "Density of the Winter Night Time Arctic Upper Atmosphere 110 to 170 km", *Annales de Geophysique*, 14, No. 1 (Jan.-Mar. 1958), p. 117.

J. W. Townsend, Jr., F. J. Hartz, "Arcon and Iris Rocket Report No. 1", Upper Atmosphere Research Report No. XXX, NRL Report 5073 (1958).

E. C. Pressly and J. W. Townsend, Jr., "Aerobee-Hi Report Number 5, The NRL-45, NRL-47, NRL-43, NRL-48, NRL-40, NRL-41, and NRL-44 Firings", Upper Atmosphere Research Report No. XXXI, NRL Report 5076, Feb. 6, 1958.

J. W. Townsend, Jr., H. Friedman, and R. Tousey, "History of the Upper-Air Rocket-Research Program at the Naval Research Laboratory 1946-1957", Upper Atmosphere Research Report No. XXXII, NRL Report 5087, Feb. 21, 1958.

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Biographical Sketch

Dr. Edward S. Epstein
Associate Administrator
for
Environmental Monitoring and Prediction
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Dr. Epstein has served in his present position since August 1973. Since June 19, 1975, he has also served as Federal Coordinator for Meteorological Services and Supporting Research. Before his appointment to his NOAA position, he was Chairman of the Department of Atmospheric and Oceanic Science at the University of Michigan.

He was born in New York City, graduated from Bronx High School of Science in 1947, Harvard College in 1951, and received an M.B.A. degree from Columbia University Graduate School of Business Administration in 1953.

From 1953 to 1957, he served as an Air Force Officer, performing research. In 1954 he received a Master of Science degree from Pennsylvania State University, and in 1960 received his Ph.D. from that institution.

Dr. Epstein's affiliation with the University of Michigan began in 1959; he served there as lecturer and research associate to 1961; as assistant professor from 1961 to 1963; associate professor from 1963 to 1968; and full professor from 1968 to 1973. He became Chairman of the Department of Atmospheric and Oceanic Science in 1971, and broadened the Department's scope to include studies of aeronomy and planetary atmospheres. He was also a member of the College Standing Committee and the University Research Policies Committee.

From 1962 to 1964, he served as consultant to the Assistant Secretary of Commerce for Science and Technology; and from 1968 to 1969 as visiting scientist at the Meteorology Institute, University of Stockholm.

Dr. Epstein is a Fellow and a member of the Executive Committee of the American Meteorological Society, and a member of the Society's Publication Commission. He is also a member of the American Geophysical Union and the Royal Meteorological Society. He was formerly Editor of the Journal of Applied Meteorology, a trustee of the University Corporation for Atmospheric Research, panel member of committees of the National Science Foundation, and the National Academy of Sciences-National Academy of Engineering.

Dr. Epstein is a Certified Consulting Meteorologist. He is married and has four children.

David H. Wallace
Associate Administrator for Marine Resources
National Oceanic and Atmospheric Administration

David H. Wallace was named Associate Administrator for Marine Resources (initially Ocean Resource Management) of the National Oceanic and Atmospheric Administration on May 11, 1971.

Mr. Wallace was born in Barclay, Maryland in 1916. He was granted a B.S. degree from Washington College, Maryland in 1935 and an M.S. from the University of Maryland in 1937. He undertook further part-time graduate study at the University from 1937 to 1940.

Mr. Wallace had been Director of the Division of Marine and Coastal Resources, New York State Department of Environmental Conservation since 1961, and prior to that was Deputy Director of Fish and Game for the Marine Region, New York State Conservation Department from 1954. From 1962 to 1965 he was also a research associated with the State University of New York at Stony Brook.

Mr. Wallace was active in Chesapeake Bay oyster culture from 1954 to 1961. He was executive director of the Oyster Institute of North America and the Sponge and Chamois Institute from 1951 to 1962.

He was Chairman of the Maryland Board of Natural Resources in 1949 and 1950. He joined the Maryland Department of Tidewater Fisheries as its Administrator in 1941, and became its Director in 1945.

From 1936 to 1940, he was engaged in fisheries research at the Chesapeake Biological Laboratory.

Mr. Wallace has been active in numerous fisheries efforts on the Federal level. He was a member of the Fisheries Advisory Committee to the Assistant to the Secretary, Department of State, from 1956 to 1970. He served on the Fish and Wildlife Advisory Committee to the Secretary of the Interior 1956 to 1960.

In 1967 and 1968, he was a member of the U.S. Mission to negotiate a Middle Atlantic Fisheries Agreement with the Soviet Union. In 1970, he was an advisory member of the U.S. Mission to negotiate a Middle Atlantic Fisheries Agreement with Poland. He is the author of many technical and popular articles on fish, shellfish and ecology, and is an honorary life member of the National Shellfisheries Association and the Atlantic Estuarine Research Society, and a member of the American Society of Limnology and Oceanography, the American Institute of Biological Sciences, and the American Fisheries Society.

He is married to the former Elizabeth McFarland. They have three sons, David, Stephen, and Douglas, and reside in Bethesda, Maryland.

BIOGRAPHICAL SKETCH

ROBERT W. KNECHT

Robert W. Knecht is Assistant Administrator for Coastal Zone Management in the National Oceanic and Atmospheric Administration. He is responsible for implementing the Coastal Zone Management Act of 1972, a landmark statute to reconcile increasing and often conflicting demands upon America's seashores.

Before assuming his present duties in November 1972, Mr. Knecht was Deputy Director of the Environmental Research Laboratories in Boulder, Colorado. There he shared administrative responsibility for 1,100 employees whose work ranged from oceanographic research to weather modification and space physics.

Mr. Knecht began his government career in 1948 with the National Bureau of Standards. Since then he has held a series of successively more responsible positions leading up to his present assignment. Mr. Knecht has served most of his career in Washington, D.C., Boulder, Colorado, and Anchorage, Alaska, where he was Director of the North Pacific Radio Warning Service.

Mr. Knecht is a former Mayor and Vice-Mayor of Boulder and the author of 35 technical papers on solar-terrestrial relations, atmospheric and space physics, and coastal zone and land use management. From 1959 to 1960, he was a Fellow at Cambridge University (England) and at the University of Rhode Island in 1971.

In 1967, Mr. Knecht received the Department of Commerce Gold Medal for leadership in a satellite experiment and has received several other honors for community service.

Mr. Knecht served in the U.S. Navy and received a Bachelor of Science degree from Union College, Schenectady, N.Y. and a Master of Marine Affairs degree from the University of Rhode Island. He is native of Ogdensburg, N.Y. and the father of three children.

GOAL A - OCEAN RESOURCE MANAGEMENT

TO ENSURE THE WISE DEVELOPMENT AND RATIONAL CONSERVATION OF OCEAN RESOURCES FOR THE ECONOMIC AND SOCIAL GOOD OF THE NATION, WHILE ASSISTING THE PRIVATE SECTOR IN EFFECTIVE DEVELOPMENT OF THESE RESOURCES. TO PROVIDE THE OCEAN AND ENVIRONMENTAL SERVICES NECESSARY FOR EFFECTIVE OCEAN RESOURCE MANAGEMENT.

THE FOLLOWING OPERATIONS AND SERVICES CONTRIBUTE TO THE REALIZATION OF THIS GOAL:

	PROGRAM LEVEL FY 1977 (millions of dollars)
MARINE MAPPING AND CHARTING SERVICES	21.5
OCEAN FISHERIES AND LIVING RESOURCES	73.3
SEA GRANT	27.7
OCEAN SCIENCE AND TECHNOLOGY	13.1
SHIP OPERATIONS	45.2
TOTAL	180.8

MARINE MAPPING AND CHARTING SERVICES

THE MARINE MAPPING AND CHARTING SERVICES ARE COMPOSED OF BASIC CHARTING ACTIVITIES AND SPECIALIZED SERVICES FOR THE SAFETY OF NAVIGATION FOR MANAGEMENT AND DEVELOPMENT OF THE COASTAL ZONES, AND FOR EXPLORATION AND UTILIZATION OF OUR OCEAN RESOURCES.

THE SAFE AND EFFICIENT NAVIGATION OF MARINE COMMERCE, THE SAFETY OF RECREATIONAL BOATERS, AND DEFENSE FLEET OPERATIONS IN OUR NATION'S NAVIGABLE WATERS REQUIRE CURRENT NAUTICAL CHARTS AND NAVIGATIONAL AIDS.

There are over 900 different nautical charts as well as other related publications for the navigable marine and Great Lakes waters of the U.S., its possessions and territories. Over two million of these products are distributed annually, half of which are for use by government agencies. The Department of Defense is a major government user. These charts are also necessary to meet the fast growing demands of recreational boaters for new and updated small craft charts of our inland waterways and near-shore regions. Charts are vital to maritime commerce using our major ports from which 1.5 million tons of cargo is shipped annually. Nautical charts must be updated and revised to keep abreast of developing regions such as Alaska, and new facilities such as offshore terminals to assure safe and efficient navigation. The havoc and destruction of nature, from tidal waves, hurricanes and severe winter storms, for example, must also be recharted to aid in recovery of areas such as Gulf ports. In FY 77, a major initiative will be the surveying of the new 200 mile economic marine boundary of the United States established by Public Law 94-265.

MAPS AND DESCRIPTIVE INFORMATION OF OUR ESTUARINE AND COASTAL AREAS ARE FUNDAMENTAL ELEMENTS IN THE EFFECTIVE DEVELOPMENT AND UTILIZATION OF THE COASTAL ZONE.

There are more than 90,000 miles of tidal coastline of the U.S. Maps of this coastline and adjacent wetlands and of the shores of the Great Lakes provide detailed descriptions and understanding of the physical properties of these areas and waters for planning and management. Maps determined from tidal datums and aerial photography are prepared for establishing boundaries for the resolution of jurisdictional disputes--local, national and international. To assist local pollution abatement programs, circulation studies also are undertaken in major harbors and estuaries such as Penobscot Bay and Boston Harbor.

OCEAN FISHERIES AND LIVING RESOURCES

NOAA IS RESPONSIBLE FOR IMPLEMENTING THE 1976 FISHERY CONSERVATION AND MANAGEMENT ACT WHICH EXTENDS U.S. FISHING JURISDICTION TO 200 MILES. THROUGH A NEW NATIONWIDE SYSTEM OF FISHERY MANAGEMENT, NOAA HAS THE OCCASION TO HELP RESTORE DEPLETED FISH STOCKS, REVITALIZE THE FISHING INDUSTRY AND PROVIDE IMPROVED RECREATIONAL FISHING OPPORTUNITIES.

The U.S. fishing industry has become less competitive among fishing nations in the last two decades. Internationally, the U.S. catch has dropped from second place in 1956 to fifth place in 1974. Meanwhile domestic and world demands for fish have increased and are projected to continue. In the United States the production and sale of domestically harvested fishing products is an estimated $3 billion a year business.

The Fishery Conservation and Management Act (P.L. 94-265), effective March 1, 1977, provides conservation and management authority to regulate fishing vessels beyond the U.S. territorial sea to a distance of 200 miles, and to authorize the U.S. to carry out its obligations under international fisheries agreements.

The Act established eight Regional Fishery Management Councils: New England, Mid-Atlantic, South Atlantic, Caribbean, Gulf, Pacific, North Pacific, and Western Pacific. The Councils are directed to prepare fishery management plans for each fishery within their geographical area of authority. After formulation by the Councils, the plans are submitted to the Secretary of Commerce for his review and approval.

The Councils conduct short-term biological, social, and economic analyses required to complete specific elements of each of the Council's regional management plans. NOAA provides plan development support to the Councils. NOAA also supports the States or State Councils in the development of management plans for fisheries primarily within territorial waters, should the States choose to utilize this mechanism in preference to the Regional Councils.

NOAA CARRIES OUT A COMPREHENSIVE FISH STOCK ASSESSMENT TO PROVIDE THE DATA NECESSARY FOR WISE FISHERY MANAGEMENT.

Living resources are not inexhaustible. Haddock stocks in the Northwest Atlantic are nearly exhausted from over-fishing, dwindling from 300 million pounds caught in 1929 to 16.2 million pounds in 1975. Environmental conditions and excessive fishing have destroyed fisheries, such as the California sardine fishery. A NOAA program is in operation to monitor, assess, and predict the kinds and quantities of available fishery stocks around U.S. coasts. In providing a comprehensive assessment of resources on a continuous basis. The program will furnish information useful for both domestic and international fisheries management.

Biological research on living marine resources is conducted on important food and recreational fisheries and other aquatic animals with emphasis on geographic distribution, life cycles, and abundance.

NOAA PROVIDES ECONOMIC, MARKETING AND CONSUMER INFORMATION ON FISHERY PRODUCTS FOR A VARIETY OF USERS.

Activities to promote the consumption of fishery products concentrate on consumer education to enhance public awareness of the value of fishery products. Services to identify and develop domestic and export markets include participation in approximately 4 international trade fairs yearly. Marketing research determines consumer use patterns, marketability of under-utilized species, and market structure. Data or statistical analyses are provided for policy formulations, allocation of grant funds to states, and to research programs within both Government and private industry.

NOAA IS CONCERNED WITH THE EFFECTS OF POLLUTANTS ON FISHERIES.

Discovery of excessive levels of mercury in fish demonstrated that marine contaminants impair the wholesomeness of fish and threaten our fishing industry. Comprehensive surveys of principal species measure the presence of heavy metals like mercury, and pesticides and other chlorinated hydrocarbons such as PCB's. These surveys are supplemented by studies on the effects of contamination on fish populations and by studies to provide guidelines for establishing tolerance levels. Work is cooperative with the Food and Drug Administration and state agencies to present a factual picture of contamination in fish.

NOAA ADMINISTERS FINANCIAL ASSISTANCE PROGRAMS AIMED AT MODERNIZING THE U.S. FISHING FLEET.

A Fisheries Loan Fund provides direct loans; a fishing vessel and mortgage insurance program guarantees loans; and a new capital construction fund enables fishermen to obtain tax benefits for vessel replacement. At the present time, direct loans outstanding are valued at $1.5 million and loan guarantee obligations total about $60 million. About $358 million in capital construction fund projects are presently scheduled under outstanding agreements, and over $77 million has been actually deposited by program participants. It is estimated that about 800 new vessels of all types are annually added to the Fleet.

NOAA ADMINISTERS THE MARINE SPECIES PORTIONS OF THE MARINE MAMMAL PROTECTION ACT, THE ENDANGERED SPECIES ACT AND THE PACIFIC FUR SEALS ACT.

NOAA is charged with the protection of marine mammals and marine endangered species. in this connection, NOAA has led U.S. efforts for the protection of whales, the reduction of porpoise mortality from tuna fishing, and in management of fur seal stocks. These programs all have a significant international component.

NOAA SUPPORTS AN AQUACULTURE RESEARCH PROGRAM DIRECTED AT REALIZING THE POTENTIAL FOR AUGMENTING THE NATURAL FOOD SUPPLIES FROM THE SEA.

Cultivation of marine organisms in the U.S. is at the stage of U.S. agriculture some 50 years ago. Scientific progress in mass artificial propagation of several species offers great potential. Pacific Salmon have already been produced and are being marketed on a pilot plant basis. Oysters are being bred in hatcheries. Japan now grows shrimp commercially in closed systems and is making pilot studies on other valuable organisms. This is a promising activity for creation of new self-sustaining industry and for developing new and dependable sources of seafood.

THE SEA GRANT COLLEGE PROGRAM

THE SEA GRANT PROGRAM IS A VITAL FEDERAL PROGRAM FOR DEVELOPING THE NATION'S MARINE RESOURCES THROUGH ACADEMIC RESEARCH, BY PROVIDING THE SPECIALIZED TRAINED MANPOWER NEEDED IN THIS FIELD, AND THROUGH TECHNOLOGY TRANSFER AND OTHER EXTENSION SERVICES TO MARINE INDUSTRY.

NOAA administers the National Sea Grant Program under the National Sea Grant College and Program Act of 1966. It is patterned after the Morrill Act Land Grant Program of 1862, which was so successful in developing agricultural resources. Cooperative academic-industrial programs under Sea Grant sponsorship assist the States in management of marine resources. Approximately 40 percent of the program is in matching funds provided by industry, State and local governments, and private institutions. The three principal activities of the program are applied research, education, and advisory services. Eleven Sea Grant colleges have been established to date in Washington, Oregon, Texas, Rhode Island, Wisconsin, Hawaii, California, New York, Florida, North Carolina, Delaware.

OCEAN SCIENCE AND TECHNOLOGY

OCEAN EXPLORATION IS ESSENTIAL TO OUR UNDERSTANDING OF MARINE RESOURCES AND THE OCEAN ENVIRONMENT.

We have only begun to acquire an understanding of the properties and dynamics of the ocean and of the characteristics of the sea floor and the processes determining its structure. Our studies of the oceans are aimed at understanding major ocean current systems, physical and chemical properties throughout the oceans, and the evolution of ocean basins and sediment deposits. Since many of these studies require cooperation, they are often done in collaboration with other agencies and other countries through cooperative international programs.

NOAA STUDIES THE CRITICAL IMPACTS OF MAN ON MARINE ECOSYSTEMS.

The formation of NOAA has brought together the talents and facilities required for detailed physical and the biological analyses of marine ecosystems. With the growing competition for the coastal zone, especially in urban areas, greater ecosystem knowledge is needed by local planners, government agencies and the public. A detailed experiment is underway in New York Bight, where the problem of sewage sludge dumping and its effects upon the environment, marine life and public health is of serious concern. Completion is planned in FY 1981. Plans are to extend this research effort to Puget Sound and to other areas where man's activities have put great pressure on marine and coastal ecosystems.

OCEAN ENGINEERING IS THE KEY TO EFFECTIVE DEVELOPMENT OF OCEAN RESOURCES AND PROTECTION OF THE OCEAN ENVIRONMENT.

The Office of Ocean Engineering was formed in September 1976 from the NOAA Data Buoy Office, the Office of Manned Undersea Technology and certain functions of the former National Oceanography Instrumentation Center, to Coordinate existing NOAA ocean engineering programs, recommend new program initiatives for ocean engineering, and serve as a focal point for technology transfer within the entire marine community. The Office is responsible for developing more structured relationships between NOAA's ocean engineering capabilities and national needs, the establishment of design standards and guidelines, and facilitating access to sources of ocean data and information. OOE is presently focusing on ocean technology, ocean instrumentation and technology for diving, and manned undersea activities.

DEEP OCEAN MINING ENVIRONMENTAL STUDY (DOMES) - THE PROSPECT OF IMMINENT MINING OF THE OCEAN FLOOR HAS PROMPTED THE CONSIDERATION OF THE ENVIRONMENTAL IMPACT OF THESE OPERATIONS.

NOAA received funds in FY 1976 for DOMES I to acquire basic data on the environment at selected deep ocean manganese nodule mining sites before commercial mining begins. In FY 1978 NOAA hopes to receive funds to undertake the second phase of DOMES. DOMES II will monitor and evaluate environmental effects of industrial testing of prototype manganese module mining equipment. While DOMES I provided the basis for an environmental impact statement, DOMES II will complete the specification of any needed environmental guidelines for mining activities.

GOAL B - COASTAL ZONE MANAGEMENT

TO ENSURE THE WISE AND BENEFICIAL PLANNING AND MANAGEMENT OF THE LAND AND WATER RESOURCES OF THE NATION'S COASTAL ZONES.

In response to intense pressures upon, and conflicts within, and the importance of the coastal zones of the United States, Congress passed the Coastal Zone Management Act (P.L. 92-583). Signed into law on October 27, 1972, the Act authorized a Federal program to be administered by the Secretary of Commerce, who in turn delegated this responsibility to the National Oceanic and Atmospheric Administration (NOAA). The Act's goal was to bring about the rational use and conservation of the Nation's coastal zones by encouraging States, through specified grant assistance programs, to exercise their full responsibilities in the coastal zone by means of the development and implementation of effective coastal management programs.

NOAA IS RESPONSIBLE FOR ASSISTING THE COASTAL STATES IN THE PLANNING AND DEVELOPMENT OF EFFECTIVE COASTAL MANAGEMENT PROGRAMS.

Since March of 1974, when the first funding became available, NOAA has provided about 100 program development grants totaling approximately $40 million to the 30 coastal States (22 bordering the oceans and 8 on the Great Lakes). Most States are now in their third year of Federally-assisted work and anticipate submitting completed (and implemented) programs for Federal review and approval in late 1977 or 1978. Grants for program development and planning cannot be given after September 30, 1979.

Work to date has concentrated on inventories of valuable coastal resources, conduct of needed research studies, assessment of coastal problems and potential, and the formulation of public policy with regard to the conservation and use of coastal assets. States are now beginning to wrestle with difficult institutional and governmental issues dealing with the acquisition of adequate State authority for managing their shorelines, the division of responsibility between State and local governments, and the incorporation of the

national interest into their coastal plans.

The first coastal State, the State of Washington, received Federal approval of its coastal management program in June of 1976. Implementation of this program is now assisted by a CZM administration grant. Completed programs are expected to be submitted from the States of California and Oregon during the first half of 1977.

The Coastal Zone Management Program is important in another sense. The Act and the unique State-Federal partnership it creates can be seen as pointing the way toward a return of certain types of decisionmaking to the State and local levels of government. Furthermore, the novel Federal consistency provision of the Act, requires that the actions of Federal agencies be consistent with State coastal management programs once they are approved by the Secretary of Commerce, thus putting the States in a much stronger position than heretofor with regard to controversial and conflicting Federal plans and activities.

NOAA IS MANAGING THE DEVELOPMENT AND IMPLEMENTATION OF THE NEW COASTAL ENERGY IMPACT PROGRAM.

In July of 1976, the first major amendments to the 1972 Act became law (P.L. 94-370). They authorized $1.6 billion over a 10-year period for an energy impact assistance program for coastal States and expanded NOAA's existing Coastal Zone Management Program. The amendments recognized a national commitment to assist States and communities impacted by the accelerated exploration and production of oil and gas from the Outer Continental Shelf and other coastal energy activities. The Department of Commerce was assigned responsibility for executing the expanded program in close coordination with the ongoing coastal zone management programs of the States.

The financial assistance available through the Coastal Energy Impact Program is to be used for: (1) planning for the social, economic, and environmental consequences in the coastal zone resulting from new energy development; (2) construction of public facilities and provision of public

services, the need for which is attributable to increased populations resulting from new and expanded coastal energy activity; (3) prevention, reduction, or amelioration of unavoidable damage or degradation of valuable environmental or recreational resources resulting from past or future coastal energy activity.

The program consists of two interlocking sources of financial assistance: (1) the Coastal Energy Impact Fund authorized for $800 million over 10 years; and (2) formula grants authorized for $400 million over 8 years. Assistance is aimed at meeting State and local needs resulting from impacts caused by coastal energy activity. Coastal energy activity is defined in the Act to include three types: (1) Outer Continental Shelf energy activity; (2) any transportation or processing of liquified natural gas; and (3) any transportation, transfer, or storage of coal, oil, or natural gas.

With exploration on the Federal Outer Continental Shelf already underway in the Gulf of Alaska, and lease sales having occurred or pending adjacent to other portions of that State and other States, an urgent need exists for early implementation of the program. After extensive involvement of affected interests, draft regulations were issued on October 22, 1976. The regulations are scheduled for publication in final form in late December. Assuming that the Administration submits the required supplemental budget request (for fiscal 77) to Congress in January, and assuming expeditious handling by the Congress, NOAA plans to be ready to receive applications for assistance under the Coastal Energy Impact Program in May of 1977.

NOAA IS RESPONSIBLE FOR OPERATING THE NATION'S ESTUARINE AND MARINE SANCTUARY PROGRAMS.

Under the Coastal Zone Management Act of 1972, as amended, and the Marine Research, Protection and Sanctuaries Act of 1972, the Department of Commerce is responsible for developing and operating two closely related sanctuary

programs--the National Estuarine Sanctuary Program and the National Marine Sanctuary Program.

The Estuarine Sanctuary Program is aimed at assisting States in the acquisition and operation of a set of estuarine sanctuaries broadly representative of the major types of estuaries found along the U.S. shorelines. While the stated purpose of the system of estuarine sanctuaries is education and research, it is also clearly intended that they be used to support the development of State coastal management programs.

As of November 1976, three estuarine sanctuaries have been approved--South Slough, Oregon; Sapalo Island, Georgia; and Waimanu, Hawaii and active proposals are under review for sanctuaries in Florida and Ohio.

The Marine Sanctuary Program has as its aim the Federal designation of certain coastal waters adjacent to the U.S. shoreline for special management because of their high ecological, recreational, research or historic value. Two marine sanctuaries have so far been designated--the site of the sinking of the U.S.S. Monitor off Cape Hatteras, and a substantial formation of important coral reefs off the Florida Keys.

These sanctuary programs have recently taken on even more significance with the greatly accelerated exploration of our outer continental shelves for oil and gas, the extension of U.S. fisheries jurisdiction to 200 miles, and the likely increase in hard minerals activity off of our shores. An effective program of protecting unique ocean areas prior to the onset of any potentially damaging developmental activities is of fundamental importance.

GOAL C - ENVIRONMENTAL MONITORING, PREDICTION AND CONTROL

TO DEVELOP AND OPERATE SYSTEMS TO MONITOR AND PREDICT ENVIRONMENTAL CONDITIONS SUCH AS WEATHER AND OCEAN HAZARDS SO THAT LIFE AND PROPERTY CAN BE PROTECTED AND THE EFFICIENCY OF COMMERCIAL, INDUSTRIAL AND AGRICULTURAL ACTIVITIES IMPROVED. TO EXPLORE THE FEASIBILITY, AND, WHERE WARRANTED, TO DEVELOP THE NATIONAL CAPABILITY FOR THE BENEFICIAL MODIFICATION OF ENVIRONMENTAL CONDITIONS, AND TO UNDERSTAND THE CONSEQUENCES OF INADVERTENT ENVIRONMENTAL MODIFICATION. THE FOLLOWING PROGRAMS CONTRIBUTE TO THE FULFILLMENT OF THIS GOAL:

	Program Level FY 1977 (millions of dollars)
BASIC WEATHER SERVICES	173.6
SPECIALIZED WEATHER SERVICES	27.3
OCEAN ENVIRONMENTAL SERVICES	4.6
RIVER AND FLOOD SERVICES	10.2
SPACE ENVIRONMENTAL SERVICES	5.0
OTHER ENVIRONMENTAL SERVICES	13.6
ENVIRONMENTAL DATA SERVICES	15.6
SATELLITE SERVICES	89.8
OTHER RESEARCH AND FIELD PROGRAMS	9.3
GLOBAL MONITORING OF CLIMATIC CHANGE	1.8
WEATHER MODIFICATION	6.5
TOTAL	357.3

THE BASIC AND PUBLIC WEATHER SERVICES

THE BASIC AND PUBLIC WEATHER SERVICES PROVIDE THE COMMON NETWORKS OF WEATHER OBSERVATIONS AND COMMUNICATIONS USED TO OBSERVE AND DISSEMINATE GENERAL FORECASTS AND DISASTER WARNINGS TO THE NATION.

Approximately 350 National Weather Service Offices, including the National Meteorological Center, the National Hurricane Center, and the National Severe Storms Forecast Center provide the essential weather services to the Nation.

The weather observation and communication network of the Basic Meteorological Service also supports the Specialized Meteorological Services. These basic networks consist of 341 manned and unmanned surface weather observing stations, 107 upper air stations, and 94 weather radars. Their data are collected and distributed over nationwide teletypewriter and facsimile networks.

Annual losses from weather in the U.S. amount to about $15 billion, of which one-third to one-half are due to catastrophic weather.

Hurricane and tornado damages exceed $800 million a year and winter weather causes more than a $200 million loss annually. Warning systems minimize the loss of life and assist in property protection.

SPECIALIZED WEATHER SERVICES

METEOROLOGICAL SERVICES ARE PROVIDED TO WEATHER-SENSITIVE SEGMENTS OF THE ECONOMY.

WEATHER SERVICES FOR AIR TRANSPORTATION. ACCURATE AVIATION WEATHER FORECASTS ARE ESSENTIAL TO THE SAFE AND EFFICIENT USE OF AIR SPACE.

> The Aviation Weather Service provides forecasts for civil and military, domestic and international uses. Weather information and forecasts are basic elements in planning aircraft operations. In 1975, this service supported 167,000 general aviation and 2,267 domestic and many foreign air carrier aircraft, during a period when air carriers carried over 205 million passengers.

WEATHER SERVICES FOR AGRICULTURE. THIS SERVICE HELPS CUT WEATHER-RELATED FARM LOSSES, AND IMPROVE AGRICULTURAL PRODUCTIVITY.

> Forecasts and information services are designed to emphasize differing seasonal and geographical needs which vary according to types of farm production. Annual crop losses due to weather amount to $1.6 billion. The Agricultural Weather Service attempts to reduce these losses, enhances the production of weather-sensitive crops, and makes possible more effective application of pesticides and fertilizers.

AIR POLLUTION AND FIRE WEATHER SERVICES. THIS SERVICE PROVIDES FORECASTS, AND WARNINGS TO SUPPORT FEDERAL, STATE, AND LOCAL AGENCIES IN THEIR PROGRAMS FOR FOREST AND RANGE FIRE PREVENTION, CONTROL, AND MANAGEMENT, AND FOR URBAN AIR POLLUTION.

Resource losses in National Forests amounted to more than $600 million in 1975. During 1974, 91,000 forest fires burned 1.7 million acres. NOAA provides services from 52 offices, and 19 mobile weather teams are used for on-site assistance to the U.S. Forest Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, State and local governments, and private owners. These users estimated the value of the services at approximately $85 million in FY 1974.

Air pollution problems are of direct concern to more than 70 percent of the Nation's population, living in 200 urban areas. NOAA has instituted air pollution potential forecast services. Nationwide and local forecast support is provided to local officials in all cities which require the information. Special purpose upper-air observation teams operate in cities where pollution problems are most severe.

OCEAN ENVIRONMENTAL SERVICES

TO PROTECT LIFE AND SAFETY AT SEA, AND TO INCREASE THE EFFICIENCY OF ALL MARINE OPERATIONS, THE OCEAN FORECASTING SERVICE PROVIDES WARNINGS AND OTHER ADVISORIES ABOUT SEVERE STORMS, STRONG WINDS, AND HAZARDOUS OCEAN CONDITIONS.

> Thirty-four National Weather Service Offices provide forecasts and warnings to coastal, transoceanic, and Great Lakes shipping, commercial and sports fishermen, offshore mineral industries and water pollution control agencies. Marine environmental information for near-shore users is broadcast over NOAA's Weather Radio stations along the coasts and by cooperative stations of other agencies, High seas forecasts for shipping are provided to meet our national commitments to the Safety of Life at Sea Convention and World Meteorological Organization agreements.

A SEISMIC SEA WAVE (TSUNAMI) WARNING SYSTEM IS MAINTAINED IN THE PACIFIC BASIN TO PROTECT COASTAL COMMUNITIES AGAINST THESE EARTHQUAKE-GENERATED HAZARDS.

> This system comprises a network of seismic stations and tide gages throughout the Pacific Ocean. The headquarters (National Tsunami Warning Center) in Hawaii carries the responsibility for alerting all affected areas in the Pacific Basin. Under international agreement, NCAA also operates an International Tsunami Information Center in Hawaii.
>
> Some 500 U.S. coastal cities, towns, and recreational areas could be affected by tsunamis.

RIVER AND FLOOD FORECASTING SERVICES

NOAA MAINTAINS A NATIONAL SYSTEM FOR RIVER AND FLOOD FORECASTING FOR THE PROTECTION OF LIFE AND PROPERTY AND SUPPORT OF THE NATION'S WATER MANAGEMENT ACTIVITIES.

Twelve River Forecast Centers of the National Weather Service prepare forecasts and warnings for approximately 2,000 points along major river systems. These forecasts provide advance warnings that vary from a few hours for small headwater areas to two to three weeks in advance for downstream points on large river systems.

Predictions of river stages and flood warnings form the basis for actions to save life and property and to take protective measures to prevent long-term disruptions that result from protracted shut-downs of flood-damaged industries. Flash flood warnings are also issued whenever weather forecasts or radar observations indicate the possibility of flooding.

OTHER ENVIRONMENTAL SERVICES

NOAA IS THE CENTRAL AGENCY FOR ESTABLISHMENT AND MAINTENANCE OF THE NATIONAL GEODETIC NETWORK.

NOAA has the responsibility for establishing and maintaining highly accurate networks of horizontal and vertical control points which serve as the basis for surveying, mapping, and large engineering projects. This involves land use and property surveys, topographic and coastal zone mapping for development and restoration of wetlands and extension of seaward boundaries, and precise surveys for highways, water, and sewage systems. These coordinated frameworks support $60 billion worth of major engineering and construction projects yearly, and are standard references in international Federal, State, and local systems. More than 1.5 million requests for geodetic data are accommodated annually from more than 32,000 professional surveyors and engineers.

THE AERONAUTICAL CHARTING PROGRAM PROVIDES MAPS AND CHARTS FOR GENERAL AND COMMERCIAL AIRCRAFT USING THE NATIONAL AIRSPACE SYSTEM.

Aeronautical charts are an integral part of the National Airspace System operated by the Federal Aviation Administration. They are essential for FAA's control of the system and for the general and commercial aviation personnel who must operate within the system. All requirements for charts are established by the FAA.

In 1975, 40.6 million copies of products were distributed of which about 3.8 million were for FAA use and 1.8 million for DOD.

UPPER ATMOSPHERE AND SPACE SERVICES

NOAA PROVIDES FORECASTS AND WARNINGS OF SOLAR CONDITIONS AND THE SPACE ENVIRONMENT BETWEEN THE SUN AND EARTH.

Events of critical importance to man in space and to communications systems on earth can be triggered by solar flares or heightened sunspot activity. Without warnings of magnetic storms, extensive power blackouts may occur and long-distance radio communications may be lost. When the NASA space shuttle program becomes operational, a new class of monitoring and prediction services will be required. NOAA's Space Environment Service Center at Boulder, Colorado, is the national focal point for these services.

ENVIRONMENTAL DATA SERVICE

NOAA OPERATES A NETWORK OF ENVIRONMENTAL DATA, INFORMATION AND ASSESSMENT CENTERS TO MEET THE NEEDS OF INDUSTRY, COMMERCE, AGRICULTURE, THE SCIENTIFIC AND ENGINEERING COMMUNITY, THE GENERAL PUBLIC, AND FEDERAL, STATE, AND LOCAL GOVERNMENT.

NOAA's Environmental Data Service operates the National Climatic Center, the National Oceanographic Data Center, the National Geophysical and Solar Terrestrial Data Center, the Center for Climatic and Environmental Assessment, the Center for Experiment Design and Data Analysis, the Environmental Science Information Center, as well as a comprehensive data and information referral system.

EDS Centers are considered the national repositories for much data and information relating to the atmosphere, ocean, solid earth and space, and associated environmental interactions. International data exchanges are accomplished through World Data Centers, for which NOAA has the U.S. responsibility in most environmental disciplines.

SATELLITE SERVICES

NOAA OPERATED ENVIRONMENTAL SATELLITES MONITOR GLOBAL WEATHER, OCEAN, AND SOLAR CONDITIONS.

The NOAA environmental satellite program consists of polar-orbiting and geostationary spacecraft. The polar-orbiting system provides quantitative data required for numerical weather analysis and prediction. The polar-orbiting spacecraft provide twice-daily global imagery of the earth and its environment, day and night, including direct readout to ground stations throughout the world. The geostationary system provides repetitive imagery needed by the environmental warning services to detect, track, and predict the growth and decay of severe weather systems. The geostationary spacecraft obtain near-continuous observations of the earth and its environment throughout the day and night, collect and relay environmental data from remote observing platforms, and broadcast centrally prepared environmental products to remote locations.

In addition to their key role in weather observation and prediction, the environmental satellite is a unique source of data which are useful in a number of different applications. For example, these data are used in mapping extent and location of snow-pack areas which is essential for river and flood warning and for water supply estimates. Charting the distribution of sea and lake ice contributes to the safety of shipping and offshore operations. Charting of sea surface temperature provides valuable data for fisheries management and for navigation.

THE WORLD WEATHER PROGRAM

THIS IS A COMPREHENSIVE INTERNATIONAL EFFORT TO IMPROVE THE FUNDAMENTAL UNDERSTANDING OF GLOBAL WEATHER AND CLIMATE, AND TO ESTABLISH A WORLDWIDE WEATHER OBSERVING AND FORECASTING SYSTEM.

The World Weather Program comprises

- o The World Weather Watch (WWW), an operational system for the global acquisition, communication, processing and dissemination of weather-related data and services,

- o The Global Atmospheric Research Program (GARP), a research program to improve our understanding of climate and lay the basis for extending the time range of weather forecasting.

NOAA coordinates the participation of eight Federal Departments and agencies which participate in the program. In accordance with a Senate Concurrent Resolution, the President submits an annual World Weather Program Plan, prepared by NOAA, reporting the recent progress and detailing program and fiscal plans.

ENVIRONMENTAL RESEARCH AND DEVELOPMENT HIGHLIGHTS

SEVERE STORMS RESEARCH IS CENTRAL TO IMPROVING ACCURACY OF WARNINGS.

The structure, circulation and energy sources of hurricanes are studied using data from specially instrumented aircraft, satellites, and conventional reporting networks. This work is carried out at the National Hurricane and Experimental Meteorological Laboratory in Miami.

Tornadoes and severe local storms are investigated using a specially instrumented high density network, Doppler radars, atmospheric electricity monitors, and other new sensing technology. The Severe Storms Research Laboratory is located in Tornado Alley in Oklahoma.

GEOPHYSICAL FLUID DYNAMICS RESEARCH WILL YIELD A CAPABILITY FOR COMPUTER SIMULATION OF OCEAN AND ATMOSPHERIC CONDITIONS.

This program is directed to long-range weather forecasting, exploring the possibility of large-scale weather and climate control, and assessing the influence of pollutants on the global climate.

It employs large digital computers and mathematical models to simulate the behavior of the entire ocean-atmosphere system of the planet. The Laboratory is located in Princeton, N.J.

NOAA'S DATA BUOY PROJECT WILL UTILIZE BUOYS FOR AUTOMATED OCEAN DATA COLLECTION FOR OCEAN AND WEATHER FORECASTS, AND OCEAN POLLUTION MONITORING TO COMPLEMENT OTHER DATA GATHERING SYSTEMS.

This project will utilize unmanned automatic buoys to collect accurate environmental data and to transmit it rapidly and reliably to users and processors. We are working toward a capability which will support both operational and research programs. Tests are now being conducted in the Atlantic Ocean, the Gulf of Mexico and the Gulf of Alaska.

HURRICANE MODIFICATION

NOAA'S PROJECT STORMFURY SEEKS TO REDUCE HURRICANE STORM DAMAGE THROUGH AIRBORNE SEEDING.

Hurricane modification experiments in the Atlantic have provided encouraging results. Maximum wind-speed reduction of 15-30% have been observed. NOAA plans to undertake experimental storm modification in the Atlantic-Caribbean-Eastern Pacific in FY 1978 with newly equipped aircraft.

MODIFICATION OF CONVECTIVE CLOUDS

NOAA SEEKS TO INCREASE PRECIPITATION FROM TROPICAL CLOUD SYSTEMS.

Tropical cumulus cloud seeding experiments in southern Florida have shown a threefold increase in rain.

GLOBAL MONITORING FOR CLIMATIC CHANGE

NOAA OPERATES A GLOBAL CLIMATE MONITORING SYSTEM OF THESE TRENDS.

NOAA operates baseline monitoring stations in Hawaii, Alaska, the South Pole, and on American Samoa. These stations are key elements in an international global monitoring system designed to detect changes in climate and pollutants that may affect climate.