PART X

APPENDICES

APPENDIX A

OCEANS ACT OF 2000

One Hundred Sixth Congress
Of the
United States of America

AT THE SECOND SESSION

AN ACT

To establish a Commission on Ocean Policy, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Section 1. Short Title

This Act may be cited as the "Oceans Act of 2000."

Section 2. Purpose and Objectives

The purpose of this Act is to establish a commission to make recommendations for coordinated and comprehensive national ocean policy that will promote—

(1) the protection of life and property against natural and manmade hazards;

(2) responsible stewardship, including use, of fishery resources and other ocean and coastal resources;

(3) the protection of the marine environment and prevention of marine pollution;

(4) the enhancement of marine-related commerce and transportation, the resolution of conflicts among users of the marine environment, and the engagement of the private sector in innovative approaches for sustainable use of living marine resources and responsible use of nonliving marine resources;

(5) the expansion of human knowledge of the marine environment including the role of the oceans in climate and global environmental change and the advancement of education and training in fields related to ocean and coastal activities;

(6) the continued investment in and development and improvement of the capabilities, performance, use, and efficiency of technologies for use in ocean and coastal activities, including investments and technologies designed to promote national energy and food security;

(7) close cooperation among all government agencies and departments and the private sector to ensure—

(A) coherent and consistent regulation and management of ocean and coastal activities;

(B) availability and appropriate allocation of Federal funding, personnel, facilities, and equipment for such activities;

(C) cost-effective and efficient operation of Federal departments, agencies, and programs involved in ocean and coastal activities; and

(D) enhancement of partnerships with State and local governments with respect to ocean and coastal activities, including the management of ocean and coastal resources and identification of appropriate opportunities for policy-making and decision-making at the State and local level; and

(8) the preservation of the role of the United States as a leader in ocean and coastal activities, and, when it is in the national interest, the cooperation by the United States with other nations and international organizations in ocean and coastal activities.

Section 3. Commission on Ocean Policy

(a) ESTABLISHMENT—There is hereby established the Commission on Ocean Policy. The Federal Advisory Committee Act (5 U.S.C. App.), except for sections 3, 7, and 12, does not apply to the Commission.

(b) MEMBERSHIP—

(1) APPOINTMENT—The Commission shall be composed of 16 members appointed by the President from among individuals described in paragraph (2) who are knowledgeable in ocean and coastal activities, including individuals representing State and local governments, ocean-related industries, academic and technical institutions, and public interest organizations involved with scientific, regulatory, economic, and environmental ocean and coastal activities. The membership of the Commission shall be balanced by area of expertise and balanced geographically to the extent consistent with maintaining the highest level of expertise on the Commission.

(2) NOMINATIONS—The President shall appoint the members of the Commission, within 90 days after the effective date of this Act, including individuals nominated as follows:

(A) 4 members shall be appointed from a list of 8 individuals who shall be nominated by the Majority Leader of the Senate in consultation with the Chairman of the Senate Committee on Commerce, Science, and Transportation.

(B) 4 members shall be appointed from a list of 8 individuals who shall be nominated by the Speaker of the House of Representatives in consultation with the Chairmen of the House Committees on Resources, Transportation and Infrastructure, and Science.

(C) 2 members shall be appointed from a list of 4 individuals who shall be nominated by the Minority Leader of the Senate in consultation with the Ranking Member of the Senate Committee on Commerce, Science, and Transportation.

(D) 2 members shall be appointed from a list of 4 individuals who shall be nominated by the Minority Leader of the House in consultation with the Ranking Members of the House Committees on Resources, Transportation and Infrastructure, and Science.

(3) CHAIRMAN—The Commission shall select a Chairman from among its members. The Chairman of the Commission shall be responsible for—

(A) the assignment of duties and responsibilities among staff personnel and their continuing supervision; and

(B) the use and expenditure of funds available to the Commission.

(4) VACANCIES—Any vacancy on the Commission shall be filled in the same manner as the original incumbent was appointed.

(c) RESOURCES—In carrying out its functions under this chapter, the Commission—

(1) is authorized to secure directly from any Federal agency or department any information it deems necessary to carry out its functions under this Act, and each such agency or department is authorized to cooperate with the Commission and, to the extent permitted by law, to furnish such information (other than information described in section 552(b)(1)(A) of title 5, United States Code) to the Commission, upon the request of the Commission;

(2) may enter into contracts, subject to the availability of appropriations for contracting, and employ such staff experts and consultants as may be necessary to carry out the duties of the Commission, as provided by section 3109 of title 5, United States Code; and

(3) in consultation with the Ocean Studies Board of the National Research Council of the National Academy of Sciences, shall establish a multidisciplinary science advisory panel of experts in the sciences of living and nonliving marine resources to assist the Commission in preparing its report, including ensuring that the scientific information considered by the Commission is based on the best scientific information available.

(d) STAFFING—The Chairman of the Commission may, without regard to the civil service laws and regulations, appoint and terminate an Executive Director and such other additional personnel as may be necessary for the Commission to perform its duties. The Executive Director shall be compensated at a rate not to exceed the rate payable for Level V of the Executive Schedule under section 5136 of title 5, United States Code. The employment and termination of an Executive Director shall be subject to confirmation by a majority of the members of the Commission.

(e) MEETINGS—

(1) ADMINISTRATION—All meetings of the Commission shall be open to the public, except that a meeting or any portion of it may be closed to the public if it concerns matters or information described in section 552b(c) of title 5, United States Code. Interested persons shall be permitted to appear at open meetings and present oral or written statements on the subject matter of the meeting. The Commission may administer oaths or affirmations to any person appearing before it.

(2) NOTICE; MINUTES; PUBLIC AVAILABILITY OF DOCUMENTS—[1]

(A) All open meetings of the Commission shall be preceded by timely public notice in the Federal Register of the time, place, and subject of the meeting.

(B) Minutes of each meeting shall be kept and shall contain a record of the people present, a description of the discussion that occurred, and copies of all statements filed. Subject to section 552 of title 5, United States Code, the minutes and records of all meetings and other documents that were made available to or prepared for the Commission shall be available for public inspection and copying at a single location in the offices of the Commission.

(3) INITIAL MEETING—The Commission shall hold its first meeting within 30 days after all 16 members have been appointed.

(4) REQUIRED PUBLIC MEETINGS—The Commission shall hold at least one public meeting in Alaska and each of the following regions of the United States:

(A) The Northeast (including the Great Lakes).

(B) The Southeast (including the Caribbean).

(C) The Southwest (including Hawaii and the Pacific Territories).

(D) The Northwest.

(E) The Gulf of Mexico.

(f) REPORT—

(1) IN GENERAL—By June 20, 2003,[2] the Commission shall submit to Congress and the President a final report of its findings and recommendations regarding United States ocean policy.

(2) REQUIRED MATTER—The final report of the Commission shall include the following assessment, reviews, and recommendations:

(A) An assessment of existing and planned facilities associated with ocean and coastal activities including human resources, vessels, computers, satellites, and other appropriate platforms and technologies.

(B) A review of existing and planned ocean and coastal activities of Federal entities, recommendations for changes in such activities necessary to improve efficiency and effectiveness and to reduce duplication of Federal efforts.

(C) A review of the cumulative effect of Federal laws and regulations on United States ocean and coastal activities and resources and an examination of those laws and regulations for inconsistencies and contradictions that might adversely affect those ocean and coastal activities and resources, and recommendations for resolving such inconsistencies to the extent practicable. Such review shall also consider conflicts with State ocean and coastal management regimes.

(D) A review of the known and anticipated supply of, and demand for, ocean and coastal resources of the United States.

(E) A review of and recommendations concerning the relationship between Federal, State, and local governments and the private sector in planning and carrying out ocean and coastal activities.

(F) A review of opportunities for the development of or investment in new products, technologies, or markets related to ocean and coastal activities.

(G) A review of previous and ongoing State and Federal efforts to enhance the effectiveness and integration of ocean and coastal activities.

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[1] Public Law 107–372 (section 306)

[2] Public Law 107–206 (section 206)

(H) Recommendations for any modifications to United States laws, regulations, and the administrative structure of Executive agencies, necessary to improve the understanding, management, conservation, and use of, and access to, ocean and coastal resources.

(I) A review of the effectiveness and adequacy of existing Federal interagency ocean policy coordination mechanisms, and recommendations for changing or improving the effectiveness of such mechanisms necessary to respond to or implement the recommendations of the Commission.

(3) CONSIDERATION OF FACTORS—In making its assessment and reviews and developing its recommendations, the Commission shall give equal consideration to environmental, technical feasibility, economic, and scientific factors.

(4) LIMITATIONS—The recommendations of the Commission shall not be specific to the lands and waters within a single State.

(g) PUBLIC AND COASTAL STATE REVIEW—

(1) NOTICE—Before submitting the final report to the Congress, the Commission shall—

(A) publish in the *Federal Register* a notice that a draft report is available for public review; and

(B) provide a copy of the draft report to the Governor of each coastal State, the Committees on Resources, Transportation and Infrastructure, and Science of the House of Representatives, and the Committee on Commerce, Science, and Transportation of the Senate.

(2) INCLUSION OF GOVERNORS' COMMENTS—The Commission shall include in the final report comments received from the Governor of a coastal State regarding recommendations in the draft report.

(h) ADMINISTRATIVE PROCEDURE FOR REPORT AND REVIEW— Chapter 5 and chapter 7 of title 5, United States Code, do not apply to the preparation, review, or submission of the report required by subsection (e) or the review of that report under subsection (f).

(i) TERMINATION—The Commission shall cease to exist 90[3] days after the date on which it submits its final report.

(j) AUTHORIZATION OF APPROPRIATIONS—There are authorized to be appropriated to carry out this chapter a total of $8,500,000[4] for the 3-fiscal-year period beginning with fiscal year 2001, such sums to remain available until expended.

Section 4. National Ocean Policy

(a) NATIONAL OCEAN POLICY—Within 90[5] days after receiving and considering the report and recommendations of the Commission under section 3, the President shall submit to Congress a statement of proposals to implement or respond to the Commission's recommendations for a coordinated, comprehensive, and long-range national policy for the responsible use and stewardship of ocean and coastal resources for the benefit of the United States. Nothing in this Act authorizes the President to take any administrative or regulatory action regarding ocean or coastal policy, or to implement a reorganization plan, not otherwise authorized by law in effect at the time of such action.

(b) COOPERATION AND CONSULTATION—In the process of developing proposals for submission under subsection (a), the President shall consult with State and local governments and non-Federal organizations and individuals involved in ocean and coastal activities.

[3] Public Law 107–372 (section 306)
[4] Public Law 107–372 (section 306)
[5] Public Law 107–372 (section 306)

Section 5. Biennial Report

Beginning in September, 2001, the President shall transmit to the Congress biennially a report that includes a detailed listing of all existing Federal programs related to ocean and coastal activities, including a description of each program, the current funding for the program, linkages to other Federal programs, and a projection of the funding level for the program for each of the next 5 fiscal years beginning after the report is submitted.

Section 6. Definitions

In this Act:

(1) MARINE ENVIRONMENT—The term "marine environment" includes—

(A) the oceans, including coastal and offshore waters;

(B) the continental shelf; and

(C) the Great Lakes.

(2) OCEAN AND COASTAL RESOURCE—The term "ocean and coastal resource" means any living or non-living natural, historic, or cultural resource found in the marine environment.

(3) COMMISSION—The term "Commission" means the Commission on Ocean Policy established by section 3.

Section 7. Effective Date

This Act shall become effective on January 20, 2001.

The Oceans Act of 2000 (Public Law 106–256) was signed into law on August 7, 2000.

APPENDIX B

Acronyms Appearing in the Report

Acronyms Appearing in the Report

AAAS	American Association for the Advancement of Science
APD	Application for Permit to Drill
APHIS	Animal and Plant Health Inspection Service
APPS	Act to Prevent Pollution from Ships
ARS	Agriculture Research Service
ASMFC	Atlantic States Marine Fisheries Commission
AUV	Autonomous Underwater Vehicle
BEA	Bureau of Economic Analysis
BEACH Act	Beaches Environmental Assessment and Coastal Health Act of 2000
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
BOR	Bureau of Reclamation
BTS	Bureau of Transportation Statistics
CAA	Clean Air Act Amendments
CAFO	Concentrated Animal Feeding Operation
CALFED	California Bay-Delta Program
CBD	Convention on Biological Diversity
CBRA	Coastal Barrier Resources Act
CDC	Centers for Disease Control and Prevention
CDIAC	Carbon Dioxide Information Analysis Center
CEIP	Coastal Energy Impact Plan
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CIAP	Coastal Impact Assistance Program
CIESIN	Center for International Earth Science Information Network
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COOL	Coastal Ocean Observation Laboratory
CORE	Coastal and Ocean Resource Economics
CORM	Committee on Ocean Resource Management
COSETO	Committee on Ocean Science, Education, Technology, and Operations
COSEE	Centers for Ocean Science Education Excellence
CWA	Clean Water Act
CWPPRA	Coastal Wetland Planning, Protection, and Restoration Act
CWSRF	Clean Water State Revolving Fund
CZARA	Coastal Zone Act Reauthorization Amendments
CZMA	Coastal Zone Management Act
DAACs	Distributed Active Archive Centers
DDT	Dichlorodiphenyltrichloroethane
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOJ	Department of Justice
DOS	Department of State
DOT	Department of Transportation
DPA	Deepwater Port Act
ECOHAB	Ecological Oceanography of Harmful Algal Blooms
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habit
EHRC	Estuary Habitat Restoration Council
EIS	Environmental Impact Statement
EOP	Executive Office of the President
EPA	Environmental Protection Agency
EROS	Earth Resources Observation Systems
EROSDC	Earth Resources Observation Systems Data Centers
ESA	Endangered Species Act
ESP	Environmental Studies Program
FAA	Federal Aviation Administration
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FGDC	Federal Geographic Data Committee
FMC	Federal Maritime Commission
FPA	Federal Power Act
GAO	General Accounting Office
GDP	Gross Domestic Product
GLFC	Great Lakes Fishery Commission
GOES	Geostationary Operational Environmental Satellites
GOOS	Global Ocean Observing System
GPA	Global Program of Action for the Protection of the Marine Environment from Land-Based Sources
GSFC	Goddard Space Flight Center
GSMFC	Gulf States Marine Fisheries Commission
HAB	Harmful Algal Bloom
HACCP	Hazard Analysis and Critical Control Point
H2O	Hilltops-To-Oceans
ICRI	International Coral Reef Initiative
IDOE	International Decade of Ocean Exploration
IFQs	Individual Fishing Quotas
IMO	International Maritime Organization
IMPROVE	Interagancy Monitoring of Protected Visual Environments Program
IOC	U.N. Intergovernmental Oceanographic Commission
IOOS	Integrated Ocean Observing System
ITQs	Individual Transferable Quotas
JEA	Joint Enforcement Agreement
JSA	Joint Subcommittee on Aquaculture
LaRC	Langley Research Center
LME	Large Marine Ecosystem
LNG	Liquefied Natural Gas
LOS Convention	United Nations Convention on the Law of the Sea
LWCF	Land and Water Conservation Fund
MACT	Maximum Achievable Control Technology
MARAD	Maritime Administration

MARPOL	International Convention for the Prevention of Pollution from Ships
MEDEA	Measurment of Earth Data for Environmental Analysis
MERHAB	Monitoring and Event Response for Harmful Algal Blooms
MERP	Marine Entanglement Research Program
MLA	Mineral Leasing Act
MMC	Marine Mammal Commission
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MOA	Memorandum of Agreement
MPPRCA	Marine Plastic Pollution Research and Control Act
MPRSA	Marine Protection, Research, and Sanctuaries Act
M-S Act	Magnuson-Stevens Fishery Conservation and Management Act
MSDs	Marine Sanitation Devices
MSIs	Minority Serving Institutions
MTBE	Methyl Tertiary Butyl Ether
MTSA	Maritime Transportation Security Act
NACOA	National Advisory Committee on Oceans and Atmosphere
NANPCA	Nonindigenous Aquatic Nuisance Prevention and Control Act
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NCDC	National Climatic Data Center
NDSF	National Deep Submergence Facility
NEIC	National Earthquake Information Center
NEMO	Nonpoint Education for Municipal Officials
NEP	National Estuary Program
NEPA	National Environmental Policy Act
NERRS	National Estuarine Research Reserve System
NFIP	National Flood Insurance Program
NGDC	National Geophysical Data Center
NIEHS	National Institute of Environmental Health Sciences
NIH	National Institutes of Health
NIMA	National Imagery and Mapping Agency
NMEA	National Marine Educators Association
NMFS	National Marine Fisheries Service
NMOC	Naval Meteorological and Oceanography Command
NMSA	National Marine Sancturaries Act
NOAA	National Oceanic and Atmospheric Administration
NOC	National Ocean Council
NODC	National Oceanographic Data Center
NOPA	National Oceanographic Partnership Act
NOPP	National Oceanographic Partnership Program
NOPS	National Ocean Policy Study
NORLC	National Ocean Research Leadership Council
NOx	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	National Research Council
NRCS	National Resource Conservation Service
NRS	National Response System
NSB	National Science Board
NSC	National Security Council
NSES	National Science Education Standards
NSF	National Science Foundation
NSIDC	National Snow and Ice Data Center
NSSDC	National Space Science Data Center
NSTC	National Science and Technology Council
NWI	National Wetlands Inventory
NWS	National Weather Service
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OMB	Office of Management and Budget
ONR	Office of Naval Research
OOI	Ocean Observatories Initiative
OPA	Oil Pollution Act
ORAP	Ocean Research Advisory Panel
ORNL	Oak Ridge National Laboratory
OSTP	Office of Science and Technology Policy
OTA	Office of Technology Assessment
OTEC	Ocean Thermal Energy Conversion
PCBs	Polychlorinated biphenyls
PODAAC	Physical Oceanography Distributed Active Archive Centers
POES	Polar-orbiting Environmental Satellite
PSMFC	Pacific States Marine Fisheries Commission
RFMC	Regional Fishery Management Council
ROV	Remotely Operated Vehicle
SAR	Synthetic Aperture Radar
SCOR	Scientific Committee on Oceanic Research
SEDAC	Socioeconomic Data and Applications Center
SLA	Submerged Lands Act
SSC	Scientific and Statistical Committee
TAO	Tropical Atmosphere Ocean array
TEU	20-foot Equivalent Units
TMDL	Total Maximum Daily Load
TOGA	Tropical Global Ocean Atmosphere
TSA	Transportation Security Agency
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Program
UNOLS	University-National Oceanographic Laboratory System
USACE	U.S. Army Corps of Engineers
USAID	U.S. Agency for International Development
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USEIA	U.S. Energy Information Administration
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USTR	Office of the U.S. Trade Representative
VMS	Vessel Monitoring Service
WRDA	Water Resources Development Act
WTO	World Trade Organization

APPENDIX C

Living Near...and Making a Living From...the Nation's Coasts and Oceans

Prepared for the United States Commission on Ocean Policy by

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Executive Summary

More than thirty years ago, the Stratton Commission identified growing population pressures on the coasts as a major reason for increased federal government attention to managing the resources of the coasts, oceans and Great Lakes. Socio-economic changes have continued to affect the nation's oceans and coasts over the three decades since the Stratton Commission report, but in much more complex ways than simple population growth alone. More people live on and near the coasts, but it is population growth away from the coast that may be the greatest cause for concern. Population growth near the coast is being outstripped by even faster employment growth, and in industries which appear clean but whose cumulative effects on the environment are significant.

The ocean has always been an important part of the economic life of the nation, but this too is undergoing dramatic change. Economic activity associated with the ocean contributed more than $200 billion to the U.S. economy in 2000, but employment in such traditional marine industries as fishing and marine transportation is declining, while employment in tourism and recreation industries is exploding. Some industries, such as ocean minerals and maritime transportation are producing more with fewer employees, while others such as commercial fishing are declining in both output and employment.

Changes in the socio-economic environment affecting the nation's oceans and coasts are essential to any consideration of public policy. This is so for three reasons:

1. Changes in how people use the ocean and coasts have profound effects on the natural resources.
2. The changes in the resources feed back to changes in the demographic and economic uses altering our uses and perceptions of the coasts and oceans.
3. To manage a resource you must manage the people who use it. Whatever form it takes, policy affects people's behavior, and so how people interact with the environment is the key to the future of the oceans.

This report explores key changes in the socio-economic environment of the nation's oceans and coasts using the latest data from the Census and a special study of the coastal and ocean economies of the United States prepared for the Commission by the National Ocean Economics Project, an independent investigation of the national ocean economy funded by NOAA and EPA. Major conclusions from this analysis include:

1. The term "coast" requires precise definition for measurement. The socio-economic definition of the coast includes at least three tiers, ranging from the near shore, the areas covered by state coastal management programs, and the counties that include coastal watersheds.
2. Population growth since 1970 in coastal watershed counties exceeded 37.5 million people, but this reflected the same rate of growth as the nation as a whole. This means that the coasts are not the destination of disproportionately large growth, but the sheer increase in the population on the same relative small land base still produces major effects.
3. Population and housing growth is shifting inland away from the shoreline. Expensive real estate and past growth have resulted in slow growth near the oceans and Great Lakes, while upland areas have absorbed more of the growth over the past decade and will likely continue to do so.
4. The largest population growth has been along the Atlantic and Pacific coasts, but the fastest population growth by far has been along the coasts of the Gulf of Mexico. The Great Lakes have seen a slight decline in population, but housing growth has continued.
5. Rural areas of the coast have seen much faster growth than urban areas. The farther from cities, the faster the population growth has been. Both year round and seasonal population and housing growth in rural counties have been substantial.
6. The coastal economy is different from the ocean economy. The coastal economy is the sum of all economic activity taking place in the coastal area, while the ocean economy is the economic activity using the ocean as an input.
7. While coastal *populations* have been growing consistent with national trends, the coastal *economy* has been growing faster. And while population has been growing more slowly near the shore than in the nation, the *economy* has been

growing much faster. The region nearest the shore also accounts for 11% of the U.S. economy, while comprising just 4% of its land area.

8. The ocean economy, comprised of the living resources, minerals, construction, transportation, and tourism & recreation sectors, also grew slightly faster than the national economy over the last decade. But tourism and recreation was the only ocean economy sector to show employment growth; all other sectors saw declines in employment in the last decade.
9. The ocean economy is overwhelmingly urban in location, with over 90% of the jobs in the ocean economy located in metro areas. But the ocean economy is proportionately twice as important in rural counties as a proportion of the economy.

In addition to the importance of the ocean and coasts to the national economy, recent research on the value of ocean and coastal resources has also begun to reveal the huge economic values that lie beyond what is reflected in measures such as employment and industrial output. While no single number can encapsulate these values, these studies show additional evidence of the importance of the oceans and coasts for recreation, and has begun to make clear how important resources such as coral reefs and estuaries are to the economic life of the nation.

There are numerous implications of these trends for the management of the nation's coastal and ocean resources. Policy responses to the impacts of "sprawl" development must address different types of sprawl in different parts of the coast. Population growth trends indicate continued large increases in population density on the coast, but at different rates in different parts of the coast. Population and housing impacts in recent years are focused more on the upland areas of the coastal watersheds and less on the near shore areas. But exactly the opposite trend is occurring in commercial and overall employment growth, where the near shore areas growing more rapidly—and more intensely—than upland areas.

Attempts to improve the "land-side" aspects of coastal and resource management must therefore focus on a number of issues about which there has been relatively little discussion. Economic growth in the near shore area has tended to focus in the trade and service industries (like the rest of the economy), which uses more land per unit of output than other types of activity. Managing the impacts of such commercial growth is very important, particularly because a high proportion is directly related to tourism and recreation uses of the coast. The coasts, particularly the near shore areas, are also the location for very high short-term population growth—from commuters, seasonal vacationers, day-use recreationists, and others. The population pressures on the near shore area are many times those implied by the year-round populations measured by the Census and reported here.

The changes in the ocean economy will also require thinking about how we use the ocean in some new ways. Clearly rebuilding the fish stocks to sustainable levels is a vital part of improving both the natural and economic health of the oceans. Other economic uses of the ocean, such as offshore oil and gas and maritime transportation, will play important even growing roles in the national economy, but will likely do so with stable or even shrinking employment levels. And tourism and recreation, which has come to dominate much of the ocean economy, will only grow further in economic importance—and impacts on coastal and ocean resources, as society gains in wealth and leisure and moves towards a huge increase in retirees over the next two decades.

The insights offered by the data analyzed in this report are useful but still incomplete. Our understanding of the economic values of coasts and oceans economies is weak. In contrast to areas like agriculture where the federal government spends over $100 million a year on economic research, the federal government makes no sustained or significant effort to monitor and expand our understanding of the economic values associated with the coasts and oceans. A sustained effort of $8–10 million a year is needed to catalyze a cooperative effort among NOAA, the federal statistical agencies, related federal agencies (NSF and EPA), and the university and private research community to develop data and analysis to improve our understanding in this area.

1. Introduction

A constant theme in discussions of the nation's coasts and oceans, including the Great Lakes, is what the Stratton Commission called the "intensifying use of coastal area"(Commission on Marine Science Engineering and Resources 1969). One particular concern has been a large and steadily increasing population. A frequently cited figure is that the coast contains over half of the population of the U.S., but just over 11% of the area. ((Rappaport, J. and Sachs, J. D. 2001);(Bookman, C. A. *et al.* 1998)) Another concern has been the level of economic activity taking place in coastal areas and its effects on resources. There is no doubt that the pressure of population and economic activity on the limited resources of the coasts and oceans is large and growing. The U.S. Ocean Policy Commission received substantial input to this effect. But the socioeconomic forces at work are at once more subtle and dramatic than are usually cited.

Reshaping America's policies towards the oceans in the future must rest on an understanding of those forces. This report examines major trends over the past one to three decades in the socio-economic forces affecting America's coasts and oceans. The report uses primary Census and economic data from federal and state sources to explore how population, housing, employment and earnings, and production in the coastal regions are changing. The data in this report includes standard Census data as well as special analyses of economic data prepared for the Commission by the National Ocean Economics Project, an independent research effort funded by NOAA and EPA. This data on the coastal and ocean economy has not been previously available.

The report begins by examining the term "coast" to provide some definitional clarity to a term that has been used with so many different meanings that it is almost impossible to compare one study to another. Next, it explores population and housing trends, both over the thirty years since the Stratton Commission report as well over the most recent decade. It then explores the coastal and ocean economy, making a distinction between the myriad of economic activities that take place in coastal regions and those that are directly tied to the oceans and Great Lakes. This analysis focuses on the measurement of economic activity involving market transactions and measured by widely-used statistical series. Beyond these measures, researchers are uncovering important evidence that the size of the economic values associated with the coasts and oceans are much larger than conventional measures capture.

The report then examines the implications of these trends for coastal and ocean resource management policy, and concludes with a discussion of the need for future commitments to maintain and improve our understanding of the socio-economic environment of the oceans.

2. Defining the Coast

What is meant by the "coast"? The figures cited above that more than 50% of the U.S. population is "on the coast" includes the population in all counties[1] within 50 miles (80 km) of the shoreline. The 50 mile boundary reflects both the resident population of the coast and those who live "within a day's drive" and thus are likely to be frequent visitors to the shore. This definition of the coast encompasses a substantial amount of inland geography that would not be immediately recognized as coastal by either residents or visitors. To get a better picture of the population trends affecting the coast requires three different perspectives on the idea of "coast":

- **Near shore.** The population in the region closest to the shore area and thus the population with the greatest effect on the fragile shoreline. In this report, the near shore population is measured by the population living in zip codes adjacent to the shore as defined by the Census Zip Code Tabulation Areas. (Bureau of the Census 2003) Employment, wages, and output of the near shore area is defined by the zip code of reporting establishments in the Bureau of Labor Statistics employment data.
- **Coastal Zone Counties.** This is the population living in the counties which are included in whole or in part in the coastal zone as defined by the states for purposes of the Coastal Zone Management Act.[2] The coastal zone defined by the states varies significantly from state to state. In four states,[3] the coastal zone includes the entire state. In other states the coastal zone is defined by political jurisdictions such as towns and counties[4] and while still others define it by natural features. This wide variation makes the "coastal zone" a difficult basis for comparison, but as the Coastal Zone Management Program is one of the most significant accomplishments stemming from the Stratton Commission, it requires examination.
- **Coastal Watershed Counties.** The boundaries of the near shore and coastal zone are largely determined for political and administrative purposes, and thus intersect natural regions only by chance or in those states that explicitly define their coastal zone to match natural boundaries. Another important perspective is to look at counties that include the watersheds of coastal areas, since the effects of population growth in upland areas sooner or later flow to the sea down coastal rivers and streams. Coastal watershed counties have been defined by NOAA as a means of more closely aligning political and natural boundaries. (National Oceanic and Atmospheric Administration 2001)

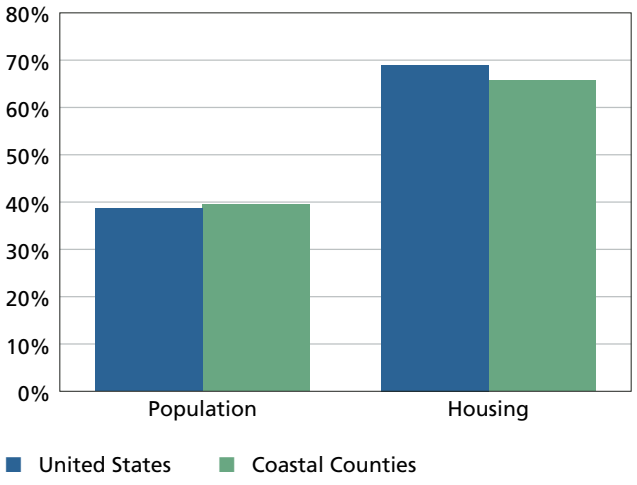
3. Trends in Population and Housing

National Trends

Population growth pressures are probably the most frequently cited socioeconomic force affecting the coast. Analysis of Census data from 1970 to 2000 shows that population growth in coastal areas has indeed been substantial, but as the coast is more complicated than a single term can encompass, so have been the population and housing dynamics. Table C.1 (all tables may be found on pages C 21–C 24) provides the data overview of the most important changes. These include:

- From 1970–2000, the population in coastal watershed counties increased by more than 37.5 million people, an amount equivalent to adding the total (year 2000) populations of California and Oregon to the United States.
- Coastal Zone counties grew by more than 28 million people, an amount larger than the 2000 populations of Texas and Virginia.

Figure C.1 Population and Housing Growth 1970–2000



Source: U.S. Census

- The population growth rates of coastal zone and coastal watershed counties have not been consistently more rapid than the nation as a whole. In fact, over the thirty year period, both tiers of coastal counties grew slightly more slowly than the nation. Both types of coastal counties did grow more rapidly than the nation during the 1980s, but not in the 1970s or 1990s. In the 1970s, population growth was rapid in inland areas associated with energy development. In the 1990s population growth was rapid in the intermountain west and southeast in the wake while the coastal regions endured the effects of a prolonged slump in growth.
- Over the last decade, population growth has been fastest away from the shoreline but also in the *counties* adjacent to the shore. When all three tiers are examined in the 1990s (data for the near shore area is available only for 1990 and 2000), the slowest growth was in the near shore tier, while the fastest growth was in the coastal zone counties. This inland shift of population results from the fact that much of the coastline is already developed and tends to be among the most expensive real estate. But rapid population growth has not yet shifted towards the farther reaches of the watersheds. Growth remains concentrated near, but not on, the shoreline.

The proportion of the total United States population in the coastal watershed and coastal zone counties has declined slightly over the past thirty years, but the proportion of population in these counties remains nearly twice their proportion of the land area of the country. (Table C.2) The proportion of the population in the *near shore* coastal area in 2000 is more than three times the proportion of land area of the near shore.

This means the population density of the coastal regions is significantly higher than the nation as a whole. The national density of 79 persons per square mile of land area (in 2000) is exceeded substantially in the near shore area, where there were more than 230 persons per square mile.[5] While the population density increased by 22 people per square mile nationally from 1970 to 2000, it increased by 43 people per square mile in the coastal counties.

Regional Trends in Population Growth

Trends in population growth in coastal regions have not been consistent across the nation. Figure C.2 summarizes the population change from 1970 to 2000 by region.[6] (See also Table C.3)

- The Atlantic and Pacific regions show the largest population growth, but the Gulf of Mexico region shows by far the fastest population growth. The coastal zone counties along the Gulf

almost *doubled* in population over the past thirty years. Much of this growth occurred in Florida.

- The Great Lakes region saw a population decline in the coastal zone counties from 1970–2000, primarily due to trends in the 1970s. This was due in large part to population declines in cities such as Detroit and Cleveland.
- Population growth trends differed in each region across the three decades, but the 1990s saw the greatest absolute *amount* of growth in all regions.
- Growth accelerated across the decades in the Atlantic region and the Great Lakes, recovered from a population loss in the 1970s to a gain in the 1990s. Growth rates were faster in the 1980s in the Pacific. The Gulf of Mexico saw the fastest growth in coastal zone counties in all three decades.
- The fastest growth in the near shore region over the past decade was in the Gulf of Mexico, the slowest in the Great Lakes.

Trends in the large regions examined here illustrate some of the major variations in population growth across the country. Important additional variations exist within each of the regions between and within states. One of the most important of these variations is the different rates of growth in urban and rural areas (Table C.4).[7]

Over the past thirty years, the population growth rate in rural areas substantially exceeds that of urban areas. Rural coastal zone counties grew by more than 57% from 1970 to 2000, compared with 38% growth in urban coastal zone counties. Population growth has been most rapid in those urban region counties which are furthest from the central city and in those rural counties furthest from the city with at least one large community.[8]

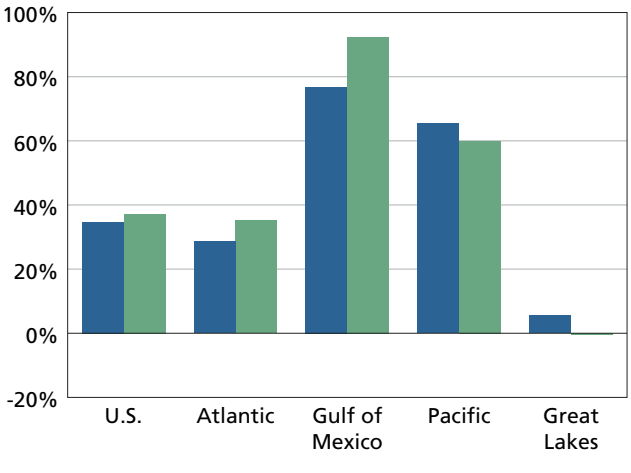
Trends in Housing Growth

The potential for population growth's impact on coastal and ocean resources extends beyond the sheer number of people who reside in coastal areas. That potential is also driven by the growth in the number of housing units in a region, which is a principal source of demand for land that may otherwise be used for wildlife habitat, wetlands, etc. Much of the growth in America takes place in a pattern which has come to be called "sprawl", which involves extensive spreading out of housing and economic activity across the landscape. Coastal areas are very much characterized by sprawling patterns of growth. (Beach, D. 2003)

Figure C.3 shows the comparative growth rates of housing and population in coastal watershed and coastal zone counties from 1970–2000. Over the whole period, housing growth has substantially exceeded population growth, although the differences in rates diminished by the 1990s. The trends of faster housing growth than population growth is particularly strong in the Great Lakes region, which saw a slight decline (0.4%) in the population in Coastal Zone counties of over the three decades, but an increase in housing in the same counties of nearly 25%.

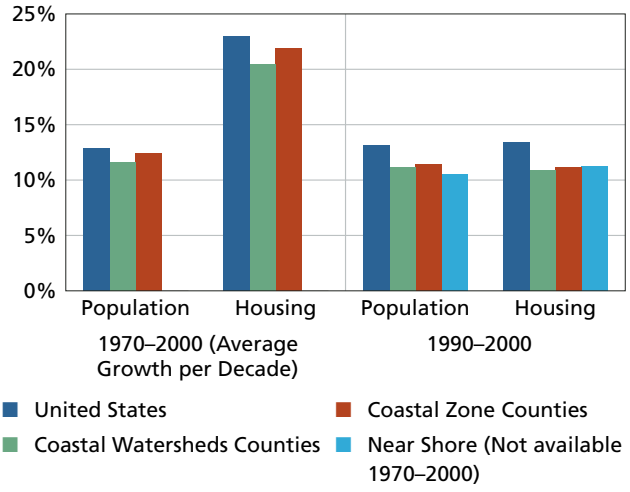
Rural coastal zone counties also grew substantially faster in housing than urban coastal zone coun-

Figure C.2 Population Growth 1970–2000



Source: U.S. Census

Figure C.3 Population and Housing Growth 1970–2000 for Coastal Regions and the United States



Source: U.S. Census

ties. From 1970–2000, the number of housing units in rural coastal counties more than doubled (a 107% growth rate), while housing grew 63% in urban counties over the same period. Smaller coastal zone counties in urban regions saw very fast housing growth rates. Coastal zone counties at the fringe of urban areas had the fastest rate of housing growth in any of the urban-rural county types, with an increase of over 150% from 1970–2000.

Two major factors drive these trends in housing relative to population growth. A certain amount of housing growth is required for population growth, but a major factor is the falling size of U.S. households. In 1970 the average household consisted of 3.14 persons; by 2000 this was reduced to 2.59 persons. (Bureau of the Census 2001) This change alone accounts for more than half of the growth in housing. Another factor that heavily influences rapid growth in coastal regions is the growth in seasonal housing, which tends to be concentrated in rural counties.

Summary of Population and Housing Trends

Population growth continues to place significantly increased pressure on coastal regions. Total population growth has not been disproportionately located in coastal counties, but the sheer magnitude of that growth on the limited land area of coastal regions creates a much heavier "footprint" than in other parts of the country. Population densities in coastal areas are two to three times as high as in the nation as a whole, reflecting both the attraction of the coast and the intensity of use.

The population of coastal regions is shifting inland, away from the shore and towards the upland areas of coastal watersheds. This trend is most noticeable in the counties closest to the shore. The fastest population growth is occurring in the counties bordering the Gulf of Mexico, particularly in Florida. The largest population growth has been occurring in the Pacific, particularly in California. Population growth has been occurring much more rapidly in rural coastal zone counties than urban coastal zone counties, and in those counties at the fringe of urban regions.

Housing growth exceeds population growth in the coastal areas, especially in the Great Lakes region and in rural coastal zone counties. This pattern of growth puts stresses on natural resources well in excess of that suggested by simple measurement of population growth. In 1969, the Stratton Commission noted that the pressures on the coastal zone were expanding seaward. While this is true, the expansion of population pressures inland and away from the urban areas may be the most important trend over the past thirty years. These trends will almost certainly continue well into the future, since they reflect both fundamental economic forces such as land value that affect where housing is affordable.

Restoring and enhancing the nation's coastal resources will require increased attention not only on the land forms, such as the Big Sur coast of California or the beaches of the Atlantic that form the coast of the popular imagination. It will require increased attention on the less populated rural parts of the coast where change is occurring most rapidly and on the upland areas of watersheds where the accumulation of subtle changes are magnified in the water rivers, streams, and lakes of the area as water flows to the sea.

4. The Coastal and Ocean Economy of the United States

It is no exaggeration to say that the American economy began on the coasts and oceans. Of course all the early European settlements were along the coast, and from these sprouted not only many of America's great cites but America itself. But even before the first permanent settlements in Virginia and Massachusetts, Europeans were venturing across the Atlantic to fish. (Innis, H. 1940) Native Americans were using the shore as their summer home centuries before the mansions of Newport were built. (Larrabee, B. W. et al. 1998) The nation grew around the ports, and trade they made possible. So the connection of the economy to the sea has been, and remains a vital one in the livelihood of the nation.

Seeing the importance of the ocean in America's past is not difficult. Understanding the role of the ocean and coasts in today's huge and complex economy is more difficult. There are many isolated facts that have been collected about the nation's ocean and coastal economy which attest to the continued importance of the ocean to the economy, but little in the way of systematic measurement has been available.[9] A major effort to develop a systematic and consistent measurement of economic activity associated with the coasts and ocean, the National Ocean Economics Project, has provided new insights into how the nation's economy depends on its coasts and oceans—and how that dependence is undergoing dramatic changes.[10]

The terms "ocean" and "coastal" economy are often applied in a way that implies they are synonymous, but they are not.

> The *ocean economy* is that portion of the economy which relies on the ocean as an input to the production process or which, by virtue of geographic location, takes place on or under the ocean.
>
> The *coastal economy* is that portion of economic activity which takes place on or near the coast.

The reason for this distinction stems from the fact that the "ocean" and "coast" are two different resources. The "ocean" provides a variety of products and services such as food, recreation, and transportation. The "coast", on the other hand is a region which provides access to the services of the ocean as well as being a specific economy within larger regions. The coast contains both ocean and many non-ocean related economic activities, and is much larger than the ocean economy. The coast economy describes the category of economic activity that creates much of the impact on coastal resources, while the ocean economy is the direct connection between the sea, the Great Lakes, and the nation's overall economic growth.

The ocean economy can be divided into the following broad sectors and industries:*

- **Living resources** (fisheries harvesting and processing, aquaculture, seaweed harvesting)
- **Marine construction** (construction of piers and wharves, dredging, beach reconstruction)
- **Ship and boat building**
- **Marine transportation** (transportation of both freight and passengers)
- **Minerals** (oil and gas, sand and gravel, miscellaneous other mineral resources)
- **Tourism and recreation** (restaurants, lodging, recreation services, marinas, boat dealers)
- **Scientific Research** (oceanographic, biological, ecological)
- **Government** (Federal, state, and local agencies that use or manage ocean resources).

Some of these industries are related to the ocean by what they do, such as marine transportation of goods and people. Other industries are ocean-related because of where they are. Tourism and recreation industries such as hotels or recreation services are ocean related when located in the near shore area, defined by being in a shore-adjacent zip code.

* The data used in this analysis are based on the ES–202 data employment and wage data series collected by the U.S. Department of Labor Bureau of Labor Statistics.

Table C.5 shows establishments, employment, wages, and output (share of gross state product) for the total economy of the coastal regions (the near shore zip-code defined regions plus the coastal zone and coastal watershed counties) in 1990 and 2000.[11]

Major conclusions from Table C.5 include:

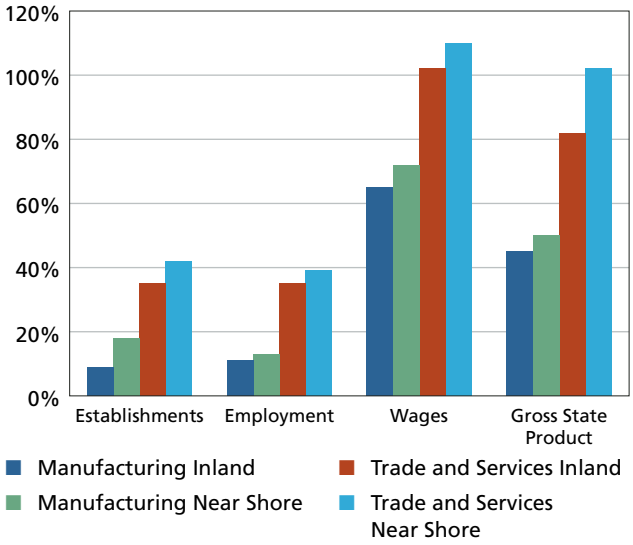
- The coastal states account for about three quarters of the U.S. economy measured by employment and value added in 2000.
- The proportion of the U.S. economy in the coastal states increased from 1990 to 2000.
- Coastal watershed counties account for just under half of the U.S. economy and coastal zone counties for about one-third of the economy.
- All of the tiers of the coast, from the near shore area to the coastal states, grew faster than the U.S. economy over the past decade.
- With 4.6% of the U.S. land area, the coastal near shore region had more than 11% of the U.S. economy in 2000.
- The near shore area was also the fastest growing area of the coast from 1990 to 2000, which grew faster in employment, wages, and value added than coastal zone or coastal watershed counties.

This comparatively rapid growth in the *economy* of the near shore area is in marked contrast to the relatively slower growth of the *population* in this area, suggesting the socio-economic pressures on the near shore area arise from more than population growth. From 1990–2000, the population of the near shore region grew by 3.6 million (see Table C.1), but the number of jobs grew by more than 3.8 million.

In sum, the economic trends over the past decade have generally shown greater emphasis on coastal regions, with the fastest growth occurring in the areas near the shore. While much of the discussion of the relationship between socioeconomic trends and the health of coastal and ocean resources has concentrated on population growth, the effects of growth in economic activity have been ignored. But economic activity, the growth in employment and output in the near shore area may be even more important than pure population growth. To understand why requires understanding of the composition of growth.

From 1990–2000 the United States gained 22 million jobs.[12] Despite overall economic growth, manufacturing jobs declined by over 600,000, while trade (wholesale and retail) plus services grew by nearly 17 million, accounting for nearly 80% of the job growth. The decline in manufacturing industries such as steel production, ship building, and chemicals reduced (often at great expense to local communities) the source of many major environmental impacts in the coastal area. Their replacement by hundreds of thousands of smaller establishments in the services and trade industries has allowed employment growth to continue, and even accelerate. But the sum total of those additional establishments has required more and more land for buildings, parking, roads, and other infrastructure, placing proportionately an even heavier demand on coastal lands and resources than the "old" economy.

Figure C.4 Economic Growth 1990–2000 By Inland and Near Shore



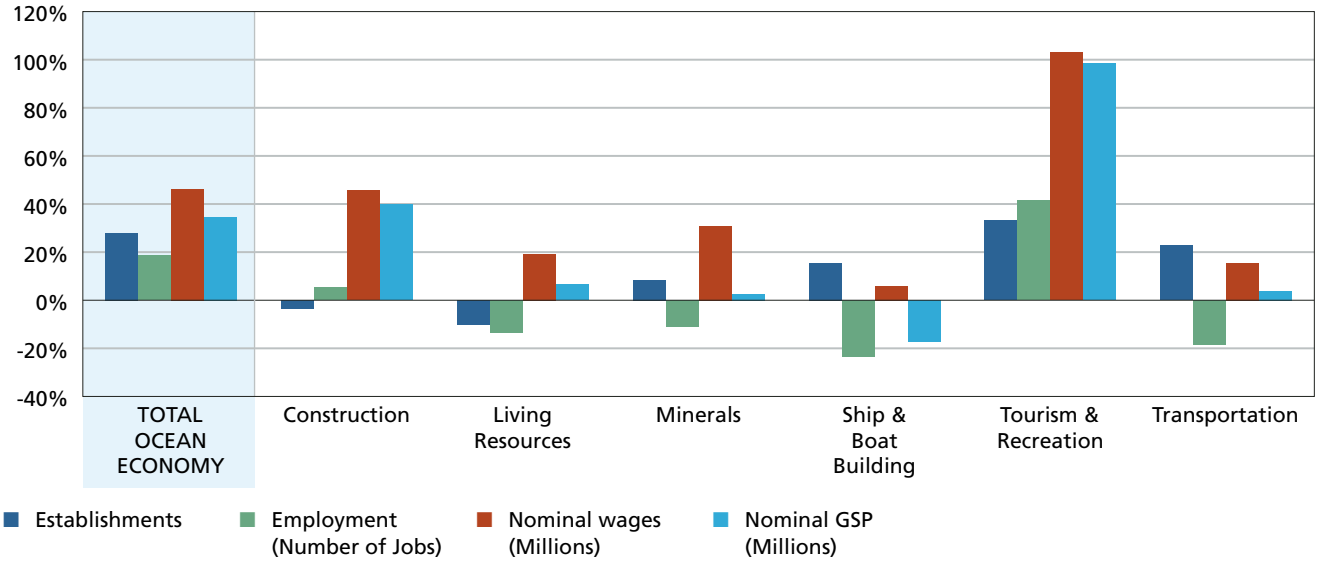
Source: BLS, NOEP

This shift in the nature of the economy has also greatly affected how we earn our living from the ocean. Table C.6 shows the data for the private sector ocean economy of the United States for 1990–2000, while Figure C.5 highlights changes in the ocean economy over the same period. The government and scientific research sectors are not included in the ocean economy because of data limitations, so the discussion in this paper is limited to the private ocean economy.[13]

Overall in 2000, the ocean economy accounted directly for 1.6% of employment and 1.4% of the total U.S. private economy. While these may seem like small proportions, they should be considered in context:

- The ocean economy would be the 27th largest state economy in the nation in 2000.
- In 2000, the ocean economy was almost 2.5 times larger than the agricultural economy in terms of output, and over 150% larger than employment in the farm sector. This employment figure for the ocean sector does not include employment in fisheries harvesting.[14]
- In employment, the ocean sector is larger than every manufacturing industry.[15]

Figure C.5 Changes in the Ocean Economy 1990–2000



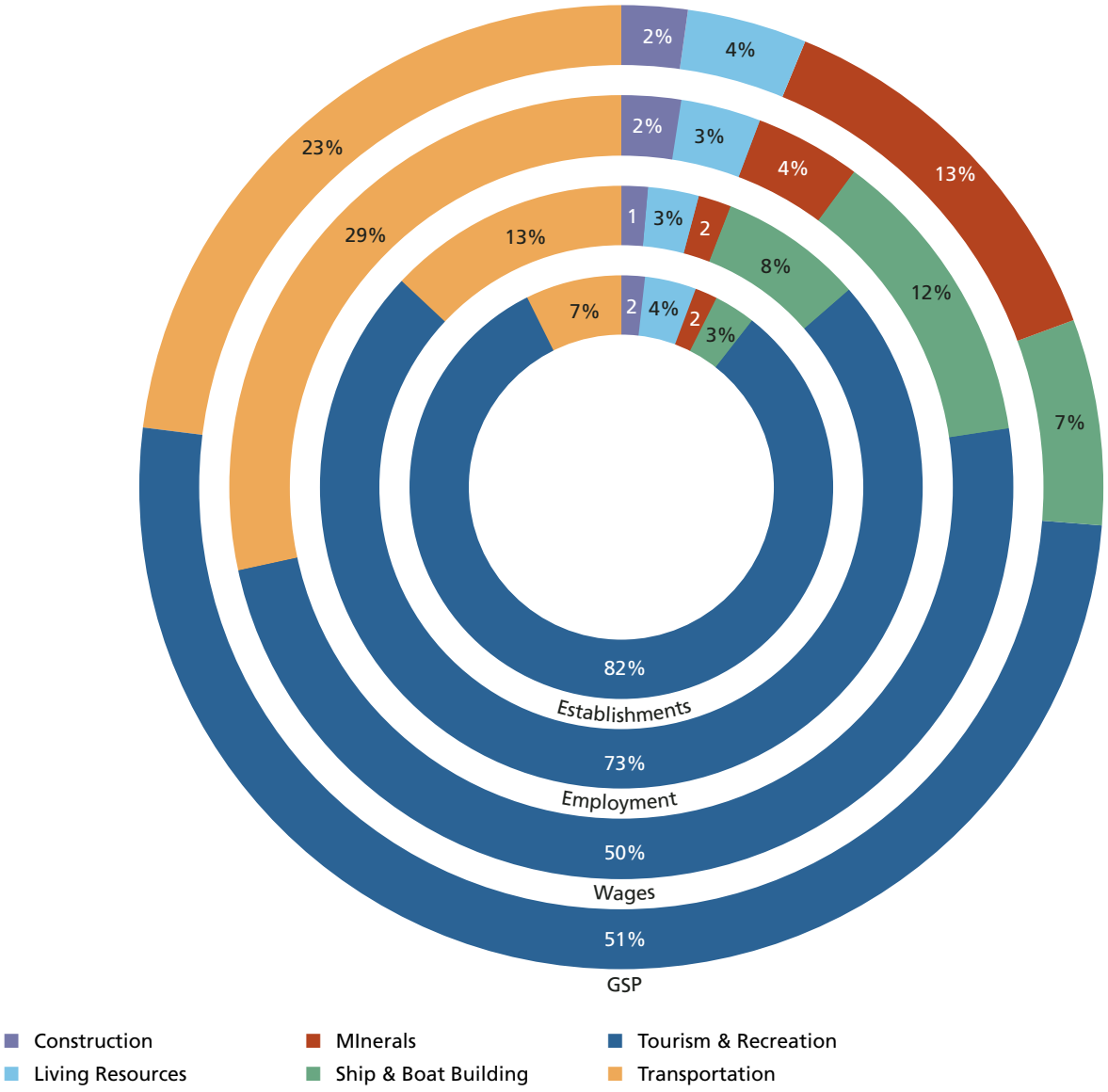
Source: BLS, NOEP

The ocean economy has followed this overall pattern of growth in the U.S. economy, shifting away from goods-oriented and towards service oriented production. From 1990 to 2000 there were sharp declines in establishments and employment in the living resources, minerals, and ship and boat building industries, while there was a substantial increase in the establishments and employment in the tourism and recreation sector. The marine construction sector also grew slightly in output, but declined in employment from 1990–2000, although it should be noted that this sector is poorly measured under the Standard Industrial Classification system and is subject to strong influence from the business cycle when measured at any two particular years.

The dramatic shift towards tourism and recreation and away from the goods producing sectors has many causes. The growth in tourism and recreation is clearly consistent with long term increases in overall affluence and increases in leisure time. The enduring appeal of the ocean as a source of recreation has not only been sustained, but enhanced by the rise of such industries as cruise ships.[16] At the same time there have been substantial changes in the goods producing sectors.

- The **ship building** industry was at a post-World War II peak in employment in 1990 as the end of the Reagan-era naval expansion was occurring. Since almost all ship building in the United States is done for the Navy, the end of the Cold War and the subsequent reduction in ship procurement for the Navy had a profound effect on this industry. Shipbuilding employment declined by 38% between 1990 and 2000, while output declined by 12%. There was a significant increase in boat building employment (32%) and output (81%), primarily for the recreational market. But this was not enough to offset the decline in employment in ship building.
- The **living resources** sector saw dramatic declines as overfishing in key areas such as New England, the Pacific, and Gulf of Mexico led to enforced reductions in fishing effort. While the fisheries harvesting sector is not fully reflected in these figures,[17] the overall trend towards declines in employment and output in this sector is clear. Seafood processing employment, which will mirror trends in seafood harvesting, declined by 12%. The value of output in the seafood processing industry rose (by 30%) as declining catches resulted in higher prices. Those declines were only slightly offset by the growth of aquaculture, which grew by 27% in employment and 23% in output, but remains a small industry.
- **Minerals** production, primarily offshore oil and gas, declined somewhat over the decade as older fields in the Gulf of Mexico were played out. Employment fell by 35% while contribution to gross state product fell by 6%. More importantly, there was a reduction in the number of employees needed in the oil and gas industry as more and more technology was employed to find and produce the ocean's mineral resources.
- Ocean related **transportation** declined in employment, but grew in importance. The declines in employment were primarily in deep

Figure C.6 Composition of the Private Sector Ocean Economy by Different Measures: 2000



Source: BLS, NOEP

sea freight handling (down 14%) and in search and navigation equipment (down 41%). In the case of freight, while the volume of ocean-going trade increased over the decade, the number of people required to handle the trade declined as containers and automation allowed fewer people to work the docks. The decline in search and navigation equipment was heavily related to post-Cold War military procurement reductions. Ocean related passenger transportation increased significantly (up 47% in employment and 130% in GSP), from cruise ships, ferry services and tour boats.[18]

The changes in the ocean economy away from goods-producing activities should, not, however, obscure the continued importance of goods-related activities. Figure C.6 compares the distribution of establishments, employment, wages, and output from the ocean sectors for 2000. Tourism and recreation dominates the number of establishments and employment, with three quarters or more of the ocean economy accounted for by this sector. When wages and output are considered, the goods producing industries are much more important, particularly the minerals sector. Accounting for 2% of employment, minerals accounts for nearly ten times the proportion of ocean economy output.

Figure C.7 Regional Distribution of the Private Ocean Economy 2000

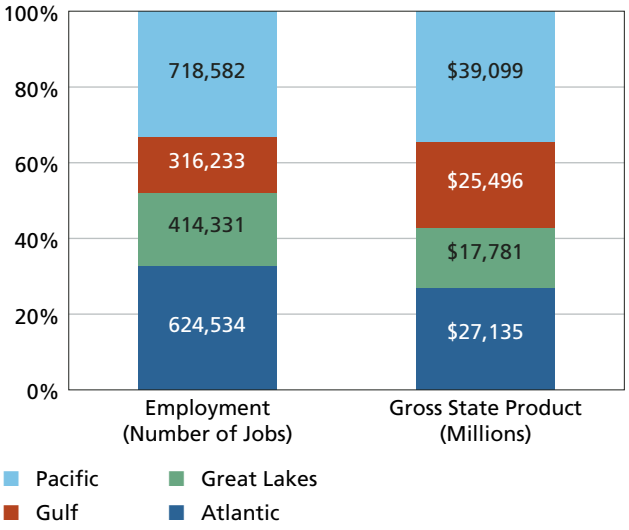
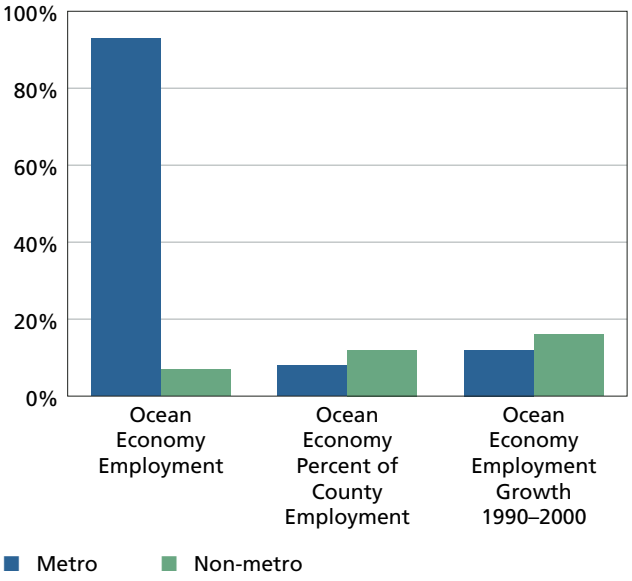


Figure C.8 Metro vs. Non-metro Distribution of Ocean Economy



Source: BLS, NOEP

This difference in importance based on which measure is used also influences which of the coastal regions of the U.S. can claim the largest share of the ocean economy. Figure C.7 shows the distribution of the ocean economy in 2000 by both employment and output. The Pacific region is the largest region on both measures, with 38% of employment and 34% of output. The Gulf of Mexico region accounts for 12% of employment and 32% of output.

The geographic distribution of the ocean must also be considered in terms of the ocean economy's role in both urban and rural locations. (Figure C.8) The ocean economy is overwhelmingly an urban economy; 93% of employment in the ocean industries is in metropolitan area counties, and two thirds of employment is in counties in metropolitan areas with a total population of one million or more.[19] It is perhaps not surprising that the ocean economy is very much an urban economy given the large number of America's principal cities that exist on the coast, but the extent of the concentration of what is a natural-resource based economy in the urban centers of the U.S. speaks to a unique role of the ocean in the American economy. Of all the major natural resources such as farmland and forests, the oceans and Great Lakes are the only resource so intimately connected to the cities, rather than just the country.

However, the importance of the ocean economy to rural economies should not be lost. While the employment in the ocean economy is overwhelmingly urban, it comprises less than 8% of the economy in urban areas, but more than 12% of the economy in rural counties. Moreover, the growth rate in ocean sector employment in rural counties over 1990–2000 was one third faster than in urban counties (16% in rural counties v. 12% in urban counties). Recalling that almost all of the growth in employment occurred in the tourism and recreation sector, the increasing importance of the ocean economy in rural counties is closely tied to their roles of providing an escape for urban dwellers looking for recreation.

Summary of Economic Trends

Total economic activity on the coast accounts for a substantial portion of the American economy. Over three quarters of U.S. domestic economic activity takes place in the coastal states, and nearly half in the coastal watershed counties. The proportion of economic activity in the near shore area is more than twice the proportion of land area, and the total volume of economic activity in the near shore area may have a more profound effect on coastal resources than the more frequently cited figures about population pressures.

The ocean economy is a small proportion of America's huge 10 trillion dollar economy, but it is still larger than all but the largest state economies. At over $117 billion in 2000, it represents a significant level of economic activity. But the way in which we use the ocean is changing dramatically and rapidly.

Mirroring larger trends in the economy, the services of tourism and recreation have provided almost all the growth in employment and much of the

growth in wages and output, while goods related sectors such as the fisheries, transportation, ship and boat building, and minerals have declined in employment and their growth in wages and output have lagged behind the overall economy. All of the ocean economy sectors remain important to the nation, and a major focus of policy towards the use of the ocean must be to balance the demands of a fast growing tourism and recreation sector with the needs of still-vital uses of the sea for living resources, minerals and fuel, transportation, and ship and boat building. Conflicts over the uses of the scarce coastal and ocean resources will only increase in intensity in the future given these trends.

Most of the employment in the ocean economy is to be found in urban areas, where the competition for land and the impacts of human activity are at their greatest, but where the ocean provides a key component making our cities both competitive and livable. At the same time, the ocean economy plays a proportionately much larger role in the rural regions of the U.S., where overall economic growth has been much slower. The vitality of rural areas on the coast remains very much tied to the sea.

5. The Coastal and Ocean Economy Beyond the Market Place

The preceding analysis examines the role of ocean and coastal economic activity using the conventional measures of employment, wages (income), and output. These measures tell a vital, but incomplete story of the role of ocean and coastal resources in the economic life of the nation. What is left out is are the economic values associated with a family spending a day at the local beach, or of surfers or sailors who are passionate about their use of the oceans, which may result in little spending each year that winds up being measured in the national income accounts but is an essential part of peoples' economic lives. Also missing are the economic values that natural resources such as estuaries or coral reefs perform as nurseries for fisheries as natural pollutant cleansing mechanisms and buffers against storm damage.

These economic values are very real, but are not measured as systematically as with market transaction-based economic activity. Economists have made substantial progress in developing methods to measure these values, but studies of these "non-market" values are sporadic. Some types of resources, such as recreational resources, have been studied regularly, but only some coastal regions have been studied and many areas have never been examined. Other resources are studied only when damaged by events such as an oil spill for purposes of federal law.[20] The result is that it is not possible to provide an overview of these economic values of the ocean and coasts, but only to provide examples of these values and why they are important.

Estuaries are perhaps the most diverse of coastal environmental systems, and so are recognized as being among the most valuable. A number of studies have been done of the economic values associated with estuaries, particularly those which are covered by the National Estuary Program administered by EPA. One such study of the Indian River Lagoon area of Florida examined the economic values associated with recreational fishing in the region, as well as resident's willingness to pay to restore and enhance the Lagoon's environmental quality. (Apogee Research and Resource Economic Consultants 2000) Estimates of the value of marine recreational fishing in excess of expenditures range from $100 to $589 per angler, resulting in an estimate of $140 million per year in recreational fishing values. This figure is limited to the residents of the five-county region around the Lagoon, and does not include recreational anglers from other areas.

This study also examined the willingness to pay to improve the environmental quality of the estuary through programs such as stormwater management, protection of wetlands, and acquisition of lands for conservation purposes. The median values of these actions per household were estimated to be $40, $25, $19, and $29 respectively. These values were reported whether or not those asked actually used the Lagoon or not. Aggregated across the population of the five-county region, the value of the environmental quality of the Indian River Lagoon was found to range between $14.6 million to $25.9 million depending on which package of environmental improvements residents were asked to value.

Coral Reefs are also one the most important marine resources and one of the most threatened. Understanding the economic value of the reefs has become an important element in developing restoration and management strategies. A recent study (Cesar, H. *et al*. 2002) of parts of the reef systems in the Hawaiian Islands estimates the values of the rich coral reefs of that state to be at least $384 million per year. The vast majority if this benefit is from tourism and recreation, but it also derives from the enhanced value of real estate in areas bordered by coral reefs, the value of the biodiversity of the reef ecosystems, and the values of enhanced commercial and recreational fisheries productivity.

Estimating the **value of lost resources** from events such as oil spills has become an integral part of the response to such disasters. One of the most important of such estimates was the study of the value lost to Americans from the damages caused by the grounding of the tanker *Exxon Valdez* in 1989. Studies done for the State of Alaska (Carson, R. T. *et al*. 1992) found that Americans were highly aware of the damage from that spill, and were willing to pay to avoid the losses caused by that oil spill. These studies found a median willingness to pay to avoid the damages of $31 per household, or about $2.8 billion for the U.S. as a whole. This study became the basis for the litigation and a settlement arising from what was the largest oil spill in U.S. waters.

The value of beach recreation Beaches are among the coast's most important recreational resources. Their economic value is comprised of the expenditures that visitors make to visit the beach and the value to the beach-goer over and above what they spend. A significant body of research has attempted to measure these values. While the research methods and approaches have differed, most of the research has shown that the non-market values of the use and enjoyment of beaches are significant.

Southern California has among the most famous beaches in the world. The beaches of Orange County attract upwards of 150,000 visits per day in the summer. Studies of the value of use and enjoyment[21] of southern California beaches range from $18.00 per day for Santa Monica beaches to $23.00 per day for Huntington Beach. (Hanneman, M. 2001) The beaches of Ohio are less well known, but just as important to the residents and visitors. Studies of the northern Ohio beaches of Headlands State Park and Maumee Bay found values similar to California of $15.60 per day for the former and $25.60 per day for the latter. (Sohngen, B. *et al*. 1999) Summed over a year, the value of using Santa Monica beach is estimated at over $200 million for the 12 million visitors to these beaches. The comparable value for Huntington Beach is over $12 million, while the Ohio beaches are valued at $6.1 million (Maumee Bay) and $3.5 million (Headlands) based on the lower number of visitors. These studies illustrate both the potential size of the non-market values of beaches, and the lack of data which exists in many other beach-oriented coastal regions from Maine to Hawaii.

Because of the complexities in estimating these non-market values, it will probably never be possible to compile a single picture of these values of the ocean and coasts in the same way we can with measures such as employment, wages, and output. But these illustrations show that these non-market values are often large and understanding them is vital to our ability to manage ocean and coastal resources to best advantage.

6. Implications

The changes in the coastal and ocean socio-economic environment that have been underway will shape policy for the coasts and oceans in a number of important ways. Much of the health of the oceans depends on what happens on the land, as the Stratton Commission recognized. Shaping policy towards the management of the land and water resources of the coastal areas will have to take into account the increases in population density throughout the coast, but also the faster population growth in upland areas and the faster economic and employment growth near the shore. The upland areas of watersheds require more attention as a result of the first trend, while the impacts of rapid commercial growth near the shore require attention as a result of the second.

Population impacts must also be reconsidered as resulting from more than the people who live on the coast. The real population growth on the coasts is not from permanent residents near the shore but the large number of people who come to the shore for short periods of time. These include the large number of employees who must commute into the near-shore region to take the growing number of jobs there but who cannot live there because of high real estate prices. It also includes people who commute to the near shore area for shopping or to utilize the growing retail and service industries there. Finally, it includes large numbers of tourists and recreationists who increase the population in coastal areas several fold, primarily in the summer. These populations are poorly measured, but are clearly implied by the trends in the economy and housing.

The sum of the "short term" and "resident" populations means that the public must plan for and build a transportation infrastructure to serve a much larger population in coastal areas than actually live there. Because of rapid employment growth in near shore areas, transportation infrastructure must have the capacity to move employees on a daily basis and tourists on a seasonal basis. This large transportation infrastructure must be provided in such a way that it minimizes impacts on the very resources that make the coast special, and allows community character to be maintained.

The complex dimensions of population, housing, and economic changes are clearly challenging federal, state, and local agencies. Inevitably questions arise about whether the high degree of both functional and geographic fragmentation in the jurisdictions of public agencies is a barrier to effective policy. Such concerns lead often lead to calls for new "regional" levels of government, in which jurisdictions match appropriate ecological and socio-economic boundaries. The question of matching jurisdictions with responsibilities is an important one.

While new forms of organizations may be needed in some cases, there are a number of organizations integrating federal, state and local governments with responsibilities appropriate to managing coastal and ocean resources. These include coastal zone management agencies under the Coastal Zone Management Act, the National Estuary Programs established under the Clean Water Act, and the Metropolitan Planning Organizations established under the Intermodal Surface Transportation Efficiency Act. These organizations can play an important role in addressing many of the issues raised by the evolution of socio-economic trends discussed here and the changes in the natural environment noted in other information provided to the Commission.

The changes in the ocean economy point to a number of different conclusions:

Fisheries It is clear that the severe problems with America's fisheries resources have had significant negative effects on the economy of many communities. The losses in jobs reflected in the processing industry figures reported here are magnified several times in the unreported employment figures of harvesting sector employment. While many fisheries remain vital sources of employment and economic output, a significant restoration of abundance in fish stocks to sustainable levels will provide important economic boosts to many regions. Aquaculture is also an important new industry, but it does not appear to be replacing the employment levels lost in the capture fisheries.

Maritime Transportation The role of the maritime transportation industry in the economy is changing dramatically. While the volume of goods being moved across the oceans and along the coasts comprises a large and growing share of the American economy, competitive pressures on the transportation industry and improved technologies are reducing the demand for labor, particularly in the handling

of freight. Expansions and improvements to maritime freight transportation will continue to be a key to the success of the ocean and national economies.

The rapid growth of the cruise ship industry, now operating in virtually all coastal regions, represents both an important new dimension to the marine transportation industry and is a part of the rapidly growing tourism and recreation industry. The cruise ship industry offers both significant economic development opportunities to the communities served by the industry and new challenges in community planning and environmental management as the equivalent of major resort hotels move up and down the coast.

Minerals The offshore oil and gas industry remains an important source of energy for the nation, albeit a controversial one. Like maritime transportation, employment in this industry is declining as efficiency improvements and changing output levels affect the industry. Also like maritime transportation, offshore oil and gas will continue to play an important part in the economy. Uses of other ocean minerals, like sand and gravel, are not currently large enough to play a significant role in the ocean economy, but may play a larger role in the future.

Tourism and Recreation The explosive growth of coastal and ocean tourism and recreation dominates the story of the ocean economy over the last decade, and this is likely to be the case for the foreseeable future. The growth in tourism and recreation is part of the reason for the rapid growth in employment and economic activity in the near shore regions, meaning that the issues discussed above concerning those trends are part of the story of tourism and recreation growth. Seasonal population and housing growth is also part of the story. While much attention has been devoted to promoting sustainable forms of "ecotourism" in coastal regions, it is clear that it is the overall growth of tourism and recreation activities in coastal areas that requires the greatest attention. There is also likely to be an increasing tie between population growth and tourism and recreation growth in coastal areas. As the baby boom generation moves into retirement in the next two decades, many will seek to permanently re-locate to the coastal regions where they have previously enjoyed vacations. Many coastal regions will develop sharp age structure imbalances, coming to be dominated by retirees and the aged.

7. The Future of Understanding the Coastal and Ocean Economy

Despite the size and importance of the ocean and coastal economy, the Federal government invests very little in trying to monitor and understand it. While the National Marine Fisheries Service and the Special Projects Office have ongoing economic research programs, they are limited to generating information directly related to NOAA programs. There is no organization with a general purpose economic research program or funding within NOAA comparable to the Economic Research Service in the Department of Agriculture, which has an annual budget of over $100 million. None of the major economic statistics agencies of the Federal government, including the Department of Commerce's Bureau of the Census and Bureau of Economic Analysis or the Department of Labor's Bureau of Labor Statistics, have either mandate or money to study the ocean and coastal economy.

The economic statistics cited in this report are the result of a NOAA and EPA-sponsored National Ocean Economics Project, a multi-year research study being conducted at several universities. This research program is providing critical information, but research is not a substitute for the kind of ongoing commitment to generating data that can be used to monitor and study the coastal and ocean economy. As part of its recommitment to ocean policy, the Federal government needs to establish an ongoing program of using its existing statistical resources to continue the measurement of the coastal and ocean economy and to generating additional data resources and analysis in this field.

A sustained effort to monitor and improve understanding of the coastal and ocean economy requires a cooperative approach among a number of different federal and nonfederal organizations. Seven organizations will play key roles.

1 **NOAA.** As the principal federal agency with responsibility for the oceans, NOAA must play the lead role, working with other agencies to set agendas for research and publication of data, as well as enhancing the use of economic data to assist decision making at the federal, state, and local levels.

2. The **Bureau of Labor Statistics.** BLS, in cooperation with the states, collects the most basic employment and wage data on the economy. The economic data presented here is based on the Longitudinal Data Base maintained by the Bureau. This data will continue to be the fundamental element of monitoring the coastal and ocean economy from national to local levels.
3. The **Bureau of the Census** is the other major collector of primary data on the economy, including the censuses of population and housing and of the major sectors of the economy. The Department of Agriculture has responsibility for the Census of Agriculture, which includes data on aquaculture.
4. The **Bureau of Economic Analysis.** BEA uses data inputs from the data collecting agencies to maintain the most important measure of annual economic activity, the national income and product accounts, the best-known element of which is the gross domestic product. Related measures such as the gross state product are key to understanding regional economies, as is the measurement of self employment.
5. **EPA.** The Environmental Protection Agency undertakes substantial economic research in the fields of land, water, and air pollution that affect ocean and coastal resources at many points. EPA's economic research focuses particular attention on nonmarket values, and provides an important supplement to NOAA's work in this area.
6. The **National Science Foundation** is the provider of support for much of the basic research in the sciences, including the social sciences. It has recently undertaken new initiatives to better link the natural and social sciences in the aid of improved management of the environment and natural resources, which fits well within the framework of socio-economic research on the coasts and oceans.
7. **Universities and Other Researchers.** As with marine science in general, the key research in measuring the coastal and ocean economy is a cooperative arrangement between the federal government and researchers in the nation's universities and in private research organizations. The interaction among federal, academic, and private researchers, with the federal government providing a key catalytic role with funding, takes advantage of the strengths of multiple perspectives and organizational missions.

The future of socio-economic information for the coasts and oceans will require the successful creation

of a network among these and other organizations who are concerned with the coasts and oceans. That network must be built around the following functions:

- **Data Collection.** Standard measures of employment, income, and output for the ocean and coastal economy need to be developed and maintained. The work by the National Ocean Economics Project provides the foundation for this work. In addition, special measures must be developed for the unique aspects of the coastal and ocean economy. In particular, the influence of the coasts and ocean on land values needs to be understood throughout the range of different coast types. The vital role of the oceans in tourism and recreation needs to be better understood in terms of both market and nonmarket values, and the economic values of the ecosystem service roles of the coasts and oceans better measured.
- **Data Distribution.** Data must be collected, but they must also be widely distributed both to be available to policy makers to factor into decisions and to spur further research. The availability of contemporary database and Internet delivery systems makes this function easier and cheaper than ever.
- **Data Analysis.** Data are only useful when they are transformed into information through analysis. Data analysis should be driven in large part by the needs to support decision making at the federal, state, and local levels about the management of ocean and coastal resources. This will mean both analysis of socio-economic trends on their own, and, increasingly, the ability to analytically link changes in the socio-economic sphere to changes in the environment, and vice versa.
- **Education and Research.** Outside of the fields of fisheries and mineral economics, the field of ocean and coastal socio-economic studies is still relatively new and confined to a fairly small group of specialists. There must be an expansion of the field through training of both researchers and policy specialists to generate and use this information. Research must also continue to improve our measurement of non-market values, to develop measures of the use of coastal and ocean resources such as beaches, and to improve the data systems for standard measures such as employment and output. Current work in these areas represents a beginning, not an end to these endeavors. The advent of geographic information systems also substantially eases the integration of socio-economic with natural resource data, and this integration needs to be another focus of research so that the interactions between the human and natural environments in the coastal areas can be better understood.

Given these resources and needs, the federal government should commit to an ongoing program of socio economic research of trends and values of the nation's coasts and oceans. That program should include the following elements:

- Designation of a specific socioeconomic research and data collection function within NOAA.
- An interagency group, chaired by NOAA, of researchers and data providers in the federal agencies concerned with data for the coasts and oceans.
- An Advisory Board, reporting to NOAA and the interagency group, of outside researchers with appropriate expertise, to help set agendas, design programs, and evaluate progress.
- A statutory requirement that the Bureau of Labor Statistics and Bureau of Economic Analysis prepare an annual report on the employment, wages, and output associated with the coasts and oceans of the United States.
- A special effort to make available key data that are missing from the current suite of economic statistics, particularly employment and incomes in the fisheries harvesting sector.
- Regular funding for research into improved measures of both the market and non-market economic values of the coasts and oceans. An area of particular importance is establishing the economic value of the nation's ocean and coastal resources as assets in which we invest.
- An Internet based data archive and distribution system that links key sources of coastal and ocean socioeconomic data and research.

Funding for these efforts should be in the $8–10 million range annually, with funds provided to both data using and data providing agency for sufficient staff and other costs. This is particularly the case for the data providing agencies such as the Bureau of Labor Statistics, Bureau of the Census and Bureau of Economic Analysis who cannot play their roles without additional resources. Partnership arrangements with nonfederal organizations like the National Ocean Economics Project should be maintained and expanded.

It should be noted that at a time of scarce budgetary resources, this amount may seem like a substantial sum. But it is less and than 1/10th of what the federal government currently spends on economic research in the agriculture sector, which is actually smaller than the ocean sector in the overall economy.

Table C.1 Population Change in the Three Tiers of the Coast

Population (Millions)

	1970	1980	1990	2000
United States	202.55	225.90	248.16	280.85
Coastal Watershed Counties	107.99	117.56	130.89	145.49
Coastal Zone Counties	75.51	82.87	92.94	103.59
Near Shore*			35.26	39.11

Change

	1970–1980		1980–1990		1990–2000		1970–2000	
	N (millions)	Percent	N (millions)	Percent	N (millions)	Percent	N (millions)	Percent
United States	23.36	11.5%	22.25	9.9%	32.69	13.2%	78.30	38.7%
Coastal Watershed Counties	9.58	8.9%	13.33	11.3%	14.60	11.2%	37.50	34.7%
Coastal Zone Counties	7.36	9.7%	10.08	12.2%	10.64	11.5%	28.08	37.2%
Near Shore*					3.85	10.9%		

* Data available only for 1990 and 2000

Source: US Census

Table C.2 Population Density in the Coastal Regions

		Percent of U.S.			Population Density (Persons per Square Mile)	
	Land Area**	Area	Population 1970	Population 2000	1970	2000
United States	3,537,377	100.0%	100.0%	100.0%	57.3	79.4
Coastal Watershed Counties	871,216	24.6%	53.3%	51.8%	124.0	167.0
Coastal Zone Counties	663,528	18.8%	37.3%	36.9%	113.8	156.1
Near Shore*	164,113	4.6%		13.6%		232.6

* Data available only for 1990 and 2000.

** In Square Miles. Excludes surface water area such as wetlands, lakes, and rivers.

Source: US Census

Table C.3 Population in Coastal Tiers by Coastal Region

Population (Millions)				
	1970	1980	1990	2000
United States				
Total	202.55	225.90	248.16	280.85
Atlantic				
Coastal Watershed Counties	39.22	41.32	45.49	50.41
Coastal Zone Counties	28.47	30.54	34.21	38.47
Near Shore*		14.2	15.7	
Gulf of Mexico				
Coastal Watershed Counties	13.18	15.70	17.80	20.95
Coastal Zone Counties	6.12	8.32	9.95	11.77
Near Shore*			6.0	7.1
Pacific				
Coastal Watershed Counties	22.84	26.95	33.21	37.92
Coastal Zone Counties	20.84	24.41	29.6	33.30
Near Shore*			8.1	8.9
Great Lakes				
Coastal Watershed Counties	30.34	30.30	30.36	32.04
Coastal Zone Counties	20.06	19.67	19.21	19.99
Near Shore*			5.40	5.52

Change								
	1970–1980		1980–1990		1990–2000		1970–2000	
	N (millions)	Percent	N (millions)	Percent	N (millions)	Percent	N (millions)	Percent
United States								
Total	23.36	11.5%	22.25	9.9%	32.69	13.2%	78.30	38.7%
Atlantic								
Coastal Watershed Counties	2.10	5.4%	4.17	10.1%	4.92	10.8%	11.19	28.5%
Coastal Zone Counties	2.07	7.3%	3.67	12.0%	4.26	12.5%	10.00	35.1%
Near Shore*					1.50	10.3%		
Gulf of Mexico								
Coastal Watershed Counties	2.52	19.1%	2.10	13.4%	3.15	17.7%	7.77	59.0%
Coastal Zone Counties	2.20	35.9%	1.63	19.6%	1.82	18.3%	5.65	92.3%
Near Shore*					1.10	18.3%		
Pacific								
Coastal Watershed Counties	4.11	18.0%	6.26	23.2%	4.71	14.2%	15.08	66.0%
Coastal Zone Counties	3.57	17.1%	5.19	21.3%	3.70	12.5%	12.46	59.8%
Near Shore*					0.80	9.9%		
Great Lakes								
Coastal Watershed Counties	-0.04	-0.1%	0.06	0.2%	1.68	5.5%	1.70	5.6%
Coastal Zone Counties	-0.39	-1.9%	-0.46	-2.3%	0.78	4.1%	-0.07	-0.3%
Near Shore*					0.12	2.2%		

* Data available only for 1990 and 2000
Source: US Census

Table C.4 Population Growth by Coastal Tier and Urban/Rural County

Population (Millions)

	Urban			Rural		
	1970	1990	2000	1970	1990	2000
Coastal Watershed Counties	100.82	121.69	135.13	7.16	9.19	10.36
Coastal Zone Counties	73.15	90.69	101.38	3.75	5.12	5.89
Near Shore*		31.58	34.87		2.97	3.29

Change

	1970–2000		1990–2000	
	N (millions)	Percent	N (millions)	Percent
Urban				
Coastal Watershed Counties	34.31	34.0%	13.44	11.0%
Coastal Zone Counties	28.23	38.6%	10.69	11.8%
Near Shore*			3.29	10.4%
Rural				
Coastal Watershed Counties	3.20	44.7%	1.17	12.7%
Coastal Zone Counties	2.14	57.1%	.77	15.0%
Near Shore*			.32	10.8%

* Data available only for 1990 and 2000
Source: US Census

Table C.5 Total Coastal Economy

	Establishments	Wage & Salary Employment	Wages (Millions)	Gross State Product (Millions)
1990				
Total U.S. Economy	NA	109,043,000	$2,743,643	$5,706,658
Total Coastal States	4,998,116	76,477,272	$1,850,303	$3,887,225
Coastal Watershed Counties	3,101,001	49,068,567	$1,246,219	$2,584,802
Coastal Zone Counties	2,267,894	36,359,010	$884,366	$1,865,741
Near Shore*	776,991	10,784,785	$264,346	$558,634
2000				
Total U.S. Economy	NA	131,720,000	$4,834,254	$9,415,552
Total Coastal States	6,495,532	100,452,156	$3,632,333	$7,023,413
Coastal Watershed Counties	3,831,358	60,696,525	$2,334,920	$4,512,357
Coastal Zone Counties	2,906,685	44,659,916	$1,698,336	$3,264,539
Near Shore*	1,065,576	14,574,973	$536,196	$1,058,596
Percent Change 1990–2000				
Total U.S. Economy	NA	20.8%	76.2%	65.0%
Total Coastal States	30.0%	31.3%	96.3%	80.7%
Coastal Watershed Counties	23.6%	23.7%	87.4%	74.6%
Coastal Zone Counties	28.2%	22.8%	92.0%	75.0%
Near Shore*	37.1%	35.1%	102.8%	89.5%

* Data available only for 1990 and 2000
Sources: Bureau of Labor Statistics, Bureau of Economic Analysis, National Ocean Economics Project.

Table C.6 Private Ocean Economy

Ocean Economy Sector	Establishments	Employment	Wages (Millions Current $)	Gross State Product (Millions Current $)
1990				
TOTAL	**91,203**	**1,924,014**	**$38,064**	**$87,074**
Construction	2,144	30,198	$937	$1,854
Living Resources	5,098	71,819	$1,540	$4,421
Minerals	1,829	45,099	$1,860	$15,043
Ship & Boat Building	3,192	230,097	$6,564	$9,769
Tourism & Recreation	71,958	1,182,809	$13,447	$29,978
Transportation	6,982	363,992	$13,716	$26,008
2000				
TOTAL	**116,736**	**2,279,006**	**$55,704**	**$117,318**
Construction	2,064	31,835	$1,364	$2,594
Living Resources	4,580	62,184	$1,838	$4,714
Minerals	1,984	40,097	$2,432	$15,414
Ship & Boat Building	3,684	176,098	$6,952	$8,089
Tourism & Recreation	95,850	1,672,156	$27,292	$59,497
Transportation	8,572	296,634	$15,826	$27,009

Ocean Economy Sector	Establishments	Employment	Nominal Wages (Millions)	Nominal GSP (Millions)
Change 1990-2000				
TOTAL	**25,533**	**354,993**	**$17,640**	**$30,244**
Construction	(80)	1,638	$427	$740
Living Resources	(518)	(9,636)	$298	$293
Minerals	155	(5,002)	$572	$371
Ship & Boat Building	492	(53,999)	$388	-$1,680
Tourism & Recreation	23,892	489,346	$13,845	$29,519
Transportation	1,590	(67,357)	$2,110	$1,001
Percent Change 1990-2000				
TOTAL	**28.0%**	**18.5%**	**46.3%**	**34.7%**
Construction	-3.7%	5.4%	45.6%	39.9%
Living Resources	-10.2%	-13.4%	19.3%	6.6%
Minerals	8.5%	-11.1%	30.8%	2.5%
Ship & Boat Building	15.4%	-23.5%	5.9%	-17.2%
Tourism & Recreation	33.2%	41.4%	103.0%	98.5%
Transportation	22.8%	-18.5%	15.4%	3.8%

Source: Bureau of Labor Statistics, Bureau of Economic Analysis, National Ocean Economics Project

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Notes

[1] "Counties" in this context includes not only political jurisdictions that function as counties, including parishes in Louisiana and boroughs in Alaska. It also includes Census-designated areas in some states. These are areas defined by the Census bureau as sub-state regions for statistical purposes even though there is no governmental function. Counties in Connecticut, Rhode Island, and Massachusetts, along with some regions in Alaska fall into this category. In Virginia, independent cities, which have functions to similar to counties, but are not classified as counties under state law, are included when they fall within defined coastal areas.

[2] Boundaries of coastal zone are provided by the Office of Coastal Resource Management, NOAA.

[3] The four states which define the entire state as the coastal zone are Florida, Rhode Island, Delaware, and Hawaii.

[4] Examples of states using county boundaries include Washington, South Carolina, Mississippi, and North Carolina. States using municipal boundaries include Maine and Connecticut. In New York, the coastal zone includes counties along the Hudson River as far north as Albany, as well as counties along both the Atlantic and Great Lakes coasts. Pennsylvania defines its coastal zone only along Lake Erie and not along the Delaware River. In this analysis, Cook County Illinois is included in the coastal zone county definition, although Illinois does not participate in the CZM program to provide complete coverage of the nation.

[5] This figure is based on the decennial census, which measures population on April 1 of the year. It does not include seasonal peak populations, which can be orders of magnitude higher in a number of coastal regions.

[6] The Atlantic region is defined as coastal zone and coastal watershed counties from Washington County, Maine to Miami-Dade County, Florida, including the Chesapeake Bay counties of Maryland and Virginia. New York counties exclude counties on the Hudson River, beginning with New York County. Monroe County, Florida is counted in the Gulf of Mexico region. The Pacific region includes Hawaii and Alaska. Cook county is included in Illinois in the coastal zone definition, although Illinois does not participate in the CZM program.

[7] For purposes of defining urban and rural, the Urban Influence Codes of the Department of Agriculture's Economic Research Service are used. These codes define counties as urban or rural based on the population of the largest city or town, the location within a Census-defined metropolitan area, and the adjacency of the county to largest central city (if in a metro area) or to a metro area. For more information, see http://www.ers.usda.gov/briefing/rurality/UrbanInf/.

[8] "Large community" is defined as a population in 1990 of 20,000 or more.

[9] There have been periodic attempts over the past three decades to define an ocean economy, beginning in the 1970's when the Bureau of Economic Analysis sponsored the first estimation of the "ocean economy". This work was updated by Pontecorvo See Pontecorvo, G., M. Wilkinson, et al. (1980). "Contribution of of the Ocean Sector to the U.S. Economy." Science 208(30): 1000–1006.}and extended somewhat in a later study of the coastal economy by Luger See Luger, M. (1991). "The Economic Value of the Coastal Zone." Environmental Systems 21(4): 278–301.A number of state and regional agencies have undertaken studies of local coastal economies in order to better understand the role of the ocean and coasts in their areas (e.g. Colgan, C. S. and J. Plumstead (1993). Economic Prospects for the Gulf of Maine. Augusta, ME, Gulf of Maine Council on the Marine Environment, Moller, R. and J. Fitz (1997). California's Ocean Resources: An Agenda for the Future. Sacramento CA, California Resources Agency.).

[10] The National Ocean Economics Project is funded by NOAA and EPA. It involves researchers at the University of Southern California, University of Vermont, and University of Southern Maine. For more information see www.oceaneconomics.org

[11] Establishments are "places of business", not firms. A firm may operate many establishments. Employment is defined as wage and salary employment in industries covered by the unemployment insurance laws. This definition excludes self employment, many of the employees in the railroad industry (who are covered under a separate federal statute), and farm employment. It also excludes harvesting sector employment in the fisheries. The Living Resources sector excludes harvesting sector employment, which is not collected nationally. Data for 1990 and 2000 are the only two years for which data on the ocean economy is currently available.

[12] Wage and salary jobs. Source: Bureau of Economic Analysis.

[13] Government employment is measured as total employment in government agencies and does not differentiate by type of function. Thus it is not possible to distinguish ocean related from non-ocean related government activities. Marine science organizations are, for the most part, separately reported from other science and research organizations and universities.

[14] Measured as farm proprietors. Source: BEA.

[15] Defined as two-digit SIC classifications.

[16] The cruise ship industry is also poorly measured in the economic statistics. The cruise ships themselves are foreign owned and foreign crewed thus do not show up in the U.S. gross state product figures. The principal measure of the cruise ship industry is thus the shore-side employment of support organizations who provide food, fuel, and other services. Consumer expenditures on cruise ships are measured in the gross domestic product within overall consumption, but cannot be separated out in this analysis of production.

[17] Employment in the harvesting sector of the commercial fishing industry is not included in any government statistics programs because this industry is excluded from the unemployment insurance laws. Occasional estimates of harvesting employment have been made for various fisheries and regions, but there is no regular measurement of employment in this sector.

[18] Tour boats should more properly be counted under tourism and recreation, and some are. But the SIC system does not separate ferry services from tour boats if the establishment is classified as waterborne passenger transportation.

[19] Metro and nonmetro are based on the 1990 designation of counties. The distribution by the size of the Urban Influence Codes of the U.S. Department of Agriculture Economic Research Service. See http://www.ers.usda.gov/briefing/rurality/UrbanInf/.

[20] A number of federal laws, including the Clean Water Act, the Comprehensive Environmental Response, Compensation, and Liability Act, and the National Marine Sanctuaries Act require that economic damages from events such as oil spills be assessed.

[21] The economic term is consumer surplus, the value represented by what one would be willing to pay to use a beach less what someone actually pays to use the beach.

APPENDIX D

Glossary of Federal Ocean and Coastal-related Commissions, Committees, Councils, Laws, and Programs

SECTION 1

SECTION 2

SECTION 3

Ocean and Coastal-related Federal Laws ..... D 8

SECTION 1

Purpose of this Glossary

This glossary is intended to provide additional context or information on the origins of many of the federal commissions, committees, councils, laws, and programs noted in the report of the U.S. Commission on Ocean Policy. Glossary entries meet the following criteria for inclusion:

- The entry is mentioned in the report.
- The entry has a significant impact on ocean and coastal policy.
- The entry provides additional information not appropriate for the report text.
- The entry is authorized by federal legislation or an executive action of the President.

Where appropriate, the entries include cross-references to related items, legal citations, and Web site addresses.

SECTION 2

Ocean and Coastal-related Federal Commissions, Committees, and Councils

Aquatic Nuisance Species Task Force

Established in 1990 by the Nonindigenous Aquatic Nuisance Prevention and Control Act (Pub. L. 101–646; 16 U.S.C. §§ 4701 et seq.) and expanded by the National Invasive Species Act in 1996 (Pub. L. 104–332), the Aquatic Nuisance Species Task Force convenes regional panels and issue-specific committees to coordinate governmental efforts dealing with aquatic nuisance species in the United States. Its activities include research, formulation of strategies to prevent species introductions and dispersal, species control and monitoring, dissemination of information, and the development of state management plans. NOAA and USFWS co-chair the task force, which includes seven federal agency representatives, an observer from Canada, and twelve nonfederal stakeholders.
Web: <http://www.anstaskforce.gov>.
See Section 3 (Federal Laws): Nonindigenous Aquatic Nuisance Prevention and Control Act; National Invasive Species Act.

Arctic Research Commission

Created by the Arctic Research and Policy Act of 1984 (Pub. L. 98-373; 15 U.S.C. §§ 4102 *et seq.*), the Arctic Research Commission's five members, appointed by the President, review federal research programs in the Arctic, make recommendations, and publish a report to the President and Congress. Members are drawn from academia, indigenous residents, and private industry.
Web: <http://www.arctic.gov>.

Atlantic States Marine Fisheries Commission

In 1942, fifteen Atlantic Coast states, stretching from Maine to Florida and including Pennsylvania, formed the Atlantic States Marine Fisheries Commission (ASMFC), a Congressionally-chartered interstate compact agency. The ASMFC assists in managing and conserving coastal fishery resources in state waters through the development of interstate fishery management plans that rely on state authorities for implementation. Congressional legislation in 1984 and 1993 made compliance with the plans, which was originally voluntary, enforceable by giving the Secretary of Commerce authority to close a state's fishery upon the recommendation of the ASMFC. The ASMFC's other program areas are research, habitat conservation, sport fish restoration, and law enforcement.
Web: <http://www.asmfc.org>.
See Section 3 (Federal Laws): Atlantic Coastal Fisheries Cooperative Management Act.

Coral Reef Task Force

Established in 1998 by Executive Order 13089, the Coral Reef Task Force has a mandate to map and monitor U.S. coral reefs, research the causes and solutions to coral reef degradation, reduce and mitigate coral reef degradation from pollution, overfishing and other causes, and implement strategies to promote conservation and sustainable use of coral reefs internationally. Co-chaired by the Departments of Commerce and the Interior, other members include CEQ, USDA, DOD, DOJ, DOS, DOT, EPA, NASA, NSF, USAID, USCG and affected U.S. states and territories.
Web: <http://coralreef.gov>.

Council on Environmental Quality

Created by the National Environmental Policy Act of 1969 (NEPA; Pub. L. 91–190; 42 U.S.C. §§ 4321 *et seq.*), the Council on Environmental Quality (CEQ) in the Executive Office of the President has a mandate to ensure that federal agencies meet their NEPA obligations and to report to the President on the state of the environment. CEQ also oversees federal agency implementation of the environmental impact assessment process and mediates disagreements between agencies over the adequacy of such assessments.
Web: < http://www.whitehouse.gov/ceq>.
See Section 3 (Federal Laws): National Environmental Policy Act.

Estuary Habitat Restoration Council

The Estuary Habitat Restoration Council (EHRC), created by the Estuary Restoration Act (Pub. L. 106–457; 33 U.S.C. §§ 2901 *et seq.*), includes the USACE, NOAA, EPA, USFWS, and USDA. The EHRC is required to develop a strategy for restoring estuaries, and published a final strategy for restoring estuaries in thirty states and U.S. territories in December 2002. The goal of the strategy is to restore one million acres of habitat by 2010.
Web: <http://www.usace.army.mil/estuary.html>.
See Section 3 (Federal Laws): Estuary Restoration Act.

Great Lakes Fishery Commission

The Great Lakes Fishery Commission (GLFC) was established in 1955 by the Convention on Great Lakes Fisheries, a bilateral treaty between the United States and Canada. The GLFC coordinates fisheries research, implements programs to control the invasive sea lamprey, and facilitates cooperative fishery management among state, provincial, tribal, and federal management agencies.
Web: <http://www.glfc.org>.

Gulf States Marine Fisheries Commission

In 1949, five states bordering the Gulf of Mexico (AL, FL, LA, MS, and TX) formed the Gulf States Marine Fisheries Commission (GSMFC), a congressionally-chartered interstate compact agency. The GSMFC assists in managing and conserving coastal fishery resources in state waters through the development of interjurisdictional fishery management plans that rely on state authorities for implementation, and coordinates state and federal programs regarding marine fisheries resources. The GSMFC's other program areas are data collection, habitat conservation, and sport fish restoration.
Web: <http://www.gsmfc.org>.

Joint Subcommittee on Aquaculture

Established by the National Aquaculture Act of 1980 (Pub. L. 96–362; 16 U.S.C. §§ 2801 *et seq.*), the Joint Subcommittee on Aquaculture (JSA) operates under the aegis of the National Science and Technology Council of the Office of Science and Technology Policy in the Executive Office of the President. The Subcommittee reviews national needs related to aquaculture, assesses the effectiveness of federal efforts, and recommends actions on aquaculture issues. The Secretary of Agriculture is the permanent chair of the JSA. Members include approximately a dozen federal agencies.
Web: <http://ag.ansc.purdue.edu/aquanic/jsa/index.htm>.
See Section 3 (Federal Laws): National Aquaculture Act.

Marine Mammal Commission

The Marine Mammal Commission (MMC) was created by the Marine Mammal Protection Act (Pub. L. 92–522; 16 U.S.C. §§ 1401 *et seq.*) to provide independent oversight of the marine mammal conservation policies and programs carried out by federal regulatory agencies. The MMC is charged with developing, reviewing, and making recommendations on domestic and international actions and policies of all federal agencies with respect to marine mammal protection and conservation and with carrying out a research program. The President appoints the MMC's three members.
Web: <http://www.mmc.gov>.
See Section 3 (Federal Laws): Marine Mammal Protection Act.

National Invasive Species Council

National and international concern about invasive species led to the issuance of Executive Order 13112 in February 1999. The Executive Order established the National Invasive Species Council, consisting of ten federal departments and agencies, to provide national leadership on terrestrial and aquatic invasive species.
Web: <http://www.invasivespecies.gov/council/main.html>.

National Ocean Research Leadership Council

The National Ocean Research Leadership Council (NORLC) is the governing body of the National Oceanographic Partnership Program (NOPP), both created by the National Oceanographic Partnership Act of 1996 (Pub. L. 104–201) to support research and education that advances ocean understanding. The NORLC consists of the heads of twelve federal agencies involved in funding or setting policy for ocean research. The NORLC is advised by a group of nonfederal experts in ocean matters, whose members represent the National Academy of Sciences, academic oceanographic research institutions, state governments, and others.
Web: <http://www.coreocean.org/Dev2Go.web?id=207765&rnd=5303>.
See Section 3 (Federal Laws): National Oceanographic Partnership Act.
See also Section 4 (Federal Programs): National Oceanographic Partnership Program.

National Science and Technology Council—Committee on Environment and Natural Resources and Committee on Science

The National Science and Technology Council (NSTC) was established in 1993 by Executive Order 12881 with a mandate to coordinate scientific research and development activities throughout the federal government and ensure their consistency with presidential priorities. Members include the President, Vice President, an Assistant to the President for Science and Technology, the Cabinet secretaries, and heads of agencies with significant science and technology responsibilities. The NSTC created the Committee on Environment and Natural Resources and the Committee of Science to advise and assist the NSTC and provide a formal mechanism for interagency coordination relevant to domestic and international environmental and natural resources issues. Within this structure, a Joint Subcommittee on Oceans was established to coordinate national ocean science and technology policy.
Web: <http://www.ostp.gov/NSTC/html/committee/cenr.html>.

Pacific States Marine Fisheries Commission

Authorized by Congress in 1947, the Pacific States Marine Fisheries Commission (PSMFC) is an interstate compact agency that includes five western states (AK, CA, ID, OR, and WA). PSMFC programs include fisheries data collection, research, and monitoring, information dissemination, and facilitation of interstate agreements on fishery management issues.
Web: <http://www.psmfc.org>.

Regional Fishery Management Councils

In 1976, the Fishery Conservation and Management Act (now titled the Magnuson-Stevens Fishery Conservation and Management Act) created eight Regional Fishery Management Councils (RFMCs) to manage the living marine resources within the nation's exclusive economic zone as later defined by the Act. The RFMCs operate in the Caribbean, Gulf of Mexico, Mid-Atlantic, New England, North Pacific, Pacific, South Atlantic, and Western Pacific regions. Each RFMC consists of a NMFS regional director, directors of the state marine management agencies, and members nominated by state governors and appointed by the Secretary of Commerce. In addition, there are at least three nonvoting members representing USCG, USFWS, and DOS; other nonvoting members may also be appointed.
Web: <http://www.noaa.gov/nmfs/councils.html>.
See Section 3 (Federal Laws): Magnuson-Stevens Fishery Conservation and Management Act.

SECTION 3

Ocean and Coastal-related Federal Laws

Abandoned Shipwreck Act

The Abandoned Shipwreck Act of 1987 (Pub. L. 100–298; 43 U.S.C. §§ 2101 *et seq.*) vests title to certain abandoned shipwrecks in state submerged lands to the federal government which, with certain exceptions, immediately transfers ownership to the state whose submerged lands contain the shipwreck. States are encouraged to develop policies to allow for public and private sector recovery of shipwrecks consistent with the protection of historical values and environmental integrity and with guidelines issued by the Secretary of the Interior.

Act to Prevent Pollution from Ships

In 1980, Congress enacted the Act to Prevent Pollution from Ships (APPS; Pub. L. 96–478; 33 U.S.C. §§ 1901 *et seq.*). Together with subsequent amendments, APPS prohibits the discharge of oil and noxious liquids and the disposal of various types of garbage in offshore waters consistent with the International Convention for the Prevention of Pollution from Ships (known as MARPOL). Requirements vary based on the form of the material and the vessel's location and distance from shore. The law applies to all ships, whether U.S. or foreign flag, that are subject to U.S. jurisdiction.

Atlantic Coastal Fisheries Cooperative Management Act

In 1993, Congress enacted the Atlantic Coastal Fisheries Cooperative Management Act (Pub. L. 103–206; 16 U.S.C. §§ 5107 *et seq.*), which provides a mechanism to ensure state compliance with mandated conservation measures of interstate fishery management plans approved by the Atlantic States Marine Fisheries Commission.
See Section 2 (Federal Commissions, Committees, and Councils): Atlantic States Marine Fisheries Commission.

Atlantic Striped Bass Conservation Act

In 1984, Congress enacted the Atlantic Striped Bass Conservation Act (Pub. L. 98–613; 16 U.S.C. §§ 1851 *et seq.*), requiring the Secretary of Commerce to impose a moratorium on fishing for striped bass in any state that is not in compliance with the Atlantic States Marine Fisheries Commission (ASMFC) interstate fisheries management plan for striped bass. Such action must be recommended by the ASMFC, and noncompliance confirmed by the Secretary.
See Section 2 (Federal Commissions, Committees, and Councils): Atlantic States Marine Fisheries Commission.

Clean Air Act

Congress passed the Clean Air Act Amendments of 1970 (CAA; Pub. L. 91–604; 42 U.S.C. §§ 7401 *et seq.*) to regulate pollution from stationary and mobile sources. Administered by EPA, the bulk of the CAA is concerned with establishing a regulatory program for controlling air pollution, although it does address the goal of improving air quality through federal subsidies, technical assistance, studies, training, and other methods. Managing atmospheric deposition of pollutants to water bodies is the principal nexus between the CAA and ocean and coastal management concerns.

Clean Vessel Act

Under the Clean Vessel Act of 1972 (Pub. L. 102–587; 33 U.S.C. §§ 1322 *et seq.*), the USFWS administers a program to issue grants to coastal and inland states for pumpout stations and waste reception facilities to dispose of recreational boater sewage.

Clean Water Act

Congress enacted the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92–500; 33 U.S.C. §§ 1251 *et seq.*), more commonly known as the Clean Water Act (CWA), to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" in order to support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." The CWA, implemented primarily by EPA and amended numerous times, employs a number of regulatory and nonregulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.
See Section 4 (Federal Programs): Descriptions of a number of CWA programs.

Coastal Barrier Resources Act

The Coastal Barrier Resources Act of 1982 (CBRA; Pub. L. 97–348; 16 U.S.C. §§ 3501 *et seq.*) established the Coastal Barrier Resources System that currently consists of nearly 1.3 million acres of coastal barrier islands along the Atlantic and Gulf coasts, Puerto Rico, the U.S. Virgin Islands, and the Great Lakes. USFWS, which administers the program, submits recommendations to Congress for new sites; Congress acts to add or exempt sites. The system seeks to preserve natural resources and minimize the loss of human life and property resulting from poorly located coastal barrier development by restricting the developer and property owners from obtaining federal financial assistance, such as flood insurance coverage or infrastructure expenditures, with exceptions for military and Coast Guard use.

Coastal Wetland Planning, Protection, and Restoration Act

Congress enacted the Coastal Wetland Planning, Protection and Restoration Act (CWPPRA; Pub. L. 101–646; 16 U.S.C. §§ 3951 *et seq.*), also known as the Breaux Act after its chief legislative sponsor, in 1990 to address wetland loss in coastal states through acquisition, protection, and restoration projects. The CWPPRA is jointly administered by the EPA and USFWS and includes annual funding of approximately $50 million for Louisiana and between $11 and $15 million awarded through a competitive grant process for other states.

Coastal Zone Management Act

Congress enacted the Coastal Zone Management Act of 1972 (CZMA; Pub. L. 92–583; 16 U.S.C. §§ 1451 *et seq.*) to promote the sustainable development of the nation's coasts by encouraging states and territories to balance the conservation and development of coastal resources using their own management authorities. Implemented by NOAA, the CZMA provides financial and technical assistance incentives for states to manage their coastal zones consistent with the guidelines of the Act. States with federally approved programs also receive "federal consistency" authority to require that federal activities affecting their coastal zone are consistent with the state's coastal management program. The CZMA also established the National Estuarine Research Reserve System, and is associated with the coastal nonpoint pollution control program established under the Coastal Zone Act Reauthorization Amendments.
See: Coastal Zone Act Reauthorization Amendments
See Section 4 (Federal Programs): Coastal Zone Management Program and National Estuarine Research Reserve System.

Coastal Zone Act Reauthorization Amendments

The Coastal Zone Act Reauthorization Amendments of 1990 (CZARA; Pub. L. 106–580; 16 U.S.C. §1455b), enacted as section 6217 of the Omnibus Budget Reconciliation Act of 1990 amending the Coastal Zone Management Act, established the Coastal Nonpoint Pollution Control Program to improve coastal water quality. Jointly administered by NOAA and EPA, the program requires every state with a federally-approved coastal management program to identify management measures to address nonpoint source pollution of coastal waters. State programs must include enforceable policies and mechanisms to ensure implementation of the measures.
See: Coastal Zone Management Act.

Comprehensive Environmental Response, Compensation, and Liability Act

Enacted in 1980, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA; Pub. L. 96–510; 42 U.S.C. §§ 9601 *et seq.*) gives the federal government broad authority to respond to releases or threatened releases of hazardous substances that may endanger public health or the environment. EPA is the lead implementing agency. CERCLA also sets requirements concerning closed and abandoned hazardous waste sites, including for liability of persons responsible for releases of hazardous waste at such sites.

Coral Reef Conservation Act

The Coral Reef Conservation Act of 2000 (Pub. L. 106–562; 16 U.S.C. §§ 6401 *et seq.*) requires NOAA to develop a national coral reef action strategy, initiate a matching grants program for reef conservation, and create a conservation fund to encourage public-private partnerships that promote the purposes of the Act.

Deep Seabed Hard Mineral Resources Act

The Deep Seabed Hard Mineral Resources Act of 1980 (Pub. L. 96–283; 30 U.S.C. §§ 1401 *et seq.*) authorizes NOAA to establish a domestic regulatory regime covering the exploration and commercial recovery by U.S. citizens of minerals seaward of the natural resource jurisdiction of any nation.

Deep Water Royalty Relief Act

The Deep Water Royalty Relief Act of 1995 (Pub. L. 104–58; 42 U.S.C. § 1337) amends the OCSLA to provide incentives in the form of royalty reductions for oil and gas leases in deep water areas of the Gulf of Mexico to encourage leasing and exploration and help spur the development of advanced new technologies for production of oil and gas in these areas.

Deepwater Port Act

The Deepwater Port Act of 1974 (Pub. L. 93–627; 33 U.S.C. §§ 1501 *et seq.*), as amended in 2002, authorizes and regulates the location, ownership, construction, and operation of deepwater ports (defined as a non-vessel, fixed or floating manmade structure that is used as a port or terminal for the loading, unloading, or handling of oil or natural gas for transportation to a state) in waters beyond the U.S. state seaward boundaries, sets requirements for the protection of marine and coastal environments from adverse effects of such port development, and promotes safe transport of oil and natural gas from such locations.

Disaster Mitigation Act

The Disaster Mitigation Act of 2000 (Pub. L. 106–390; 42 U.S.C. §§ 5121 *et seq.*) requires FEMA to impose more stringent hazard mitigation planning on states. States that fail to meet new criteria developed by FEMA are denied disaster assistance awards and other types of funding, while states that exceed requirements are eligible to use a greater proportion of any post-disaster funding they receive to implement hazard mitigation projects.

Endangered Species Act

The Endangered Species Act of 1973 (ESA; Pub. L. 93–205; 16 U.S.C. §§ 1531 *et seq.*) protects species of plants and animals listed as threatened or endangered. NOAA or USFWS determine the species that are endangered or threatened and are directed to designate critical habitat and develop and implement recovery plans for threatened and endangered species. Once a species is listed, federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of their critical habitat.

Estuary Restoration Act

The Estuary Restoration Act of 2000 (Pub. L. 106–457; 33 U.S.C. §§ 2901 *et seq.*) created an Estuary Habitat Restoration Council (EHRC) that includes USACE, NOAA, EPA, USFWS, and USDA. The Act charges EHRC to develop and implement a strategy for restoring the nation's estuaries.
See Section 2 (Commissions, Committees, and Councils): Estuary Habitat Restoration Council.

Farm Bill 1985—Food Security Act

The Farm Bill Congress enacted in 1985, formally known as the Food Security Act of 1985 (Pub. L. 99–198; 7 U.S.C. §§ 1631 *et seq.*), is landmark legislation in terms of its conservation provisions, establishing the so-called Sodbuster, Swampbuster, and the Conservation Reserve and Wetland Reserve programs.
See Section 4 (Federal Programs): Farm Bill Conservation Programs.

Farm Bill 1990—Food, Agriculture, Conservation, and Trade Act

The Food, Agriculture, Conservation, and Trade Act of 1990 (Pub. L. 101–624; 14 U.S.C. §§ 1401 *et seq.*) maintained, with certain amendments, the conservation provisions of the 1985 Farm Bill and created new conservation programs applying to forestry activities.
See Section 4 (Federal Programs): Farm Bill Conservation Programs.

Farm Bill 1996—Federal Agriculture Improvement and Reform Act

The Federal Agriculture Improvement and Reform Act of 1996 (Pub. L. 104–127; 7 U.S.C. §§ 793 *et seq.*) made modifications to the Sodbuster, Swampbuster, and Conservation Reserve and Wetland Reserve programs, and created several new programs to address high-priority environmental protection goals, including the Environmental Quality Incentives Program, Wildlife Habitat Incentives Program, Flood Risk Reduction Program, Farmland Protection Program, Conservation Farm Option, and Conservation of Private Grazing Lands initiative.
See Section 4 (Federal Programs): Farm Bill Conservation Programs.

Farm Bill 2002—Farm Security and Rural Investment Act

The Farm Security and Rural Investment Act of 2002 (Pub. L. 107–171) greatly expanded overall funding for Farm Bill conservation programs and shifted the emphasis of funding from land retirement programs to supporting conservation measures on working agricultural lands.
See Section 4 (Federal Programs): Farm Bill Conservation Programs.

Federal Water Pollution Control Act

See: Clean Water Act.

Magnuson-Stevens Fishery Conservation and Management Act

When Congress passed the Fishery Conservation and Management Act in 1976 (Pub. L. 94–265; 16 U.S.C. §§ 1801 *et seq.*), it claimed for the nation sovereign rights and exclusive fishery management authority over all fishery resources within 200 miles of the coast, and over certain continental shelf and anadromous fishery resources even beyond 200 miles. Later renamed the Magnuson-Stevens Fishery Conservation and Management Act (M-S Act), the Act as amended established national standards for fishery conservation and management in U.S. waters. The M-S Act also created eight Regional Fishery Management Councils composed of state and federal officials and fishing industry representatives that prepare and amend fishery management plans for certain fisheries requiring conservation and management. The Act also requires that fishery management plans identify essential fish habitat and protection and conservation measures for each managed species. In 1996, the Sustainable Fisheries Act amended the M-S Act to require NMFS to undertake a number of science, management, and conservation actions to prevent overfishing, rebuild overfished stocks, protect essential fish habitat, minimize bycatch, enhance research, and improve monitoring.
See Section 2 (Commissions, Committees, and Councils): Regional Fishery Management Councils.

Marine Mammal Protection Act

Under the Marine Mammal Protection Act of 1972 (MMPA; Pub. L. 92–522; 16 U.S.C. §§ 1361 *et seq.*), NOAA has responsibility for ensuring the protection of cetaceans (whales, porpoises, and dolphins) and pinnipeds (seals and sea lions), except walruses. USFWS is responsible for ensuring the protection of walruses, sea otters, polar bears, and manatees. NOAA and USFWS are required to consult with the Marine Mammal Commission, also created by the MMPA. With several exceptions, the MMPA establishes a moratorium on the taking and importation of marine mammals and marine mammal products.
See Section 2 (Commissions, Committees, and Councils): Marine Mammal Commission.

Marine Plastic Pollution Research and Control Act

Congress enacted the Marine Plastic Pollution Research and Control Act (Pub. L. 96–478; 33 U.S.C. §§ 1901 *et seq.*) in 1987 as an amendment to the Act to Prevent Pollution from Ships to prohibit garbage and plastic disposal in U.S. navigable waters or by U.S. flag ships.
See: Act to Prevent Pollution from Ships.

Marine Protection, Research, and Sanctuaries Act

The Marine Protection, Research and Sanctuaries Act of 1972 (Pub. L. 92–532; 33 U.S.C. §§ 1401 *et seq.*) established programs to regulate ocean dumping, conduct ocean dumping research, and set aside areas of the marine environment as national marine sanctuaries. Title I is also known as the Ocean Dumping Act and seeks to prevent or strictly limit the dumping into ocean waters of any material that would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potential. Under Title I, the USACE is authorized to issue permits for dredged material disposal, and the EPA is authorized to designate appropriate dump sites, and to issue permits for dumping of material other than dredged material. Title III is also known as the National Marine Sanctuaries Act and authorizes the Secretary of Commerce to designate discrete areas of the marine environment as national marine sanctuaries to protect distinctive natural and cultural resources. NOAA administers the National Marine Sanctuary Program.
See Section 4 (Federal Programs): National Marine Sanctuary Program.

Methane Hydrate Research and Development Act

Congress enacted the Methane Hydrate Research and Development Act of 2000 (Pub. L. 106–193) to promote the research, identification, assessment, exploration, and development of methane hydrate resources by creating a federal research and development program and establishing a Methane Hydrate Advisory Committee.

National Aquaculture Act

Congress enacted the National Aquaculture Act of 1980 (Pub. L. 96–362; 16 U.S.C. §§ 2801 *et seq.*) to promote aquaculture development in the United States by mandating a national aquaculture development plan and federal coordination of aquaculture activities through a Joint Subcommittee on Aquaculture.
See Section 2 (Commissions, Committees, and Councils): Joint Subcommittee on Aquaculture.

National Environmental Policy Act

The National Environmental Policy Act (NEPA; Pub. L. 91–190; 42 U.S.C. §§ 4321 *et seq.*) requires all federal agencies to include a detailed statement of the environmental impact of a major federal action significantly affecting the human environment. A "major" federal action is one that requires substantial planning, time, resources, or expenditure that the federal agency proposes or permits. Through Environmental Assessment and Environmental Impact Statement reviews, federal agencies are required to consider environmental impacts before action is taken. In addition, NEPA mandates coordination and collaboration among federal agencies. NEPA also created the Council on Environmental Quality in the Executive Office of the President.
See Section 2 (Commissions, Committees, and Councils): Council on Environmental Quality.

National Invasive Species Act of 1996

The National Invasive Species Act of 1996 (Pub. L. 104–332; 16 U.S.C. §§ 4701 *et seq.*) substantially amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (Pub. L. 101–646), which is the primary federal law dealing with aquatic invasive species and ballast water management, and is the basis for Coast Guard regulations and guidelines to prevent introductions of non-native species through the uptake and discharge of ships' ballast water.
See: Nonindigenous Aquatic Nuisance Prevention and Control Act
See also Section 2 (Commissions, Committees, and Councils): Aquatic Nuisance Species Task Force.

National Marine Sanctuaries Act

See: Marine Protection, Research and Sanctuaries Act.

National Oceanographic Partnership Act

Enacted as part of the 1997 National Defense Authorization Act, the National Oceanographic Partnership Act (Pub. L. 104–201) created the National Oceanographic Partnership Program and its governing body, the National Ocean Research Leadership Council, to promote the national interest in natural security, economic development, quality of life, and strong science education and communication through improved knowledge of the ocean.
See Section 2 (Commissions, Committees, and Councils): National Ocean Research Leadership Council.
See also Section 4 (Federal Programs): National Oceanographic Partnership Program.

National Sea Grant College Act

The National Sea Grant College Act of 1966 (Pub. L. 89–688; 33 U.S.C. §§ 1121 *et seq.*) established a network of programs at universities and scientific institutions focused on ocean, coastal, and Great Lakes research, education and outreach activities, and was modeled on the research and extension activities of the nation's land grant universities. Sea Grant administration was originally housed at the National Science Foundation, but was transferred to the newly created NOAA in the Department of Commerce in 1970.

Nonindigenous Aquatic Nuisance Prevention and Control Act

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA; Pub. L. 101–646; 16 U.S.C. §§ 4701 *et seq.*) created a broad new federal program to prevent the introduction of aquatic nuisance species and control their spread. The Act established the federal interagency Aquatic Nuisance Species Task Force, whose members include USFWS, USCG, EPA, USACE, and NOAA, to develop a program of prevention, monitoring, control, and study. NANPCA was reauthorized and expanded by the National Invasive Species Act of 1996.
See: National Invasive Species Act of 1996.
See also Section 2 (Commissions, Committees, and Councils): Aquatic Nuisance Species Task Force.

Ocean Dumping Act

See: Marine Protection, Research, and Sanctuaries Act.

Ocean Thermal Energy Conversion Act

The Ocean Thermal Energy Conversion Act of 1980 (Pub. L. 96–320; 42 U.S.C. §§ 9101 *et seq.*), administered by NOAA, established a program to license facilities and plantships designed to convert thermal gradients in the ocean into electricity.

Oceans Act of 2000

The Oceans Act of 2000 (Pub. L. 106–256; 33 U.S.C. § 857–19) established the U.S. Commission on Ocean Policy to carry out a comprehensive review of marine-related issues and laws and make recommendations to Congress and the President for a coordinated and comprehensive national ocean policy and system of ocean governance.

Oil Pollution Act of 1990

The Oil Pollution Act of 1990 (OPA; Pub. L. 101–380; 33 U.S.C. §§ 2701 *et seq.*), enacted after the Exxon Valdez oil spill in Alaska's Prince William Sound, addresses oil discharges to navigable waters and shorelines. The Act seeks to harmonize oil spill response mechanisms from the Clean Water Act, the Deepwater Port Act of 1974, the Trans-Alaska Pipeline Act, and the Outer Continental Shelf Lands Act and other federal laws with state laws, international conventions, and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). OPA requires that emergency response plans be prepared, raises liability limits, and creates an Oil Spill Liability Trust Fund to pay for removal costs and damages if the government is unable to collect cleanup costs from the liable party.

Outer Continental Shelf Lands Act

The Outer Continental Shelf Lands Act of 1953 (OCSLA; Pub. L. 83–212; 43 U.S.C. §§ 1331 *et seq.*) asserted United States jurisdiction over and ownership of the mineral resources of the continental shelf seaward of state boundaries (generally three miles offshore). The OCSLA authorizes the Secretary of the Interior to lease offshore tracts through competitive bidding, collect royalties on production of oil and natural gas, cancel leases if continued activity is likely to cause serious harm to life, including fish and other aquatic life, and consider economic, social, and environmental values of renewable and nonrenewable resources in managing the outer Continental Shelf (OCS). In 1978, Congress significantly revised the OCSLA with the Outer Continental Shelf Lands Act Amendments, requiring the Secretary of the Interior to balance energy needs with the protection of human, marine, and coastal environments, provide greater opportunities for coastal states and competing user concerns to be taken into account, and to integrate improved environmental procedures into the OCS process.

Rivers and Harbors Act Section 10

Section 10 of the Rivers and Harbors Act of 1899 (30 Stat. 1151; 33 U.S.C. §§ 403 *et seq.*) prohibits the unauthorized obstruction of navigable waters of the United States or on the outer Continental Shelf (OCS). Construction of any structure or excavation or fill in U.S. navigable waters, including the OCS, is prohibited without a permit from USACE. Courts have also interpreted such obstructions to include pollution if it destroys the navigable capacity of a navigable waterway.

Submerged Lands Act

Congress enacted the Submerged Lands Act of 1953 (SLA; Pub. L. 83–31; 43 U.S.C. §§ 1301 *et seq.*) to grant to the U.S. coastal states title to the natural resources located within three nautical miles of their coastlines (nine nautical miles for Texas and the Gulf Coast of Florida). For purposes of the SLA, the term "natural resources" comprise oil, gas, and all other minerals, and all fish and other marine animal and plant life. The SLA also preserves the control of the seabed and its resources beyond state boundaries for the federal government.

Sustainable Fisheries Act

See: Magnuson-Stevens Fishery Conservation and Management Act.

Water Resources Development Act

Congress enacts a Water Resources Development Act (most recent WRDA at Pub. L. 108–137; 33 U.S.C. §§ 2201 *et seq.*) approximately every two years. WRDAs authorize USACE to study or implement individual projects around the nation, including navigation improvements, flood and shoreline erosion control, hurricane and storm damage reduction, emergency stream bank and shoreline stabilization, recreation, and more. WRDAs also contain provisions of general applicability to USACE activities, such as directives that establish environmental protection and no-net-loss of wetlands as USACE goals, and also authorize funding for technical assistance and studies for state, local, and tribal governments.

SECTION 4

Ocean and Coastal-related Federal Programs

Atmospheric Deposition Monitoring Programs

Numerous federal agencies, including EPA, NOAA, and a number of agencies within the Departments of Agriculture, the Interior, and Energy collaborate with dozens of academic, research, industry, and state and local government entities in a variety of networks that monitor the atmospheric deposition of pollution to water bodies. The preeminent national deposition monitoring network is the National Atmospheric Deposition Program, which monitors more than 200 sites nationwide. EPA administers the Clean Air Status and Trends Network, measuring deposition at about 80 sites.
Web: <http://nadp.sws.uiuc.edu>.

Centers for Ocean Science Education Excellence

The Centers for Ocean Science Education Excellence (COSEE) promote partnerships between research scientists and educators to advance ocean sciences education. The centers are a network of seven regional centers and a central coordinating office funded by the National Science Foundation with additional support from the U.S. Navy's Office of Naval Research and NOAA's National Sea Grant Program, National Ocean Service, and Office of Ocean Exploration. Launched in 2002, each center has multiple participating academic, research, and educational institutions.
Web: <http://www.geo.nsf.gov/cgi-bin/geo/showprog.pl?id=109&div=oce>.

Civil Works Program of USACE

The USACE Civil Works Program encompasses a vast array of programs that affect ocean and coastal resources, including permitting and implementation of wetland fill projects, offshore dumping and structures, navigational and other types of dredging, flood control projects, beach nourishment and other shoreline protection projects, invasive species control, regional sediment management, dam removal, disaster response, and more.
Web: <http://www.usace.army.mil/inet/functions/cw/>.
See Section 3 (Federal Laws): Water Resources Development Act.

Clean Water Act—Beaches Environmental Assessment and Coastal Health Act

The Beaches Environmental Assessment and Coastal Health Act of 2000 amends section 303(a) and several other sections of the Clean Water Act to require states to set certain types of water quality standards for their coastal recreational waters. It also authorizes EPA to award grants to eligible states, territories, tribes, and local governments to support testing and monitoring of coastal recreational waters.
Web: <http://www.epa.gov/beaches/>.
See Section 3 (Federal Laws): Clean Water Act.

Clean Water Act—Discharge of Dredged and Fill Material (Section 404)

EPA and the USACE jointly administer the program created by Section 404 of the Clean Water Act, which prohibits the discharge of dredged or fill material into waters of the United States, including wetlands, without a permit. Such discharges may occur only when there is no alternative that is less damaging to the aquatic environment. The applicant must demonstrate efforts to avoid and minimize potential adverse impacts, and, where relevant, must provide compensation for any remaining, unavoidable impacts through activities to restore or create wetlands. EPA can veto a USACE permit decision.
Web: <http://www.epa.gov/owow/wetlands/facts/fact10.html>.
See Section 3 (Federal Laws): Clean Water Act.

Clean Water Act—National Estuary Program (Section 320)

Created by 1987 amendments to the Clean Water Act, the National Estuary Program was established to improve the quality of estuaries of national importance. EPA administers the program, providing funds and technical assistance to local stakeholders to develop plans for attaining or maintaining water quality in a designated estuary. Stakeholders create a comprehensive conservation and management plan that includes measures for protection of public water supplies, protection and propagation of shellfish, fish, and wildlife populations, allowance for recreational activities in and on the water, and control of point and nonpoint sources of pollution that supplement existing pollution control measures. There are currently twenty-eight estuaries in the program. In addition to the National Estuary Program, the Clean Water Act also authorizes several other important regional estuary programs such as the Chesapeake Bay Program and the Great Lakes Program.
Web: <http://www.epa.gov/nep>.
See Section 3 (Federal Laws): Clean Water Act .

Clean Water Act—National Pollutant Discharge Elimination System (Section 402)

Established by the Clean Water Act in 1972, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources (e.g., pipes or constructed ditches) that discharge pollutants into waters of the United States. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states.
Web: <http://cfpub.epa.gov/npdes>.
See Section 3 (Federal Laws): Clean Water Act.

Clean Water Act—Nonpoint Source Pollution Program (Section 319)

Under the Clean Water Act Nonpoint Source Pollution Program, EPA provides matching grants to states to develop and implement statewide programs for managing nonpoint sources of water pollution, such as runoff from farms, parking lots, and lawns. States must prepare an assessment of waters where the control of nonpoint source pollution is necessary to meet water quality standards, identify the significant sources of that pollution, and specify control measures. States also must develop a program that sets forth the best management practices necessary to remedy the problems.
Web: <http://www.epa.gov/owow/nps/cwact.html>.
See Section 3 (Federal Laws): Clean Water Act.

Clean Water Act—Marine Sanitation Devices (Section 312)

Section 312 of the Clean Water Act requires vessels that operate in U.S. navigable waters and that have installed toilet facilities to have operable marine sanitation devices certified as meeting certain standards. Section 312 also allows establishment of zones where discharge of sewage from vessels is completely prohibited. Section 312 does not apply beyond three nautical miles offshore.
Web: <http://www.epa.gov/owow/oceans/regulatory/vessel sewage>.
See Section 3 (Federal Laws): Clean Water Act.

Clean Water Act—State Revolving Fund

The Clean Water State Revolving Fund (CWSRF) provides matching grant funds to states to establish revolving loan programs that provide below-market interest rates on loans and other financial incentives to towns, counties, nonprofit organizations, farmers, and homeowners for water quality improvement projects. The funds, which may finance only capital costs (not operations and maintenance costs) are mostly used for constructing wastewater treatment plants. From its inception in 1988 to 2002, the funds have provided an average of $3.8 billion per year for water quality improvement. Since the program's inception, $38.7 billion has been disbursed.
Web: <http://www.epa.gov/owm/cwfinance/index.htm>.
See Section 3 (Federal Laws): Clean Water Act.

Clean Water Act—Total Maximum Daily Load Program (Section 303(d))

Section 303(d) of the Clean Water Act created the Total Maximum Daily Load (TMDL) program to address waters in the nation that still do not meet the Clean Water Act goal of "fishable, swimmable" after implementing pollution control technology at point sources of pollution. Under the TMDL program, states must identify and develop TMDLs for such waters with EPA oversight. A TMDL is the maximum amount of a pollutant, from both point and nonpoint sources, that can be accommodated while still meeting water quality standards. States must develop a TMDL for each pollutant of concern, and develop and implement plans to achieve and maintain TMDLs by allocating reductions among point and nonpoint sources.
Web: <http://www.epa.gov/owow/tmdl>.
See Section 3 (Federal Laws): Clean Water Act.

Clean Water Act—Water Quality Certification Program (Section 401)

The Clean Water Act Section 401 program, administered by EPA, requires federal agencies to obtain certification, or to require permit applicants to do so, from the state, territory, or Indian tribes before issuing permits that would result in increased pollutant loads to waters and wetlands. The certification is issued only if such increased loads would not cause or contribute to violations of water quality standards. States may grant, deny, or condition these certifications.
Web: <http://www.epa.gov/OWOW/wetlands/regs/sec401.html>.
See Section 3 (Federal Laws): Clean Water Act.

Coastal Barrier Resources System

Web: <http://www.fws.gov/cep/cbrtable.html>.
See Section 3 (Federal Laws): Coastal Barrier Resources Act.

Coastal Nonpoint Pollution Control Program

Web: <http://coastalmanagement.noaa.gov/czm/6217>.
See Section 3 (Federal Laws): Coastal Zone Act Reauthorization Amendments.

Coastal Program of USFWS

The USFWS Coastal Program focuses efforts to conserve fish and wildlife and their habitats in support of healthy coastal ecosystems in bays, estuaries and watersheds around the U.S. ocean coastline and Great Lakes. The program targets funding to sixteen high priority coastal ecosystems. The program provides assessment and planning tools to identify priorities for habitat protection and restoration, conserves pristine coastal habitats through voluntary conservation easements and locally initiated land acquisition, and forms partnerships to restore degraded habitat.
Web: <http://www.fws.gov/cep/cepcode.html>.

Coastal Zone Management Program

The Coastal Zone Management Program created by the Coastal Zone Management Act of 1972 encourages coastal and Great Lakes states to develop and implement programs to manage the use and protection of their coastal zones. NOAA is the federal agency with oversight. States with approved programs become eligible for matching grants and also gain "federal consistency" review authority.
Web: <http://coastalmanagement.noaa.gov/czm>.
See Section 3 (Federal Laws): Coastal Zone Management Act.

Environmental Monitoring and Assessment Program

The Environmental Monitoring and Assessment Program is a research program within EPA that develops the tools necessary to monitor and assess the status and trends of national ecological resources.
Web: <http://www.epa.gov/emap>.

Farm Bill Conservation Programs

Congress has enacted Farm Bills since the 1920s. Since 1985, the laws, passed approximately every five years, have included an increasing conservation focus. The programs, administered primarily by the USDA's Natural Resources Conservation Service, provide farmers and ranchers incentives to implement conservation actions and disincentives against taking actions that harm natural resources. Programs created and modified in the conservation titles of the 1985, 1990, 1996, and 2002 Farm Bills encourage compliance with minimum conservation practices, promote land retirement, and create incentives for improved farming and ranching practices to address environmental problems. Additional Farm Bill programs affecting natural resource protection include those that prevent conversion of farmland and grassland to urban uses, and a variety of programs that encourage watershed protection efforts. The 2002 Farm Bill raised anticipated spending for conservation and environmental programs over ten years to $38.6 billion. While funding to all programs increased, the 2002 bill shifted the funding emphasis from land retirement to conservation efforts on working lands.
Web: <http://www.usda.gov/farmbill>.
See Section 3 (Federal Laws): Farm Bill 1985, 1990, 1996, 2002.

National Estuarine Research Reserve System

Established by the Coastal Zone Management Act in 1972, the program encourages coastal states and territories to set aside representative estuaries for long-term research, education, and stewardship purposes. Once an area is designated as a reserve, federal financial assistance is available for acquisition of property, and management, research, and education activities. NOAA is responsible for overseeing state management of the twenty-six reserves.
Web: <http://nerrs.noaa.gov>.
See Section 3 (Federal Laws): Coastal Zone Management Act.

National Flood Insurance Program

In 1968, Congress enacted the National Flood Insurance Program (NFIP), administered by FEMA. The NFIP maps flood-prone regions throughout the nation. Communities that voluntarily adopt NFIP building standards and land use controls intended to minimize flood damages and property losses in those areas make their residents and businesses eligible for guaranteed flood insurance coverage. About 19,000 communities participate in the program.
Web: <http://www.fema.gov/nfip>.

National Marine Sanctuary Program

NOAA administers the National Marine Sanctuary Program, created by Title III of the Marine Protection, Research, and Sanctuaries Act of 1972. The Act authorizes the Secretary of Commerce to designate discrete areas of the marine environment as national marine sanctuaries to protect distinctive natural and cultural resources. There are currently thirteen national marine sanctuaries in the program.
Web: <http://www.sanctuaries.nos.noaa.gov>.
See Section 3 (Federal Laws): Marine Protection, Research, and Sanctuaries Act.

National Oceanographic Partnership Program

The National Oceanographic Partnership Program (NOPP) promotes and funds research partnerships among federal agencies, academia, industry, and other members of the oceanographic scientific community to further ocean knowledge. Among NOPP programs is Ocean.US, which coordinates the development of the Integrated Ocean Observing System. NOPP is governed by the National Ocean Research Leadership Council.
Web: <http://www.coreocean.org/Dev2Go.web?Anchor=nopp_home_page&rnd=5308>.
See Section 2 (Federal Commissions, Committees, and Councils): National Ocean Research Leadership Council.
See also Section 3 (Federal Laws): National Oceanographic Partnership Act.

National Park System

The National Park System, administered by the National Park Service, includes a number of national parks in coastal or ocean areas, including in Florida, Alaska, Maine, Michigan, California, U.S. Virgin Islands, and American Samoa. Other ocean and coastal elements of the system include national seashores (ten national seashores on the Atlantic, Gulf and Pacific coasts), national lakeshores (four, all on the Great Lakes), and a number of national monuments (landmarks, structures, and other items of historic or scientific interest situated on federal lands).
Web: <http://www.nps.gov>.

National Sea Grant College Program

The National Sea Grant College Program's ocean, coastal, and Great Lakes research, education, technology transfer, and outreach activities are implemented by a network of programs at thirty universities and scientific institutions around the nation. The program was modeled on the research and extension activities of the nation's land grant universities. NOAA administers the program.
Web: <http://www.nsgo.seagrant.org>.
See Section 3 (Federal Laws): National Sea Grant College Act.

National Status and Trends Program

The objective of NOAA's National Status and Trends Program is to evaluate and detect changes in the environmental quality of the nation's estuarine and coastal waters. The program conducts monitoring of contaminants and other environmental conditions at approximately 350 sites nationwide.
Web: <http://ccma.nos.noaa.gov>.

National Stream Quality Accounting Network

USGS conducts long-term water quality and quantity monitoring through the National Stream Quality Accounting Network at fixed locations on large rivers around the country. Currently, this program focuses on monitoring the water quality of the nation's largest rivers—the Mississippi, Columbia, Colorado, Rio Grande, and Yukon. Consequently, most coastal regions are left out of the monitoring network.
Web: <http://water.usgs.gov/nasqan>.

National Streamflow Information Program

USGS operates the National Streamflow Information Program, a network of about 7,000 stream gages nationwide. (About 6,000 of these stations are telemetered by an Earth-satellite-based communications system.) The majority of the stream-gaging stations are jointly funded in partnerships with more than 800 state, local, and tribal governments or other federal agencies.
Web: <http://water.usgs.gov/nsip>.

National Water Quality Assessment

USGS operates the National Water Quality Assessment, which uses a regional focus to study status and trends in water, sediment, and biota in forty-two major river basins and aquifer systems. This effort has made considerable progress toward assessing current water quality conditions and long-term trends.
Web: <http://water.usgs.gov/nawqa>.

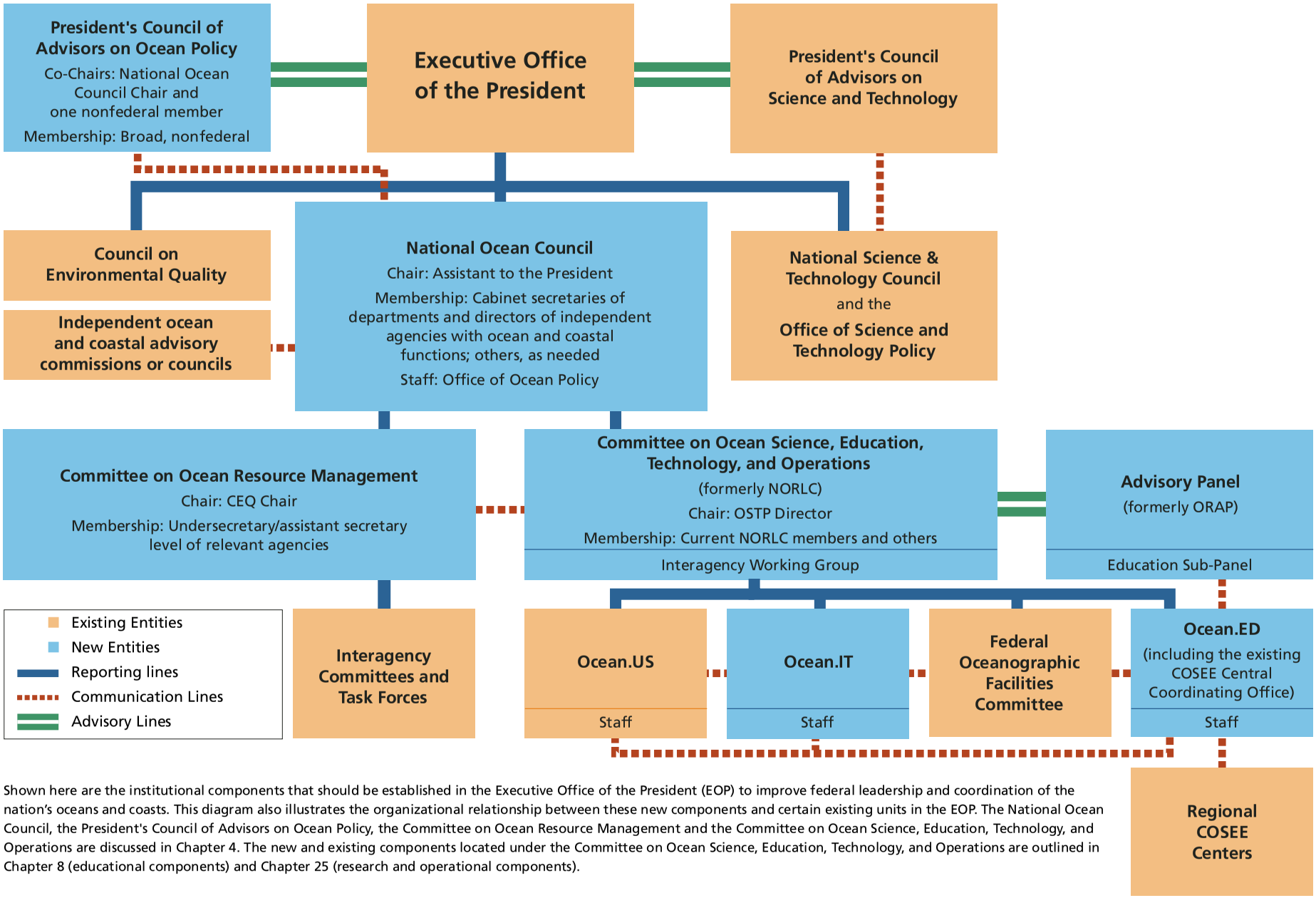
National Wildlife Refuge System

The National Wildlife Refuge System, administered by the USFWS, encompasses over 95 million acres on more than 540 refuges and waterfowl production areas dedicated to the protection and conservation of the nation's wildlife resources. In 1966, legislation (Pub. L. 89–669; 16 U.S.C. § 668dd) codified the system, which was first established by executive order of President Theodore Roosevelt as a network of wildlife refuges and ranges, areas for the protection and conservation of fish and wildlife threatened with extinction, game ranges, wildlife management areas, and waterfowl production areas.
Web: <http://refuges.fws.gov>.

APPENDIX E

Proposed Structure for Coordination of Federal Ocean Activities

Proposed Structure for Coordination of Federal Ocean Activities



Shown here are the institutional components that should be established in the Executive Office of the President (EOP) to improve federal leadership and coordination of the nation's oceans and coasts. This diagram also illustrates the organizational relationship between these new components and certain existing units in the EOP. The National Ocean Council, the President's Council of Advisors on Ocean Policy, the Committee on Ocean Resource Management and the Committee on Ocean Science, Education, Technology, and Operations are discussed in Chapter 4. The new and existing components located under the Committee on Ocean Science, Education, Technology, and Operations are outlined in Chapter 8 (educational components) and Chapter 25 (research and operational components).

APPENDIX F

Congressional Committees and Subcommittees with Jurisdiction over Ocean and Coastal Issues

Congressional Committees and Subcommittees with Jurisdiction over Ocean and Coastal Issues

The primary institutions for policy and legislative development in Congress are the standing committees of the House and Senate. As the level of assertiveness of Congress has fluctuated over the years, its committee structure and power have also been subject to change. Congressional policy activism of the 1970s and 1980s, for example, resulted in the proliferation of the number of standing committees and subcommittees in both chambers. In the 100th Congress (1987–88), there were over 280 permanent jurisdictional entities in the House and Senate. Reform in the mid-1990s realigned and consolidated a significant portion of the committee system; in the 108th Congress (2003–04), there are slightly more than 200 standing committees and subcommittees.

Despite the reduction in the number of jurisdictional entities overall, the legislative and oversight responsibilities with respect to ocean and coastal issues in the United States Congress are spread across more than one-quarter of its committees and subcommittees. Some panels exercise more direct and broader jurisdiction over ocean policy than others, but all listed in this appendix have an important role in the collective and cumulative programmatic and budgetary decisions of Congress that define such policy.

It should be noted that the following identification and characterization of congressional committee ocean policy jurisdiction in the 108th Congress is not intended to be authoritative. Committee jurisdiction, although defined by the rules of each chamber, is an evolving concept affected by years of bill referral precedents and changing procedures occasioned by periodic reorganization and reform efforts. At a minimum, practically every Congress experiences some realignment in the subcommittee structure of one or more standing committees.

The built-in tension in the modern-day Congress between its representational role and agenda-setting and legislative responsibilities affect many different congressional processes, including the policy coherence of its committee structure. This appendix is illustrative of the breadth of committee and subcommittee involvement in ocean and coastal policy oversight and management in the 108th Congress. The current distribution of authority over the laws and policies of the nation's ocean and coastal activities among a broad suite of fifty-eight congressional committees and subcommittees highlights the difficulty of policy coordination in the legislative branch of the federal government similar, perhaps, to that experienced in the executive branch.

In addition to the jurisdictional entities listed below, there are other standing committees in the Senate and House that indirectly impact ocean and coastal policy through important legislative authority over broader governmental and cross-cutting issues, such as: executive branch organization; taxes, customs, duties, and trade policies; health sciences; Indian affairs; labor standards and safety regulations; and other related matters.

There have been efforts from time to time to better coordinate ocean policy development in Congress. In the 1970s, a temporary select committee composed of members from the various standing units of jurisdiction was established in the House to rewrite the federal offshore oil and gas law. Also, around the same time, the Senate authorized the Commerce Committee to establish the National Ocean Policy Study (NOPS), a non-legislative cross-Senate entity that included ex officio representation by Members from other committees with similar jurisdictional interests. Operated in many ways as a broad ocean policy oversight subcommittee, NOPS has been inactive since 1994. A more recent initiative was the establishment in the 106th Congress of the House Oceans Caucus, composed of a broad bipartisan membership of the House of Representatives. Like other congressional caucuses, it possesses no legislative authority but provides a voice within the House for Members interested in ocean and coastal issues.

Table F.1 Congressional Committees and Subcommittees

Number with Ocean- and Coastal-related Jurisdiction, 108th Congress

	Standing Committees			Subcommittees of Standing Committees			Number of Jurisdictional Entities*		
	Total	Number with ocean- and coastal-related jurisdiction	Percent with ocean- and coastal-related jurisdiction	Total	Number with ocean- and coastal-related jurisdiction	Percent with ocean- and coastal-related jurisdiction	Total	Number with ocean- and coastal-related jurisdiction	Percent with ocean- and coastal-related jurisdiction
U.S. Senate	17	7	41%	68	21	31%	85	28	33%
U.S. House	19	8	42%	98	22	22%	117	30	26%
Total	36	15	42%	166	43	26%	202	58	29%

* total of full committees and subcommittees

United States Senate Committees And Subcommittees With Ocean- And Coastal-related Jurisdiction: 108th Congress

In the 108th Congress, of the seventeen standing committees and sixty-eight subcommittees in the Senate, seven committees and twenty-one subcommittees are involved in ocean- and coastal-related policy and legislative issues. Selective examples of ocean-related programs, activities, and agencies under the jurisdiction of the applicable full authorizing committees and appropriations subcommittees are provided for illustrative purposes.

Authorizing Committees

Committee on Commerce, Science, and Transportation
Jurisdiction includes ocean and atmospheric policy, generally: NOAA, NASA, U.S. Coast Guard, MARAD, and Marine Mammal Commission programs and activities; coastal zone management; marine fisheries; merchant marine and ocean navigation, including transportation and safety; science, engineering, and technology research, development, and policy; transportation and commerce aspects of outer Continental Shelf lands; and elements of climate change.

- Subcommittee on Oceans, Fisheries, and Coast Guard
- Subcommittee on Science, Technology and Space
- Subcommittee on Surface Transportation and Merchant Marine

Committee on Environment and Public Works
Jurisdiction includes environmental protection, generally: EPA; CEQ; FEMA (Hazards Mitigation); USACE civil works programs for navigation, environmental restoration, and shoreline protection; DOI wildlife and fisheries programs, including endangered species; air and water pollution and water resources; environmental aspects of outer Continental Shelf lands; environmental policy (including NEPA), regulation and research; and ocean dumping.

- Subcommittee on Clean Air, Climate Change, and Nuclear Safety
- Subcommittee on Fisheries, Wildlife and Water
- Subcommittee on Transportation and Infrastructure

Committee on Energy and Natural Resources
Jurisdiction includes energy resource development, generally: DOI leasing program for oil, gas, and other minerals on the outer Continental Shelf and deep seabed; national parks, refuges, forests, and the Land and Water Conservation Fund; DOE and energy policy, research, development and regulation (including hydroelectric and renewable energy); energy-related aspects of deepwater ports; and U.S. territorial possessions.

- Subcommittee on Energy
- Subcommittee on Public Lands and Forests
- Subcommittee on Water and Power

Committee on Agriculture, Nutrition, and Forestry
Jurisdiction includes: USDA Forest Service, Natural Resources Conservation Service programs, including watershed conservation on agricultural lands and nonpoint source pollution activities as they relate to agriculture practices; and inspection of marine mammals in captivity.

- Subcommittee on Forestry, Conservation and Rural Revitalization
- Subcommittee on Research, Nutrition, and General Legislation

Committee on Armed Services
Jurisdiction includes: DOD naval operations, research and development, and related environmental issues.
- Subcommittee on Seapower

Committee on Foreign Relations
Jurisdiction includes: DOS oceans and international environmental and scientific affairs, including treaties and agreements; boundaries of the United States; and U.S. activities related to the United Nations Convention on the Law of the Sea.

Appropriations Committee

Committee on Appropriations
Jurisdiction of the full Committee includes appropriation of the revenue and the provision of new spending authority for the support of the government.
- Subcommittee on Agriculture, Rural Development, and Related Agencies
  Funding for USDA and FDA
- Subcommittee on Commerce, Justice, State and the Judiciary
  Funding for NOAA, DOS, and MMC
- Subcommittee on Defense
  Funding for the Navy
- Subcommittee on Energy and Water Development
  Funding for USACE Civil Works and DOI/BOR
- Subcommittee on Foreign Operations
  Funding for USAID and DOS
- Subcommittee on Homeland Security
  Funding for USCG and FEMA
- Subcommittee on the Interior and Related Agencies
  Funding for DOI agencies (USGS, MMS, FWS, NPS) and LWCF
- Subcommittee on Transportation/Treasury and General Government
  Funding for Executive Office of the President, MARAD and FMC
- Subcommittee on Veterans Affairs, Housing and Urban Development and Independent Agencies
  Funding for NSF, EPA, NASA, NIH/NIEHS, CEQ, and OSTP

United States House Of Representatives Committees And Subcommittees With Ocean- And Coastal-related Jurisdiction: 108th Congress

Of the nineteen standing committees and ninety-eight subcommittees in the U.S. House of Representatives, eight committees and twenty-two subcommittees are involved in ocean- and coastal-related policy and legislative issues. Selective examples of ocean-related programs, activities, and agencies under the jurisdiction of the applicable full authorizing committees and appropriations subcommittees are provided for illustrative purposes.

Authorizing Committees

Committee on Resources
Jurisdiction includes: most of NOAA's marine related activities, such as living marine resource management, conservation, and regulation; coastal zone management; marine sanctuaries and oceanography; DOS' international fisheries agreements; MMS' conservation and development of oil and gas resources on the outer Continental Shelf; management of federal lands in the coastal zone (national parks, refuges, and forests); and relations with federally-recognized Indian tribes and U.S territorial possessions.
- Subcommittee on Energy and Mineral Resources
- Subcommittee on Fisheries Conservation, Wildlife and Oceans
- Subcommittee on National Parks, Recreation and Public Lands

Committee on Science
Jurisdiction includes: oceanic, atmospheric, environmental, and climatic research and development activities of NOAA, NSF, EPA, NASA, DOE, and USGS, including water and air pollution, renewable energy and fossil energy; ocean science policy and technology; earth remote sensing research and policy; and science education.
- Subcommittee on Environment, Technology and Standards
- Subcommittee on Research

Committee on Transportation and Infrastructure
Jurisdiction includes: Coast Guard safety, enforcement and environmental protection programs; FMC and merchant marine and navigation matters; USACE civil works programs for navigation, environmental restoration, and shoreline protection; water and oil pollution; ocean dumping; and FEMA (hazards mitigation).

- Subcommittee on Economic Development, Public Buildings and Emergency Management
- Subcommittee on Coast Guard and Marine Transportation
- Subcommittee on Water Resources and Environment

Committee on Energy and Commerce
Jurisdiction includes: national energy policy, generally, including renewable energy resources; environmental regulatory programs of EPA, generally; air pollution; clean-up of hazardous wastes; public health; and travel and tourism.

- Subcommittee on Energy and Air Quality
- Subcommittee on Environment and Hazardous Materials

Committee on Agriculture
Jurisdiction includes: USDA Forest Service, Natural Resources Conservation Service programs, including watershed conservation on agricultural lands and nonpoint source pollution activities as they relate to agriculture practices; seafood inspection; and inspection of marine mammals in captivity.

- Subcommittee on Conservation, Credit, Rural Development and Research
- Subcommittee on Livestock and Horticulture

Committee on Armed Services
Jurisdiction includes: naval operations, research, and development, and related environmental issues; and MARAD.

- Subcommittee on Projection Forces

Committee on International Relations
Jurisdiction includes: DOS oceans and international environmental and scientific affairs, including treaties and agreements other than international fisheries agreements; boundaries of the United States; and U.S. activities related to the United Nations Convention on the Law of the Sea.

Appropriations Committee

Committee on Appropriations
Jurisdiction of the full Committee includes appropriation of the revenue and the provision of new spending authority for the support of the government.

- Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies
  Funding for USDA and FDA
- Subcommittee on Commerce, Justice, and State, the Judiciary, and Related Agencies
  Funding for NOAA, DOS, DOJ, and MARAD
- Subcommittee on Defense
  Funding for the Navy
- Subcommittee on Energy and Water Development
  Funding for USACE Civil Works and DOI/BOR
- Subcommittee on Foreign Operations, Exported Financing, and Related Programs
  Funding for USAID and DOS
- Subcommittee on Homeland Security
  Funding for USCG and FEMA
- Subcommittee on Interior and Related Agencies
  Funding for DOI agencies (USGS, MMS, FWS, NPS) and LWCF
- Subcommittee on Transportation and Treasury, and Independent Agencies
  Funding for Executive Office of the President and FMC
- Subcommittee on Veterans Affairs and Housing and Urban Development, and Independent Agencies
  Funding for NSF, EPA, NASA, NIH/NIEHS, CEQ, and OSTP

APPENDIX G

Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy

Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy

Listed below are the estimated new costs, in millions of dollars, associated with each recommendation in this report. These amounts should be added to existing federal expenditures in each area. Additional caveats, context, and discussion are provided in Chapter 30.

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 1: Recognizing Ocean Assets and Challenges				
	no recommendations	N/A	N/A	
Chapter 2: Understanding the Past to Shape a New National Ocean Policy				
	no recommendations	N/A	N/A	
Chapter 3: Setting the Nation's Sights				
	no recommendations	N/A	N/A	
Chapter 4: Enhancing Ocean Leadership and Coordination				
4–1	create the National Ocean Council, the Assistant to the President, and the President's Council of Advisors on Ocean Policy (travel)	$0.162	$0.324	
4–2	define duties for the National Ocean Council	min	min	
4–3	promote ecosystem-based management approaches	min	min	
4–4	define duties for the Assistant to the President	min	min	
4–5	define duties for the President's Council of Advisors on Ocean Policy	min	min	
4–6	create the Office of Ocean Policy (small staff and budget)	$0.900	$1.800	
4–7	create a Committee on Ocean Science, Education, Technology, and Operations	min	min	
4–8	create a Committee on Ocean Resource Management	min	min	
4–9	review ocean-related councils and commissions	min	min	
	Chapter 4 Total	**$1.062**	**$2.124**	
Chapter 5: Advancing a Regional Approach				
5–1	design and apply a regional ocean council process	$3.000	$12.000	$1M per region
5–2	improve federal agency regional coordination	min	min	
5–3	adopt common federal regions	TBD	TBD	cost will depend on the nature and timing of the transition
5–4	establish regional ocean information programs	$9.000	$36.000	$3M per region
5–5	conduct regional assessments	$0.750	$0.750	$250K per assessment on a four year rotation among regions
5–6	revise NEPA guidelines to incorporate regional ecosystem assessments	min	min	
	Chapter 5 Total	**$12.750**	**$48.750**	
Chapter 6: Coordinating Management in Federal Waters				
6–1	select a lead agency for each offshore activity	min	min	
6–2	create a coordinated offshore management regime (small staff and budget)	$0.900	$1.800	
6–3	design marine protected area guidelines	min	min	
6–4	implement and assess marine protected areas	$6.000	$20.000	
	Chapter 6 Total	**$6.900**	**$21.800**	

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Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy (continued)

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 7: Strengthening the Federal Agency Structure				
7–1	establish an organic act for NOAA	min	min	
7–2	review NOAA's budget within OMB's Natural Resources Programs directorate	min	min	
7–3	review ocean and coastal programs and recommend opportunities for consolidation	min	min	
7–4	authorize presidential reorganization authority	min	min	
7–5	consider long-term reorganization of federal resource agencies	min	min	
	Chapter 7 Total	**$0.000**	**$0.000**	
Chapter 8: Promoting Lifelong Ocean Education				
8–1	create Ocean.ED (small staff and budget)	$0.900	$1.800	
8–2	establish the Ocean.ED budget as a line item in NOAA	min	min	NOAA line item would include funds to support Recs. 8–1, 8–4, 8–7, 8–8, 8–9, and 8–17
8–3	strengthen ocean education in NOAA, NSF, NASA, and ONR	$10.000	$20.000	
8–4	evaluate K-12 programs (grants and workshops)	$0.500	$2.040	
8–5	expand the Centers for Ocean Science Education Excellence	$0.000	$29.100	$1.5M per year for existing and new centers
8–6*	increase Sea Grant education efforts	*	*	* funds included in Rec. 25–4
8–7	coordinate K-12 materials to meet existing education standards (grants)	$0.000	$1.000	
8–8	establish researcher/educator collaborations (grants)	$0.000	$10.000	
8–9	promote ocean experiences outside school (traveling exhibits and grants)	$11.000	$3.000	larger first year costs cover the creation of traveling exhibits
8–10	support undergraduate ocean science course development and implementation (grants)	$0.000	$5.000	
8–11*	promote development of the ocean workforce	*	*	* funds included in Recs. 8–13, 8–14, and 8–15
8–12	establish an ocean workforce database with regular reporting and convene periodic summit meetings	$0.500	$2.000	
8–13	enhance NOAA support for undergraduates, graduate students, and postdoctoral fellows	$0.000	$18.000	
8–14	enhance NSF support for undergraduates, graduate students, and postdoctoral fellows	$0.000	$18.000	
8–15	reinvigorate ONR support for graduate students	$0.000	$10.000	
8–16	promote diversity in the ocean-related workforce (stipends)	$1.000	$3.930	
8–17	promote community education (grants)	$1.250	$12.500	
	Chapter 8 Total	**$25.150**	**$136.370**	
Chapter 9: Managing Coasts and Their Watersheds				
9–1	strengthen the Coastal Zone Management Act	$35.000	$95.000	
9–2	consolidate area-based programs	min	min	
9–3	discourage growth in fragile areas	min	min	
9–4	support watershed initiatives	$20.000	$60.000	
	Chapter 9 Total	**$55.000**	**$155.000**	

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Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy (continued)

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 10: Guarding People and Property Against Natural Hazards				
10–1	review and improve the USACE Civil Works Program	TBD	TBD	cost will depend on the nature of the changes
10–2	improve hazards-related data collection	TBD	TBD	costs to be determined after assessment of needs and capabilities
10–3	recommend changes to the National Flood Insurance Program	min	min	
10–4	support state and local hazards mitigation plans	$2.500	$10.000	
	Chapter 10 Total	**$2.500**	**$10.000**	
Chapter 11: Conserving and Restoring Coastal Habitat				
11–1#	increase coastal and estuarine land conservation funds	$35.000	$70.000	# these estimates do not cover flagship projects such as restoration of the Florida Everglades, Louisiana coastline, Chesapeake Bay, and other areas of national significance
11–2	set national and regional goals for habitat conservation and restoration	min	min	
11–3	allow discretion in the use of conservation funds	min	min	
11–4	digitize and update the National Wetlands Inventory	$5.000	$5.000	
11–5	coordinate a comprehensive wetlands program	TBD	TBD	costs will depend on the extent of programmatic changes needed
	Chapter 11 Total	**$40.000**	**$75.000**	
Chapter 12: Managing Sediment and Shorelines				
12–1	develop a national sediment management strategy	min	min	
12–2	adopt ecosystem-based management approaches at USACE	min	min	
12–3	improve cost/benefit analyses for dredging projects	min	min	
12–4	implement a streamlined, ecosystem-based dredging program	min	min	
12–5*	develop and implement improved sediment research, monitoring, assessments, and technology	$12.500	$72.500	* funds for monitoring included in Rec. 15–1 and for development research in Rec. 25–1
12–6	review USACE project outcomes	min	min	
12–7*	improve contaminated sediment management, assessments, monitoring, and research at EPA	TBD	TBD	* funds for monitoring included in Rec. 15–1 and for research in Rec. 25–1. Costs for improved management will depend on the methods available.
	Chapter 12 Total	**$12.500**	**$72.500**	

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Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy (continued)

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 13: Supporting Marine Commerce and Transportation				
13–1	designate DOT as the lead agency for marine transportation	min	min	
13–2	codify the Interagency Committee for the Marine Transportation System	min	min	
13–3#	create a national freight strategy to plan and implement intermodal projects	min	TBD	# the new strategy will help determine the extent of inter-modal improvements needed
13–4	analyze and assess short sea shipping	$1.500	$0.000	
13–5#	create a national freight flow information collection and analysis program	($1M)	($7.05M)	
13–6	incorporate emergency preparedness in the freight flow strategy	min	min	
	Chapter 13 Total	**$1.500**	**$0.000**	
Chapter 14: Addressing Coastal Water Pollution				
14–1*	require advanced nutrient removal in wastewater and study the impact of chemicals in wastewater	min	min	* funds for research included in Rec. 25–1
14–2	provide assistance to improve septic systems	$0.000	$2.000	
14–3*	support research and develop best management practices for removal of nutrients and pathogens from agricultural lands	$0.000	$2.000	* funds for research included in Rec. 25–1
14–4#	maintain and upgrade wastewater and drinking water infrastructure	($30B)	($30B)	
14–5	experiment with tradeable credits for nutrients and sediments	min	min	
14–6	modernize the National Pollutant Discharge Elimination System's monitoring and information management and strengthen enforcement (staff and budget)	$2.000	$4.500	
14–7	coordinate USDA programs aimed at reducing nonpoint source pollution with those of other agencies	min	min	
14–8	set goals and objectives for reducing nonpoint source pollution	min	min	
14–9	review CZARA section 6217 and CWA section 319 programs and consider consolidation	min	min	
14–10	provide authority for imposing disincentives against programs that degrade water quality	min	min	
14–11	help local governments improve land-use planning to maintain water quality	$0.000	$12.500	
14–12*	implement National Pollutant Discharge Elimination System stormwater programs (additional staff plus grants to state and local governments)	$5.000	$17.300	* funds for monitoring included in Rec. 15–1
14–13	develop regional approaches for reducing atmospheric deposition (staff and grants)	$3.000	$12.600	
14–14*	implement international solutions for addressing atmospheric deposition	$1.000	$3.000	* funds for research included in Rec. 25–1
	Chapter 14 Total	**$11.000**	**$53.900**	

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Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy (continued)

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 15: Creating a National Monitoring Network				
15–1*#	develop a national monitoring network	$10.000	$60.000	* funds for infrastructure included in Ch. 27 # the estimates shown cover only coastal and watershed monitoring; funds needed to achieve improved monitoring nationwide are not included
15–2	coordinate the monitoring network with the IOOS	min	min	
15–3	set goals and design elements for the national monitoring network	min	min	
	Chapter 15 Total	**$10.000**	**$60.000**	
Chapter 16: Limiting Vessel Pollution and Improving Vessel Safety				
16–1	encourage industry to adopt improved voluntary measures	min	min	
16–2#	increase safety and environmental inspections (staff and budget)	$25.000	$65.000	# these estimates are for enhancement of existing vessel inspection activities to better address safety and environmental concerns
16–3	work with the International Maritime Organization to enhance flag state oversight and enforcement	min	min	
16–4	enhance port state control and international vessel information database	min	min	
16–5	establish a new regime for managing wastewater from passenger vessels	$1.000	$1.000	
16–6	review and revise the CWA regulations on marine sanitation devices	$1.500	$0.000	
16–7	assess and increase the availability of pumpout facilities	$10.000	$10.000	
16–8	ratify MARPOL Annex VI to adopt stricter air emission standards	min	min	
16–9	develop incentives for voluntary reduction of air emissions	min	min	
16–10	conduct risk analysis of all oil transportation systems	$1.500	$0.000	
16–11	develop policies and plans for places of refuge	min	min	
16–12	reduce air and water pollution from small vessels	$1.000	$2.000	
16–13*	study and reduce impacts of vessel pollution	TBD	TBD	* funds for research included in Rec. 25–1. Costs of improvement will depend on the strategies employed.
16–14#	support ocean and coastal management needs while implementing Maritime Domain Awareness	$0.000	$10.000	# these estimates are for enhancement of existing Maritime Domain Awareness activities to better address ocean and coastal management needs
	Chapter 16 Total	**$40.000**	**$88.000**	

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Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy (continued)

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 17: Preventing the Spread of Invasive Species				
17–1*	improve the national ballast water management program	min	min	* funds for research included in Rec. 25–1
17–2	review and improve ballast water research and demonstration programs	$1.500	TBD	first year cost covers a review of existing R&D which will determine the scope of the ongoing program
17–3	employ existing legal authorities to prohibit imports of invasive species	min	min	
17–4*	coordinate public education and outreach efforts	*	*	* funds included in Rec. 8–17
17–5*	implement early detection and notification plans	$30.000	$50.000	* funds for monitoring included in Rec. 15–1
17–6	coordinate, consolidate, and improve invasive species programs	TBD	TBD	costs of improvement will depend on the strategies employed
17–7	lead international actions to control invasive species	min	min	
17–8*	coordinate interagency research and monitoring to address invasive species	*	*	*funds for monitoring included in Rec. 15–1 and for research in Rec. 25–1
	Chapter 17 Total	**$31.500**	**$50.000**	
Chapter 18: Reducing Marine Debris				
18–1	establish a marine debris management program in NOAA	$1.000	$2.000	
18–2	coordinate and implement expanded marine debris control efforts	$1.000	$3.000	
18–3	re-establish an interagency marine debris committee	min	min	
18–4	develop an international plan of action for addressing derelict fishing gear	min	min	
18–5	create incentives to dispose of derelict fishing gear	min	min	
18–6	ensure availability of adequate port reception facilities	min	min	
	Chapter 18 Total	**$2.000**	**$5.000**	
Chapter 19: Achieving Sustainable Fisheries				
19–1	expand the role of SSCs (SSC stipends)	$3.600	$7.200	
19–2	require SSCs to supply needed information	min	min	
19–3	set harvest levels at or below allowable biological catch	min	min	
19–4	ensure peer review of SSC findings	$0.400	$1.600	
19–5	set deadline for SSCs to determine allowable biological catch	min	min	
19–6	require that proposed fishery management plans be submitted with enough time for sufficient review	min	min	
19–7	develop and communicate annual RFMC information needs	min	min	
19–8	require licenses for saltwater anglers to improve data collection	min	min	
19–9	expand cooperative fishery research	$3.000	$10.000	
19–10	develop new statutory authority to support the Gulf States and Pacific States Fisheries Management Commissions	$3.000	$7.500	
19–11	designate lead authorities for interjurisdictional fisheries	min	min	

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Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy (continued)

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 19 (continued): Achieving Sustainable Fisheries				
19–12	require governors to submit a broad slate of candidates for vacant RFMC seats	min	min	
19–13	give the NOAA Administrator responsibility for appointing RFMC members	min	min	
19–14	require all new RFMC members to complete a training course (new course developed, course offered 4 times/ year, participant travel covered)	$0.650	$0.250	
19–15	authorize RFMC use of dedicated access privileges	min	min	
19–16	repeal programs that encourage overcapitalization of fishing fleets and take steps to permanently reduce fishing capacity	TBD	TBD	costs to permanently reduce capacity will depend on the strategies employed
19–17	increase funding for Joint Enforcement Agreements	$6.000	$12.000	
19–18	strengthen cooperative fishery enforcement efforts	$0.300	$0.300	
19–19	require Vessel Monitoring Systems on all fishing boats	min	min	
19–20	integrate the Vessel Monitoring System database into the larger maritime operations database	min	min	
19–21*	improve essential fish habitat designations	$5.000	$15.000	* funds for research included in Rec. 25–1
19–22	develop and implement regional bycatch reduction plans	$5.000	$30.000	
19–23	expand the NMFS program in conservation engineering	$1.000	$2.000	
19–24	encourage all countries to ratify the Fish Stocks Agreement and the UN FAO Compliance Agreement	min	min	
19–25	review and update regional and bilateral fishery agreements; fully fund U.S. fisheries treaty commitments	$1.000	$2.000	
19–26	implement International Plans of Action in the United States	TBD	TBD	implementation costs will depend on the scope of the U.S. plan
19–27	improve implementation of international fisheries treaties	TBD	TBD	implementation costs will depend on the strategies employed
	Chapter 19 Total	**$28.950**	**$87.850**	
Chapter 20: Protecting Marine Mammals and Endangered Marine Species				
20–1	require the Marine Mammal Commission to coordinate with the National Ocean Council	min	min	
20–2	place the protection of all marine mammals within the jurisdiction of NOAA	min	min	
20–3	improve coordination between NMFS and USFWS with respect to the Endangered Species Act	min	min	
20–4	expand cooperative agreements with states under Section 6 of the Endangered Species Act	$1.000	$4.000	
20–5	clarify Marine Mammal Protection Act permitting	min	min	
20–6	revise the Marine Mammal Protection Act definition of harassment	min	min	
20–7	implement programmatic permitting under the MMPA (staff and budget)	$1.000	$2.000	
20–8*	examine and mitigate the effects of human activities on marine mammals and endangered species	$5.000	$10.000	* funds for research included in Rec. 25–1

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Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 20 (continued): Protecting Marine Mammals and Endangered Marine Species				
20–9*	expand research on ocean acoustics and the potential impacts on marine species	($10M)	($20M)	* this entire research budget is included in Rec. 25–1
20–10	improve international efforts	min	min	
	Chapter 20 Total	**$7.000**	**$16.000**	
Chapter 21: Preserving Coral Reefs and Other Coral Communities				
21–1*	establish a Coral Protection and Management Act to enhance research, protection, management, and restoration of coral ecosystems	$5.000	$20.000	* funds for research included in Rec. 25–1
21–2	codify and strengthen the U.S. Coral Reef Task Force	min	min	
21–3*	designate NOAA as the lead agency for managing deep-water corals	$1.000	$3.000	* funds for research included in Rec. 25–1
21–4	develop standards for the sustainable harvest of coral reef resources	$1.200	$2.200	
21–5	develop regional, ecosystem-based research plans	min	min	
	Chapter 21 Total	**$7.200**	**$25.200**	
Chapter 22: Setting a Course for Sustainable Marine Aquaculture				
22–1	designate NOAA as the lead agency for marine aquaculture and create an Office of Sustainable Marine Aquaculture in NOAA (small staff and budget)	$1.000	$2.000	
22–2	develop a comprehensive aquaculture permitting, leasing, and regulatory program	min	min	
22–3*	expand marine aquaculture research, development, training, extension, and technology transfer	$2.000	$5.000	* funds for research included in Rec. 25–1
22–4	work with the UN FAO to encourage and facilitate international standards	min	min	
	Chapter 22 Total	**$3.000**	**$7.000**	
Chapter 23: Connecting the Oceans and Human Health				
23–1*	expand research and development on marine bioproducts	*	*	* funds included in Rec. 23–4
23–2*	expand research on marine microbiology and virology	*	*	* funds included in Rec. 23–4
23–3*	support development of technologies to detect pathogens and toxins	*	*	* funds included in Rec. 23–4
23–4*	establish an expanded Oceans and Human Health Initiative	($10M)	($14M)	* this entire research budget is included in Rec. 25–1
23–5*	fully implement programs to ensure seafood safety and coastal water quality	$2.000	$10.000	* cost shown here covers expanded seafood monitoring; costs of improving and monitoring water quality are included in Chapters 14 and 15
	Chapter 23 Total	**$2.000**	**$10.000**	
Chapter 24: Managing Offshore Energy and Other Mineral Resources				
24–1*	provide a portion of OCS revenues to states for conservation and sustainable development of renewable resources	*	*	* funds included in Rec. 30–1
24–2*	expand the MMS Environmental Studies Program	($12M)	($38M)	* this entire research budget is included in Rec. 25–1

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Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 24 (continued): Managing Offshore Energy and Other Mineral Resources				
24–3	include the oil and gas industry as partners in developing and implementing the IOOS	min	min	
24–4	review the status of methane hydrates research and development	TBD	TBD	future investments in methane hydrates research and development will depend on the outcome of the review
24–5	enact legislation to manage offshore renewable energy development (additional staff and budget)	$0.900	$1.800	
24–6	identify offshore non-energy mineral resources and examine possible uses (additional staff and budget)	$1.000	$7.000	
	Chapter 24 Total	**$1.900**	**$8.800**	
Chapter 25: Creating a National Strategy for Increasing Scientific Knowledge				
25–1	double ocean research funding	$200.000	$650.000	includes all of Recs. 20–9, 23–4, 24–2, 25–3, 25–4, and 29–6 and parts of other recommendations in Chapters 12, 14, 16, 17, 19, 20, 21, and 22
25–2	develop a national ocean research strategy	min	min	
25–3*	create a national program for social science and economic research	($5M)	($10M)	* this entire budget is included in Rec. 25–1
25–4*	expand the National Sea Grant College Program	($20M)	($60M)	* this entire budget is included in Rec. 25–1
25–5	improve federal research funding processes	min	min	
25–6*	expand ocean exploration efforts	$30.000	$110.000	* funds for infrastructure included in Rec. 27–4
25–7	coordinate and complete federal mapping and charting missions and data integration	$50.000	$200.000	
25–8#	re-establish the Office of Technology Assessment	($4M)	($18M)	
	Chapter 25 Total	**$280.000**	**$960.000**	
Chapter 26: Achieving a Sustained, Integrated Ocean Observing System				
26–1	make the IOOS a NOC priority	min	min	
26–2	designate Ocean.US as the lead for planning and NOAA as the lead for operating the IOOS	min	min	
26–3	codify Ocean.US (small staff and budget)	$3.000	$3.000	
26–4	seek input from ocean and coastal stakeholder communities	min	min	
26–5	specify core variables for IOOS	min	min	
26–6	require plans for transitioning research results to operations	min	min	
26–7	coordinate priorities and schedules for satellite missions	min	min	
26–8	transfer the ongoing operation of Earth observing satellites to NOAA	$40.000	$150.000	
26–9*	improve satellite data management at NOAA	*	*	* funds included in Rec. 26–8
26–10*	create information products based on broad user needs	*	*	* funds included in Recs. 26–11 and 28–2

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Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy (continued)

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 26 (continued): Achieving a Sustained, Integrated Ocean Observing System				
26–11	implement the IOOS (including ongoing technology development)	$188.000	$600.000	current IOOS implementation plans call for a 5 year ramp-up to full operation
26–12	integrate the IOOS into broader Earth observations	min	min	
26–13	promote international coordination and capacity building	min	min	
	Chapter 26 Total	**$231.000**	**$753.000**	
Chapter 27: Enhancing Ocean Infrastructure and Technology Development				
27–1	develop a national ocean and coastal infrastructure and technology strategy	min	min	
27–2	create an Office of Technology Transfer in NOAA (small staff and grants)	$0.900	$16.800	
27–3	conduct periodic assessments of U.S. ocean and coastal infrastructure and technology	min	min	
27–4	improve science-related infrastructure (includes UNOLS fleet renewal@$445M over 20 yrs., 2 Coast Guard icebreakers@$1.2B, ocean drilling ship@$100M, 2 deep submergence vehicles@$25M, 2 NOAA fisheries research vessels@$104M, ocean exploration platforms and equipment@$160M, renewal of NOAA airfleet@$264M over 20 yrs., and the modernization of laboratories and other facilities, major instruments, and telecommunications)	$200.000	$150.000	covers new construction and upgrades to critical science facilities, estimated at around $3B over the next 20 years. Actual annual spending levels will depend on the scheduling of these major purchases
27–5#	improve operational ocean and coastal infrastructure (includes Coast Guard fleet@$17B over 20 yrs., other agencies' fleets, operational satellites, monitoring stations, and other federal facilities)	#	#	estimates for ongoing maintenance and improvement of operational infrastructure have not been provided and are not included in Commission totals
27–6	establish virtual marine technology centers (five centers)	$5.000	$25.000	
	Chapter 27 Total	**$205.900**	**$191.800**	
Chapter 28: Modernizing Ocean Data and Information Systems				
28–1	create Ocean.IT (small staff and budget)	$1.000	$3.000	
28–2	establish a NOAA–Navy ocean and coastal information management and communications partnership	$5.000	$20.000	
28–3	improve access to ocean and coastal data by creating software for data discovery and transport	$8.000	$1.000	a total of $34M will be needed over the first five years for the design and implementation of new software, with lower ongoing operational costs
28–4	establish data reporting requirements and deadlines	min	min	
28–5	review and declassify appropriate Navy oceanographic data	min	min	
28–6	plan for an integrated Earth environmental data system	TBD	TBD	costs of implementing the new system will depend on the strategies employed
	Chapter 28 Total	**$14.000**	**$24.000**	

"TBD"	to be determined, indicates that future funds are likely to be required, but the amount can only be determined after further review
"min"	indicates that the cost is either zero or small enough to be absorbed within existing budgets
*	indicates that some or all of the costs are included in another recommendation
#	indicates that some or all of the recommendation's costs are of national scope and are not included here
($xx)	numbers in parentheses are not included in totals

Detailed Costs Associated with Recommendations of the U.S. Commission on Ocean Policy (continued)

Rec.		1st Year Cost (millions of dollars)	Ongoing Annual Cost (millions of dollars)	Comments
Chapter 29: Advancing International Ocean Science and Policy				
29–1	accede to the UN Convention on the Law of the Sea	min	min	
29–2	review ocean-related components of the UN Convention on Biological Diversity	min	min	
29–3	establish an interagency committee within the National Ocean Council focused on international ocean policy	min	min	
29–4	assess emerging international ocean-related management challenges	min	min	
29–5	improve the State Department's integration of scientific expertise in ocean-related fields (staff training and borrowed personnel)	$0.900	$1.950	
29–6*	participate in international ocean science organizations and programs	*	*	* funds included in Rec. 25–1
29–7	assist U.S. scientists conducting research in international or foreign waters (staff and budget)	$0.360	$0.900	
29–8	enhance ocean science and management capacity in other nations	$2.000	$5.000	
	Chapter 29 Total	**$3.260**	**$7.850**	
Chapter 30: Funding Needs and Possible Sources				
30–1	a) create the Ocean Policy Trust Fund b) provide support for state, territorial, and tribal ocean and coastal responsibilities	min $500.000	min $1,000.000	
30–2	compile biennial ocean budget reports	min	min	
	Chapter 30 Total	**$500.000**	**$1,000.000**	
GRAND TOTAL		$1,536.072	$3,869.944	

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