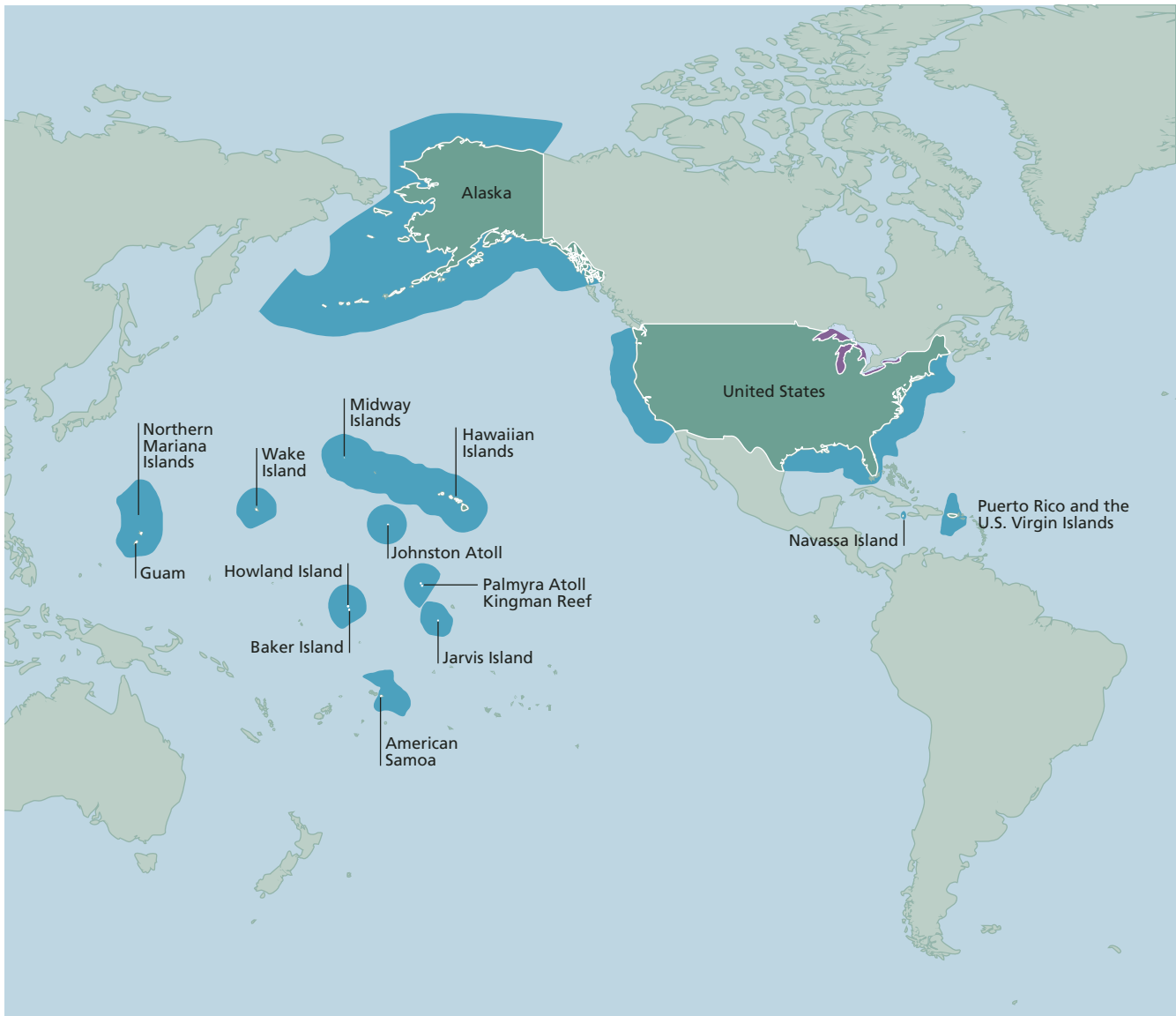


## The United States Is an Ocean Nation

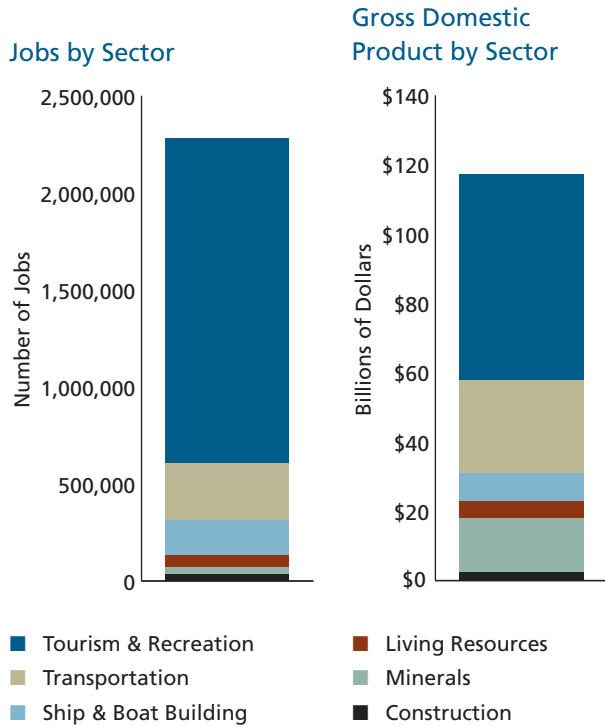


■ United States Exclusive Economic Zone ■ Great Lakes of the United States

The U.S. exclusive economic zone (EEZ) extends 200 nautical miles offshore, encompassing diverse ecosystems and vast natural resources, such as fisheries and energy and other mineral resources. The U.S. EEZ is the largest in the world, spanning over 13,000 miles of coastline and containing 3.4 million square nautical miles of ocean—larger than the combined land area of all fifty states. (A square nautical mile is equal to 1.3 square miles.)

U.S. states also have jurisdiction over a significant portion of the Great Lakes. This chain of freshwater lakes and its tributaries constitute the largest reservoir of fresh surface water on the planet, containing 6.5 quadrillion gallons of fresh water and covering an area of about 72,000 square nautical miles. The Great Lakes' U.S. coastline borders eight states and is roughly the same length as the entire Atlantic Coast.

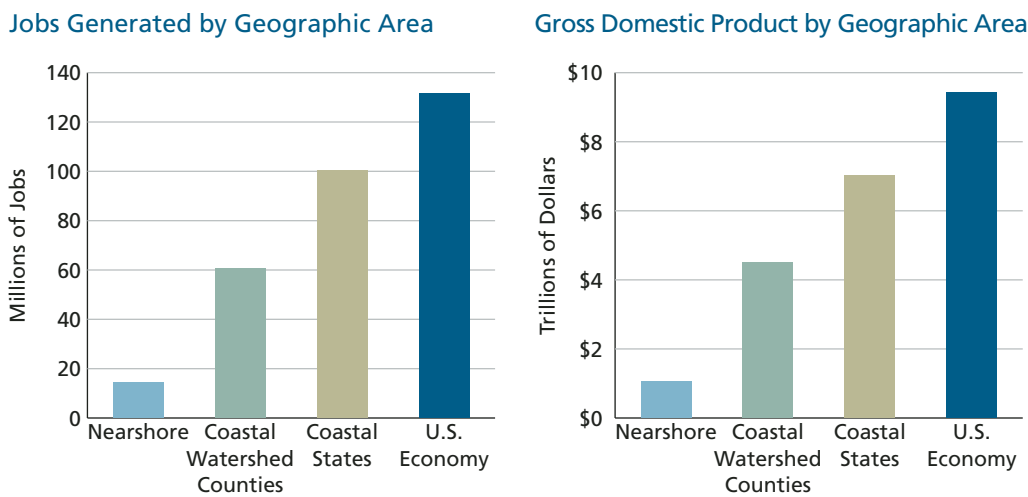
**Figure 1.1 The Value of the Oceans**



The ocean economy includes activities that rely directly on ocean attributes or that take place on or under the ocean. In 2000, Tourism and Recreation was the largest sector in the ocean economy, providing approximately 1.6 million jobs.

Source: Living Near and Making a Living from the Oceans, Appendix C.

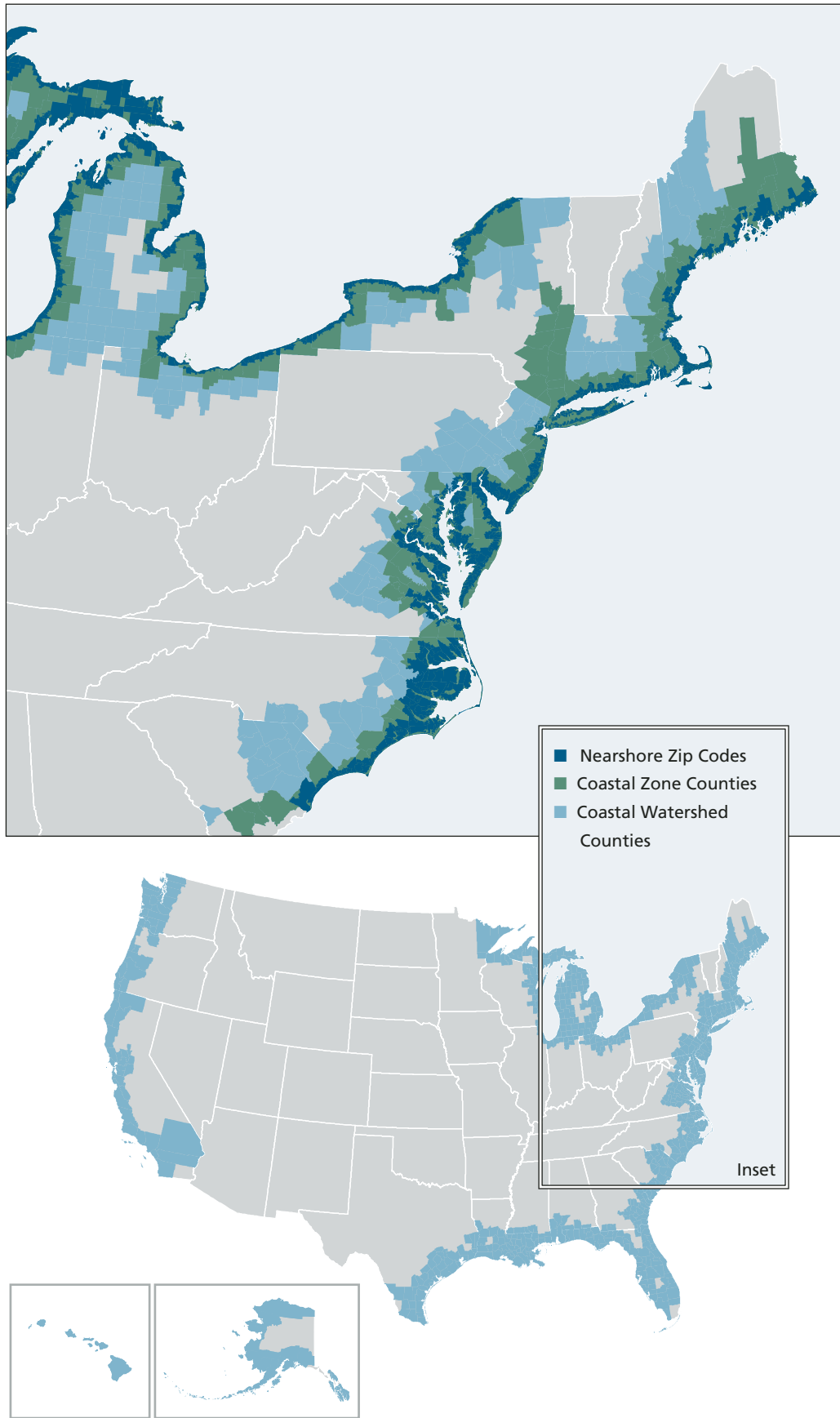
**Figure 1.2 The Value of the Coasts**



Coastal watershed counties, which account for less than a quarter of U.S. land area, are significant contributors to the U.S. economy. In 2000, they were home to nearly half of the nation's jobs and generated a similar proportion of the nation's gross domestic product.

Source: Living Near and Making a Living from the Oceans, Appendix C.

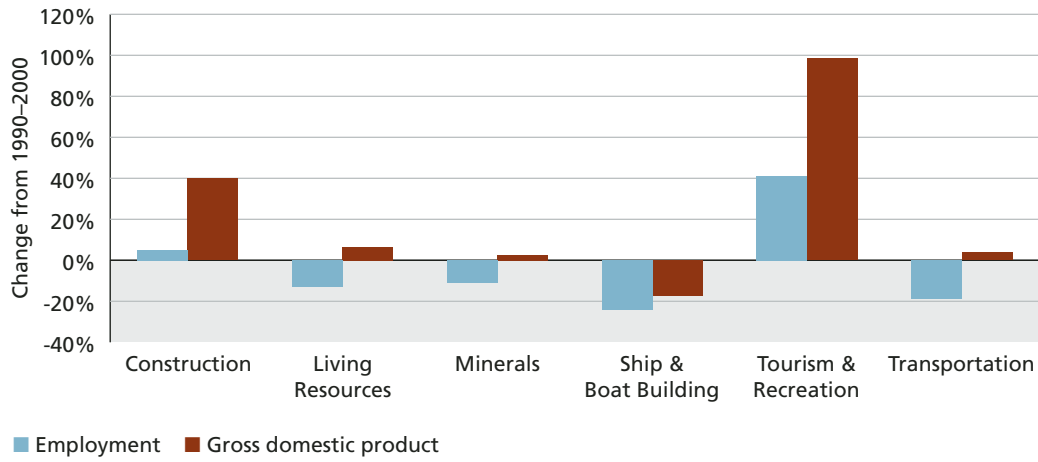
Figure 1.3 The Coasts: From the Nearshore to Coastal Watersheds



Varying interpretations of the geographic area encompassed by “the coast” have hampered our ability to quantify the economic and ecologic importance of this dynamic region. Defining distinct regions, including the nearshore, the coastal zone, and coastal watersheds, provides scientists and decision makers with clear boundaries as they develop policies and investigate coastal processes.

Source: Living Near and Making a Living from the Oceans, Appendix C.

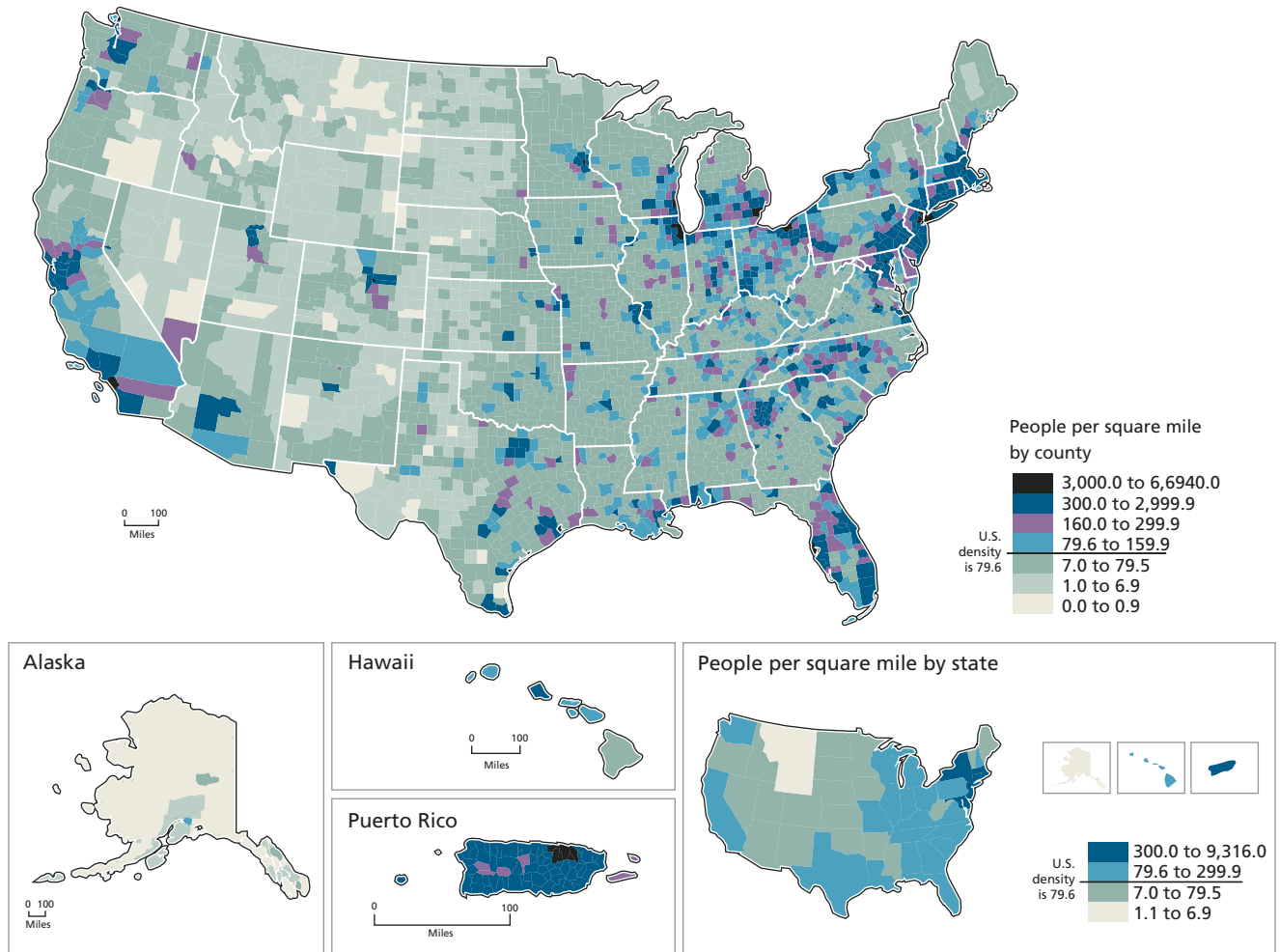
**Figure 1.4 The Shift from Goods to Services in the Ocean Economy**



Between 1990 and 2000, the ocean economy experienced a significant increase in the importance of service-oriented activities. This trend is clearly illustrated by the dramatic increase in both employment and output associated with tourism and recreation. Shifts in employment and revenue in the traditional goods-producing sectors—minerals, living resources, transportation, ship and boat building—were affected by changes in technology, national priorities, and the status of living and nonliving resources.

Source: Living Near and Making a Living from the Oceans, Appendix C.

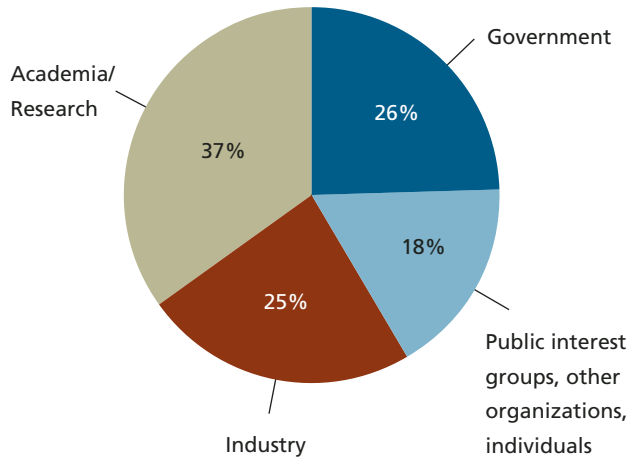
**Figure 1.5 Population Density Peaks Near the Shore**



As shown by 2000 U.S. Census figures, population density is generally highest in coastal areas, including counties surrounding the Great Lakes. Population growth and increasing population density in coastal counties reflect the attraction of the coast but also result in increased environmental impacts on coastal ecosystems.

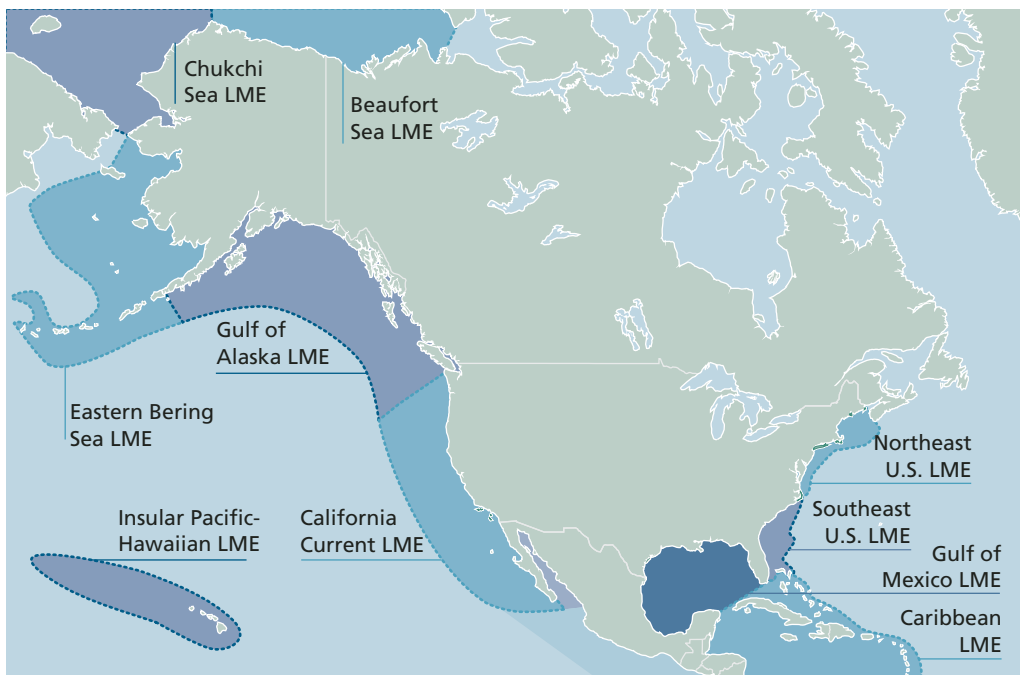
Source: U.S. Census Bureau. "Census 2000." <[www.census.gov](http://www.census.gov)> (Accessed March 2004).

**Figure 2.1 Invited Panelists Represented All Sectors of the Ocean Community**



A breakdown of the 275 panelists invited to present testimony before the U.S. Commission on Ocean Policy illustrates the breadth of input received.

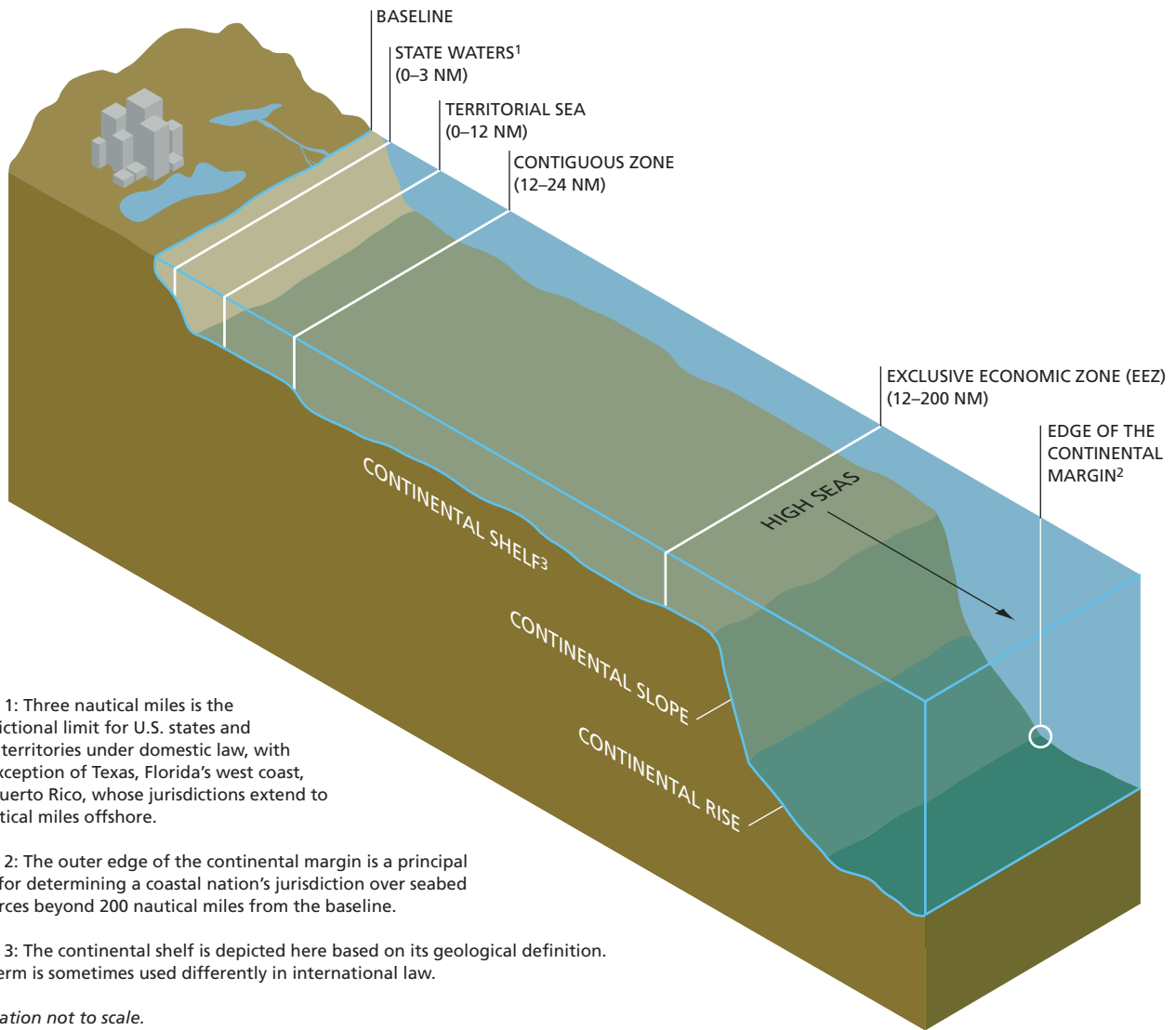
**Figure 3.1 Large Marine Ecosystems Correspond to Natural Features**



Ten large marine ecosystems (LMEs) have been identified for the United States. These LMEs are regions of the ocean starting in coastal areas and extending out to the seaward boundaries of continental shelves and major current systems. They take into account the biological and physical components of the marine environment as well as terrestrial features such as river basins and estuaries that drain into these ocean areas.

Source: University of Rhode Island Environmental Data Center, Department of Natural Resources.  
<<http://mapper.edc.uri.edu/website/lmeims/viewer.htm>> (Accessed January 2004).

Figure P.1 Lines of U.S. Authority in Offshore Waters



NOTE 1: Three nautical miles is the jurisdictional limit for U.S. states and some territories under domestic law, with the exception of Texas, Florida's west coast, and Puerto Rico, whose jurisdictions extend to 9 nautical miles offshore.

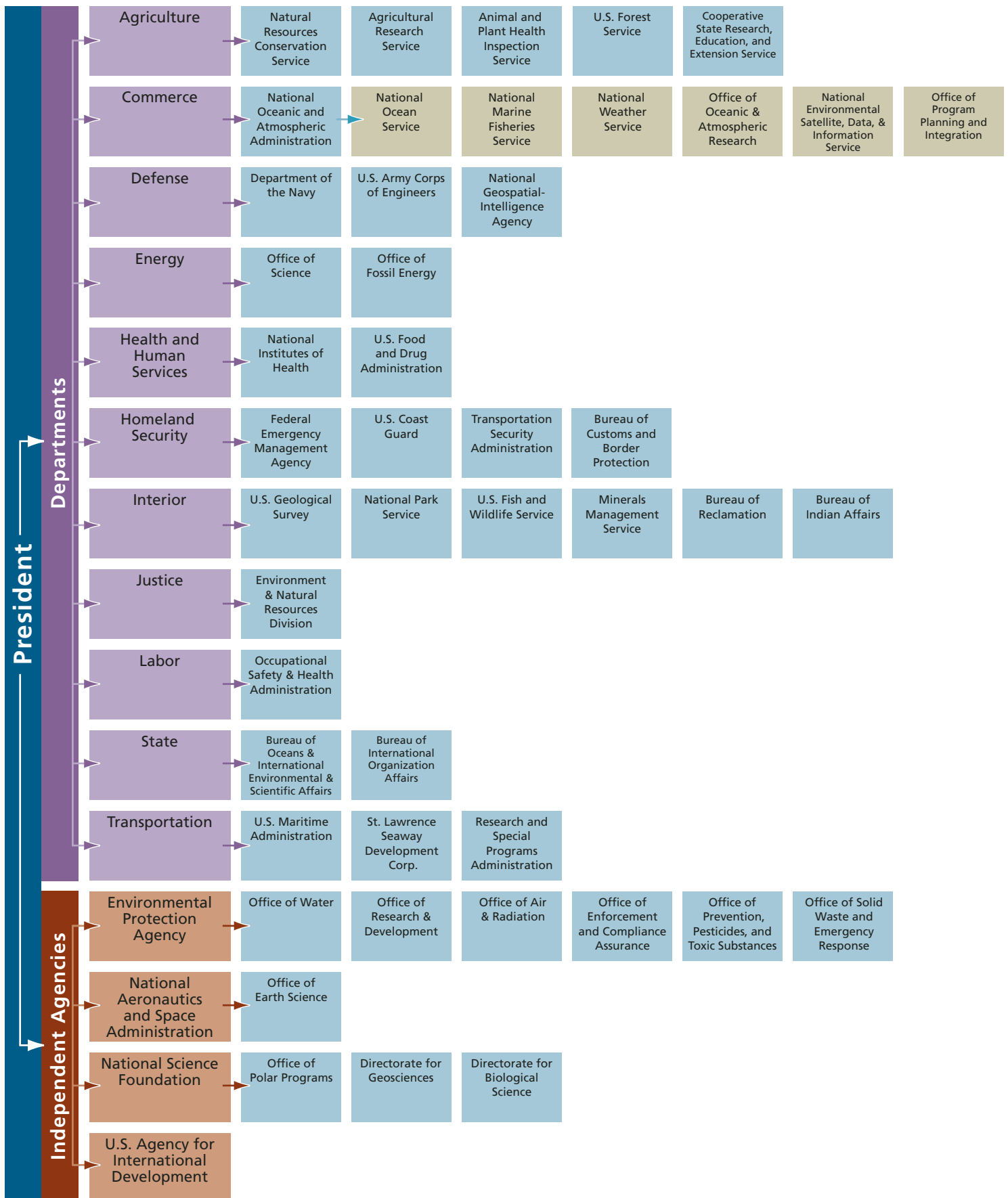
NOTE 2: The outer edge of the continental margin is a principal basis for determining a coastal nation's jurisdiction over seabed resources beyond 200 nautical miles from the baseline.

NOTE 3: The continental shelf is depicted here based on its geological definition. The term is sometimes used differently in international law.

*Illustration not to scale.*

Several jurisdictional zones exist off the coast of the United States for purposes of international and domestic law. Within these zones, the United States asserts varying degrees of authority over offshore activities, including living and nonliving resource management, shipping and maritime transportation, and national security. A nation's jurisdictional authority is greatest near the coast.

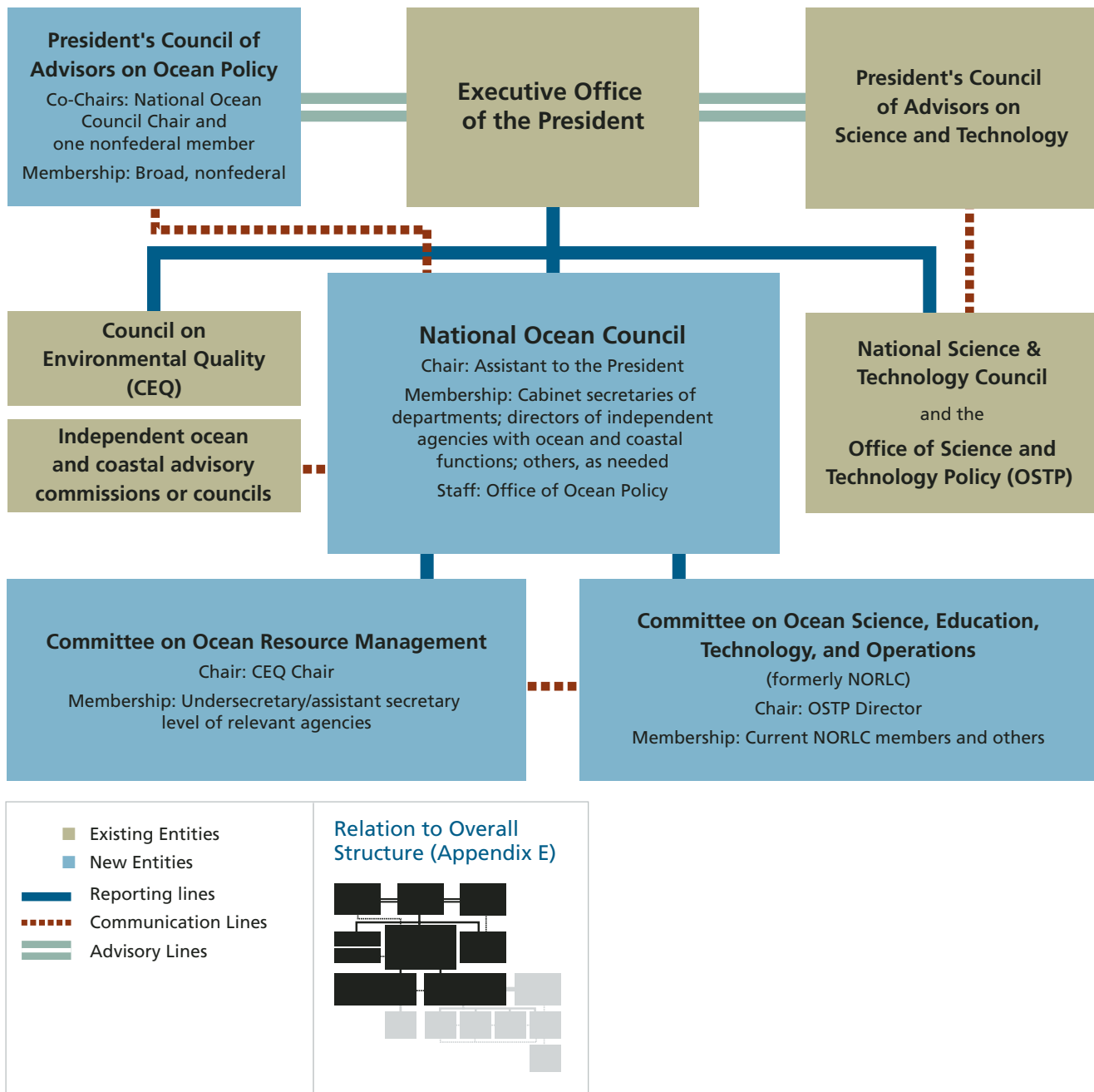
Figure 4.1 Ocean and Coastal Activities Are Conducted by Many Federal Departments and Agencies



The agencies and departments depicted have varying ocean and coastal responsibilities. Their number and variety make it clear that coordination is essential to effectively manage the nation's oceans and coasts.

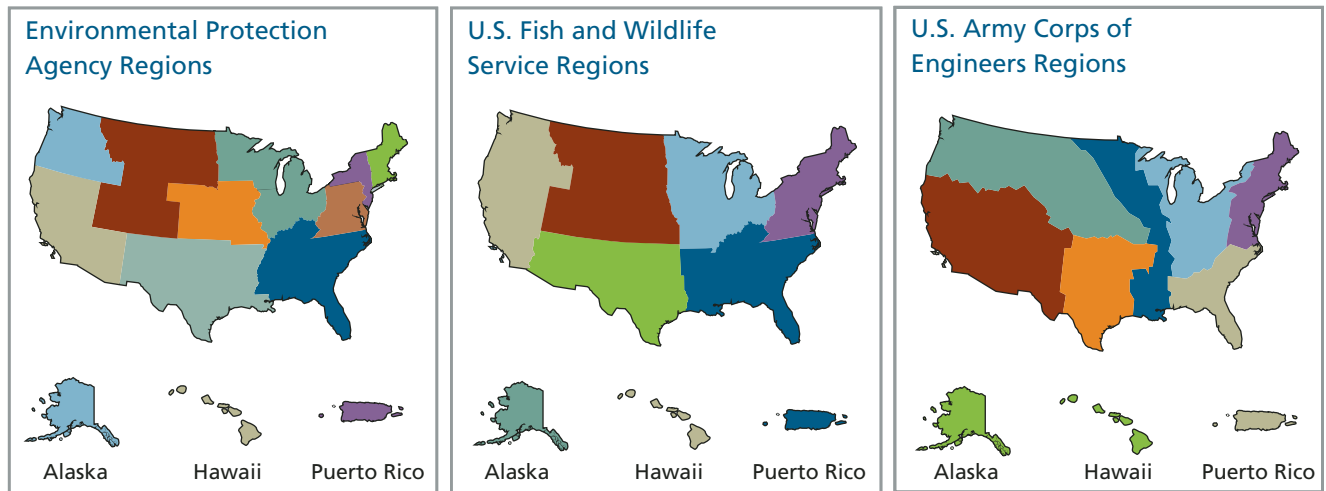


**Figure 4.2 Proposed Structure for Coordination of Federal Ocean Activities**



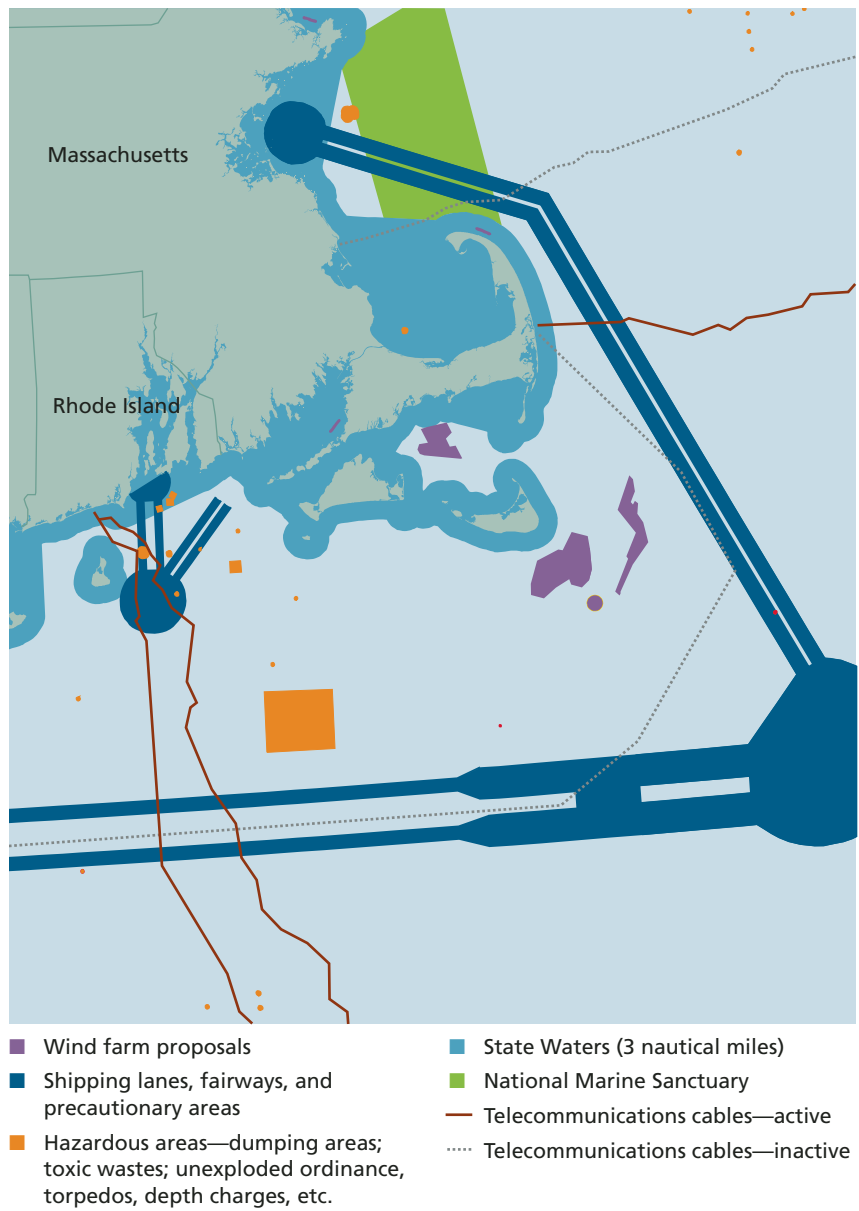
Shown here are the institutional components that should be established in the Executive Office of the President (EOP) to improve federal leadership and coordination of the nation's oceans and coasts. This diagram also illustrates the organizational relationship between these new components and existing units in the EOP. The components located under the Committee on Ocean Science, Education, Technology, and Operations (shown in grey in the inset) are discussed in Chapters 8 and 25.

**Figure 5.1 Alignment of Federal Regions Is Essential for Communication**



Shown above are the existing regional management areas for three federal agencies. Because these areas do not coincide, it is difficult for the agencies to coordinate and communicate about issues of common concern at the regional level. Furthermore, this lack of coordination impedes their ability to effectively interact with regional, state, territorial, tribal, and local entities on a regional basis.

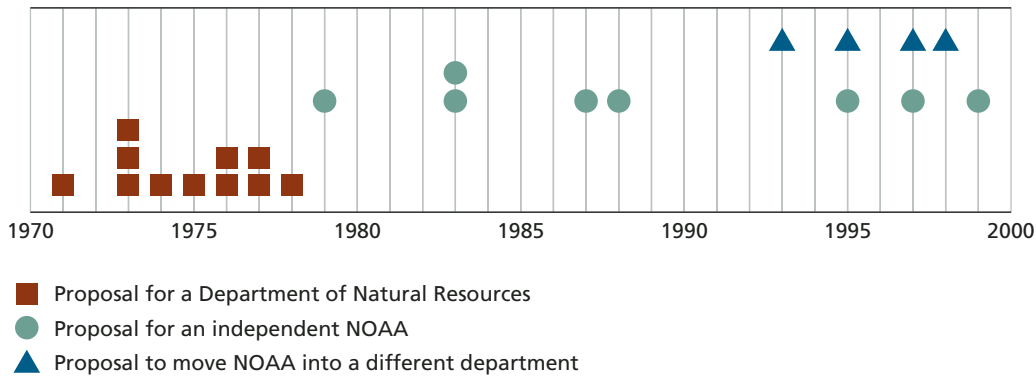
Figure 6.1 Coordination Is Essential in Busy Offshore Waters



Like many offshore areas of the nation, the waters off a small portion of the New England coast are home to a number of existing and proposed activities. In addition to the uses shown above, many offshore areas also contain dredging projects, marine protected areas, fishery closures, recreational activities, artificial reefs, and in certain coastal regions, oil and gas development. User conflicts can and do arise when incompatible activities take place in the same area. A comprehensive offshore management regime is needed for the balanced coordination of all offshore uses.

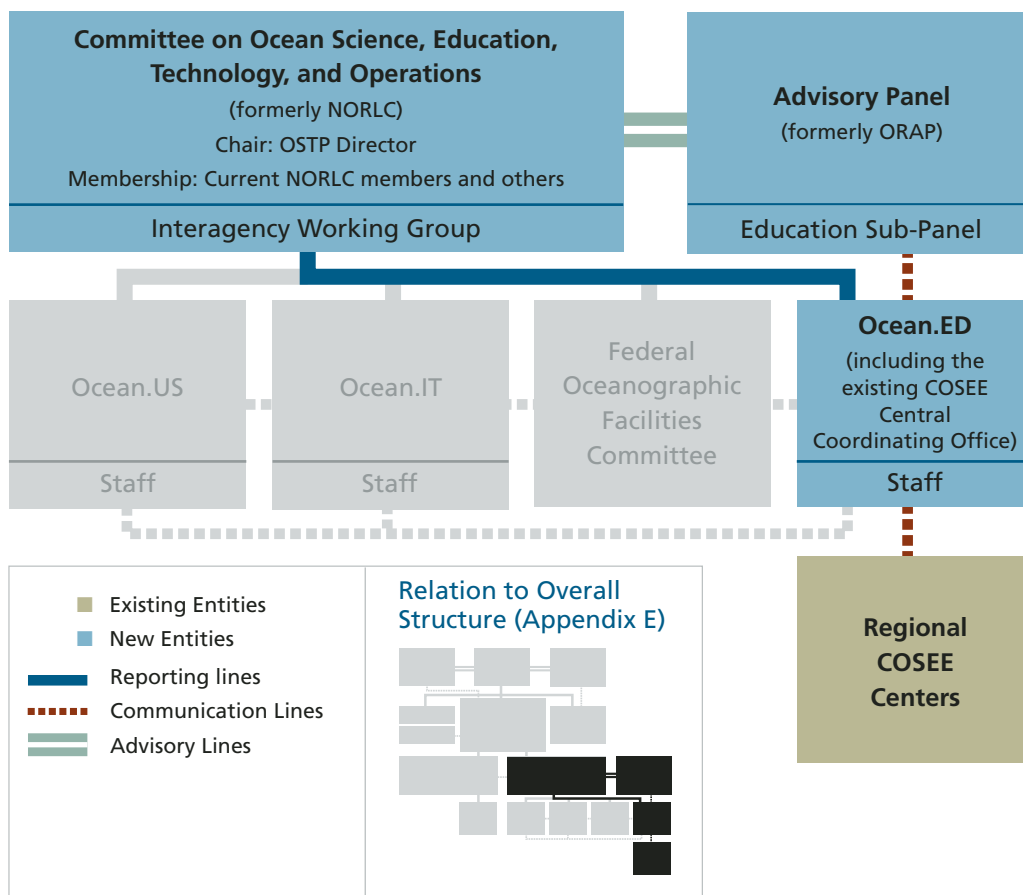
Source: Minerals Management Service, Washington, DC.

**Figure 7.1 Proposals to Reorganize Federal Ocean Management**



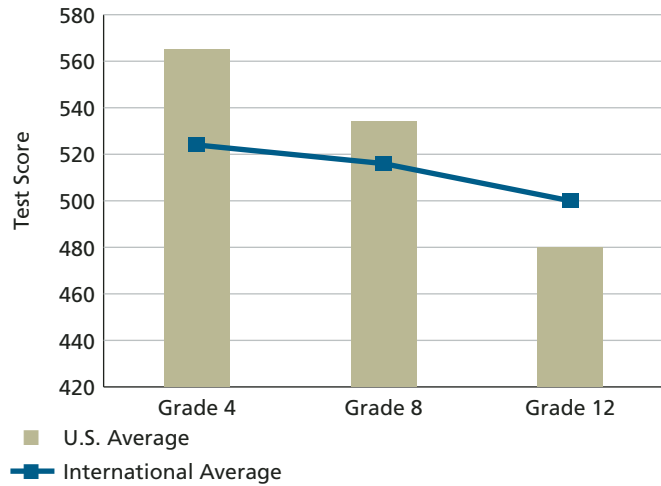
Since 1970, there have been many congressional, presidential, and federal advisory committee proposals to consolidate the management of natural resources, including oceans, within the federal government (Table 7.1). Most recently, proposals have focused on establishing NOAA as an independent agency, or moving it out of the Department of Commerce to a more compatible home.

**Figure 8.1 Proposed Structure for the Coordination of Federal Ocean Education Activities**



Shown here are the institutional components that should be established under the Committee on Ocean Science, Education, Technology, and Operations (COSETO, described in Chapter 4) to improve federal leadership and coordination in ocean education. This diagram also illustrates the links between education components and other units under COSETO. Entities shaded in gray are discussed in Chapter 25.

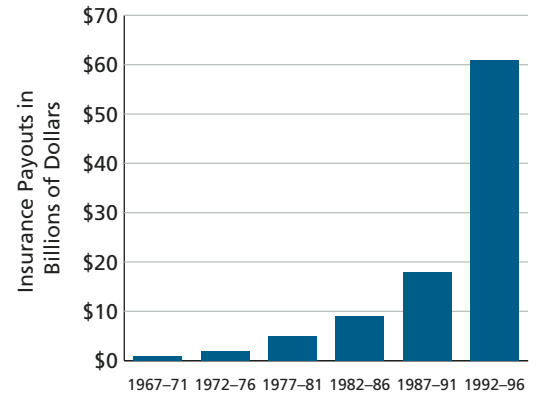
**Figure 8.2 U.S. Students Fall Behind in Science Knowledge**



U.S. students in fourth grade score above the international average in science achievement, according to the Trends in International Mathematics and Science Study. However, as students approach their final year in secondary school, the performance in U.S. schools drops well below the international average.

Source: Calsyn, C., P. Gonzales, and M. Frase. *Highlights from TIMSS [Trends in International Mathematics and Science Study]*. Washington, DC: National Center for Education Statistics, 1999.

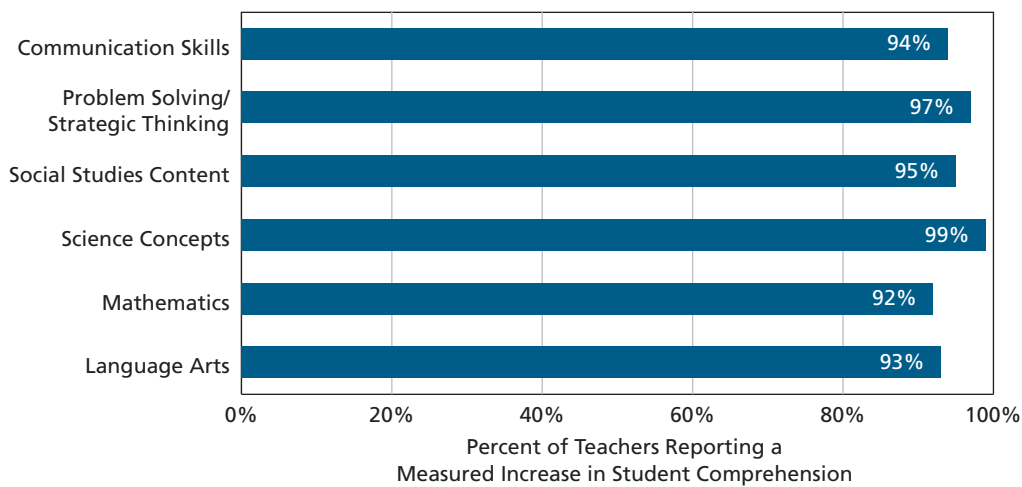
**Figure 10.1 The Growing Cost of Natural Disasters**



In the thirty years between 1967 and 1996, insurance companies have experienced a 6,000 percent increase in payouts to federal and private insurance holders for damages due to natural catastrophes.

Source: Consumer Federation of America. *America's Disastrous Disaster System*. Washington, DC, January 1998.

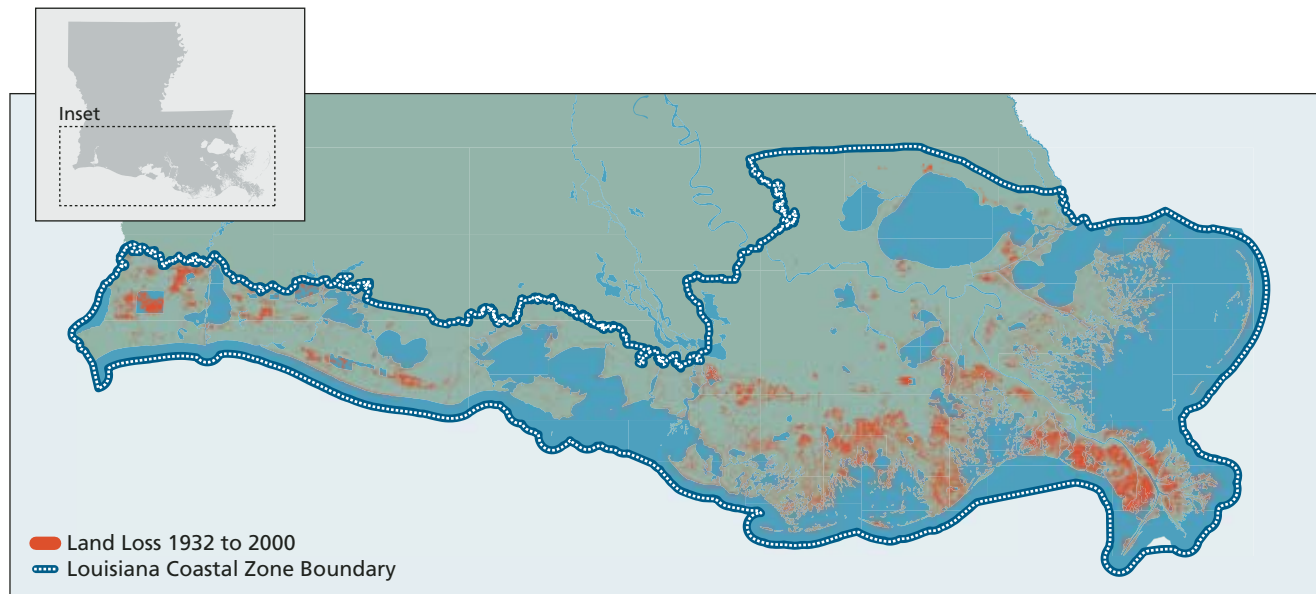
**Figure 8.3 Environment-based Education Boosts Overall Academic Achievement**



In a recent study, a high percentage of teachers reported increased student achievement when natural and sociocultural environments were used as a context for learning a range of subjects.

Source: Lieberman, G.A., and L.L. Hoody. *Closing the Achievement Gap: Using the Environment as an Integrated Context for Learning*. Poway, CA: Science Wizards, 1998.

**Figure 11.1 Dramatic Coastal Land Loss in Louisiana**



From 1932 to 2000, coastal Louisiana lost 1,900 square miles of land—an area roughly equivalent to the size of Delaware. An additional 700 square miles could potentially be lost over the next fifty years if no new restoration takes place, putting more than 2 million coastal residents at risk from floods and storms.

Source: U.S. Geological Survey. "Without Restoration, Coastal Land Loss to Continue." News release. [http://www.nwrc.usgs.gov/releases/pr03\\_004.htm](http://www.nwrc.usgs.gov/releases/pr03_004.htm) (Accessed January 2004). Map Source: U.S. Geological Survey, Lafayette, LA.

**Figure 12.1 Dams Impede Sediment  
Destined for the Coast**

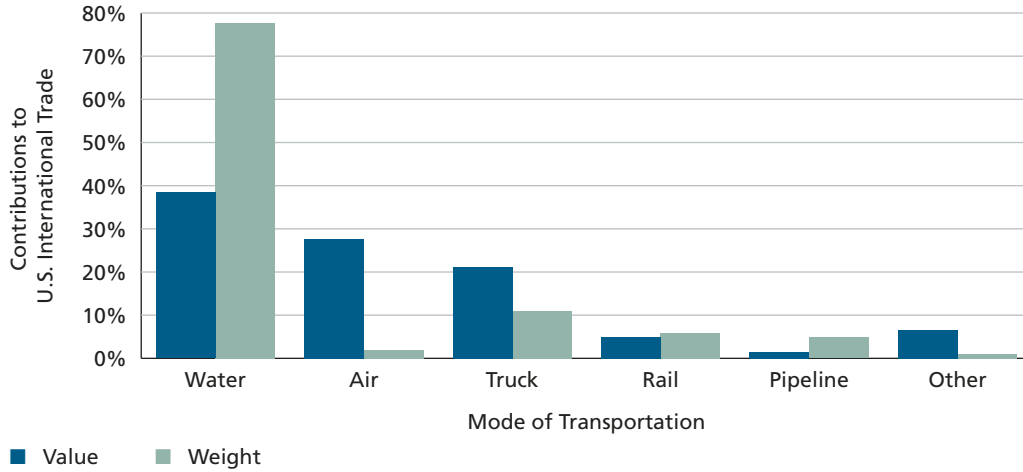


■ Dam

To support California's exponential population growth, over 1,400 dams have been constructed across the state for a number of purposes, including water storage, irrigation, flood control, recreation, and hydroelectric power. However, dams constructed in coastal watersheds block the flow of sediments needed for natural beach replenishment.

Source: California Department of Boating and Waterways. "California Beach Restoration Study." <<http://dbw.ca.gov/beachreport.htm>> (Accessed May 2004).

**Figure 13.1 Ports are the Primary Gateway for International Trade**



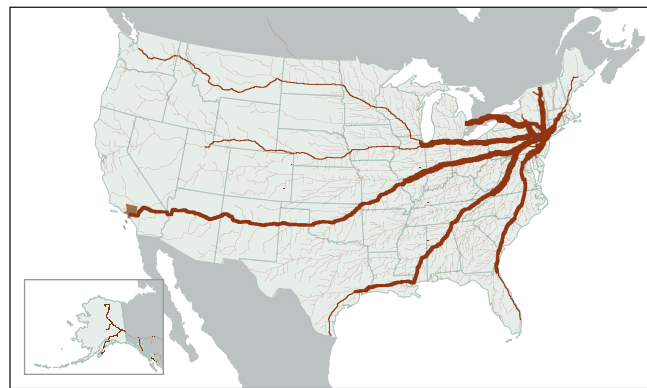
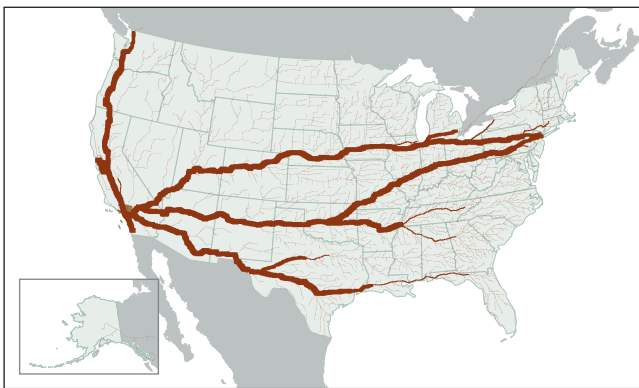
In 2001, U.S. ports were major gateways for international trade. Waterborne commerce accounted for 78 percent of total U.S. international trade by weight (1,643 million tons) and 38 percent by value (\$718 billion).

Source: U.S. Department of Transportation, Bureau of Transportation. "U.S. International Trade and Freight Transportation Trends 2003." [http://www.bts.gov/publications/us\\_international\\_trade\\_and\\_freight\\_transportation\\_trends/2003/](http://www.bts.gov/publications/us_international_trade_and_freight_transportation_trends/2003/) (Accessed May 2004).

**Figure 13.2 Goods Traveling through U.S. Ports Are Transported Nationwide**

Los Angeles/Long Beach

New York and New Jersey



**Network Flows (tons)**

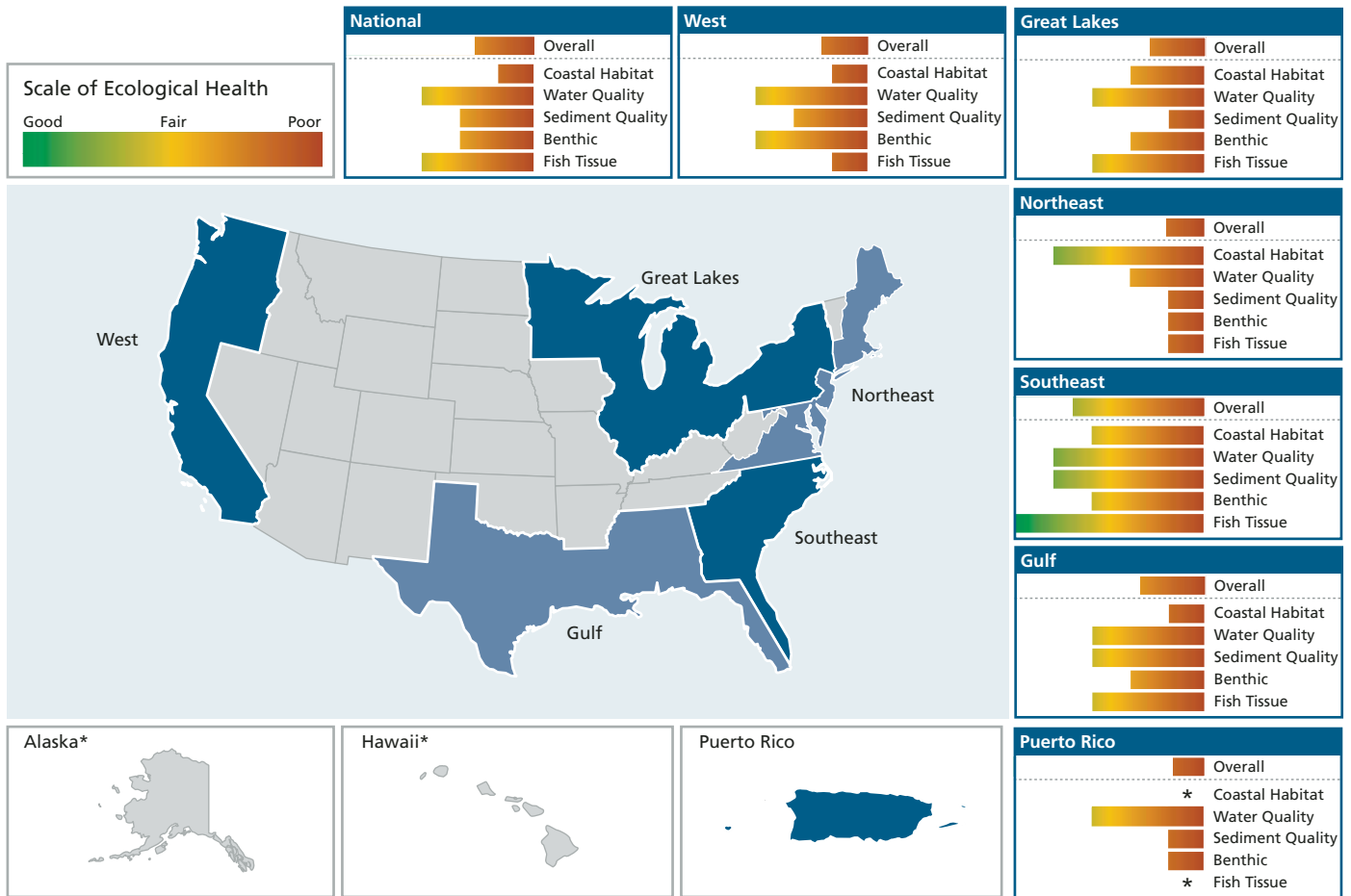
- 1 to 250,000
- 250,001 to 500,000
- 500,001 to 1,000,000
- More than 1,000,000

Highways are major arteries for the flow of international freight throughout the United States. As seen in these two maps, the ports of Los Angeles/Long Beach and New York and New Jersey are hubs for the distribution and collection of truck cargo traveling throughout the nation.

Source: U.S. Department of Transportation, Federal Highway Administration. "Freight Analysis Framework." <http://www.ops.fhwa.dot.gov/freight/Ports%20and%20Border%20Crossings/By%20State.htm> (Accessed January 2004).



**Figure 14.1 Report Card on Regional Coastal Conditions**

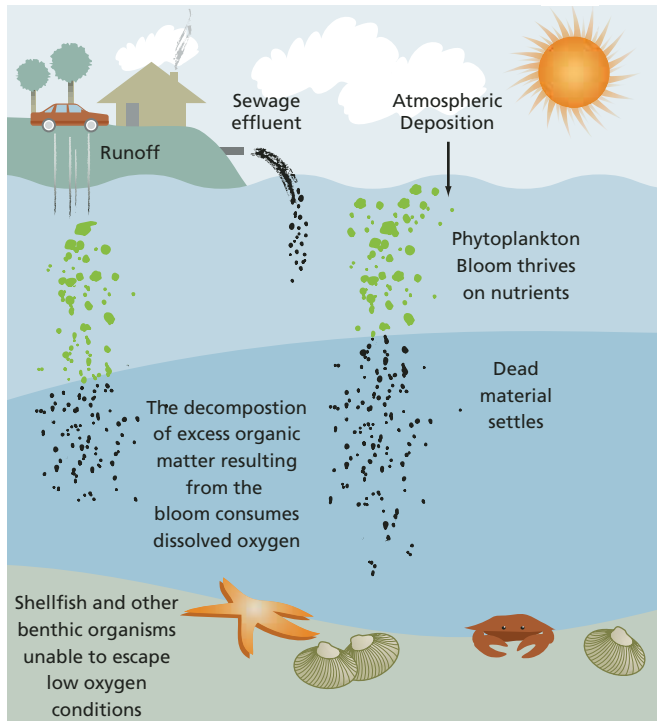


The Environmental Protection Agency's 2004 Draft National Coastal Condition Report II assessed six coastal regions of the United States, including Puerto Rico, based on monitoring data collected between 1997 and 2000. Based on five environmental indicators, EPA found that the overall condition of the nation's estuaries is fair, with poor conditions in the Northeast Coast and Puerto Rico regions and fair conditions in the Southeast Coast, Gulf Coast, Great Lakes, and West Coast regions.

\* Surveys completed but no indicator data available until the next report.

Source: U.S. Environmental Protection Agency. *Draft National Coastal Condition Report II*. EPA-620/R-03/002. Washington, DC, February 2004.

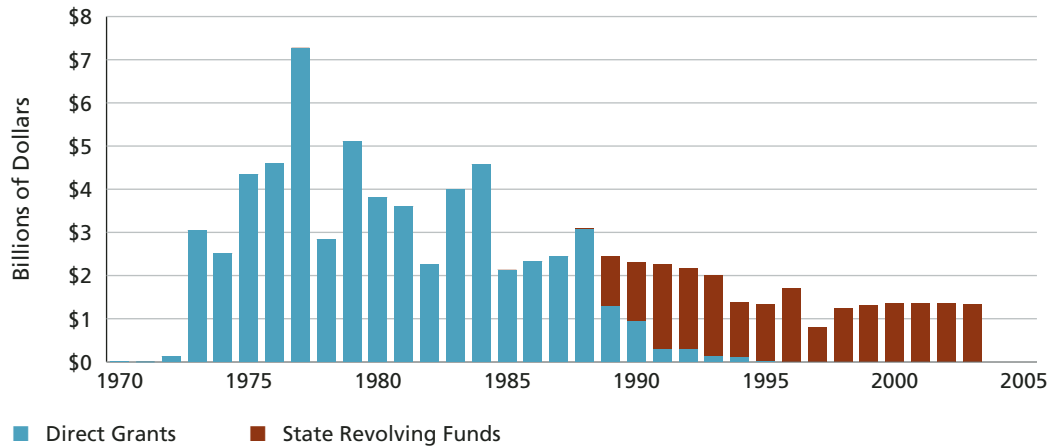
**Figure 14.2 Land-based Nutrients Can Cause Death on the Seafloor**



When ocean water becomes enriched in dissolved nutrients, from such sources as agricultural runoff and sewage outflows, these nutrients can stimulate the growth of phytoplankton. As the phytoplankton die and sink to the bottom, their decomposition consumes the dissolved oxygen in the water and sediments that other benthic organisms need to survive.

Source: U.S. Environmental Protection Agency. *National Coastal Condition Report*. EPA620-R-01-005. Washington, DC, August 2001.

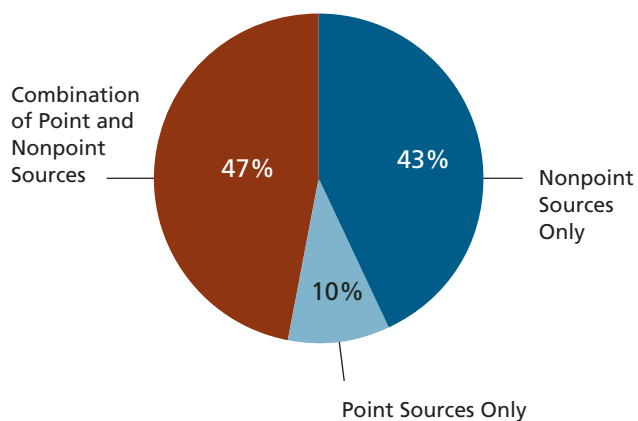
**Figure 14.3 Changes in Funding for Water Pollution Controls**



In the last thirty years, there has been a fundamental shift in the way the federal government funds the infrastructure for water pollution control in local communities. From 1970 to 1995, Congress, through EPA, provided \$61.1 billion in direct grants to help build or upgrade wastewater treatment facilities. However, since 1988, the federal government has increasingly provided financial support for these types of projects by making capitalization grants to the State Revolving Funds, which provide low interest loans that are paid back into the fund to finance future projects. As of fiscal year 2004, the federal capitalization grants total about \$22.4 billion, with state matching funds totaling about \$4.5 billion.

Source: U.S. Environmental Protection Agency. *Progress in Water Quality: An Evaluation of the National Investment in Municipal Wastewater Treatment*. EPA-832-R-00-008. Washington, DC, June 2000.

**Figure 14.4 Controlling Nonpoint Source Pollution Is Key to Cleaner Waters**



Nonpoint source pollution is a factor in 90 percent of all incidents where water quality is determined to be below the standards set for specific activities, such as recreation, water supply, aquatic life, or agriculture.

Source: U.S. Environmental Protection Agency. *Clean Water Act Section 303(d) Lists: Overview of TMDL Program*. Washington, DC, 1998.

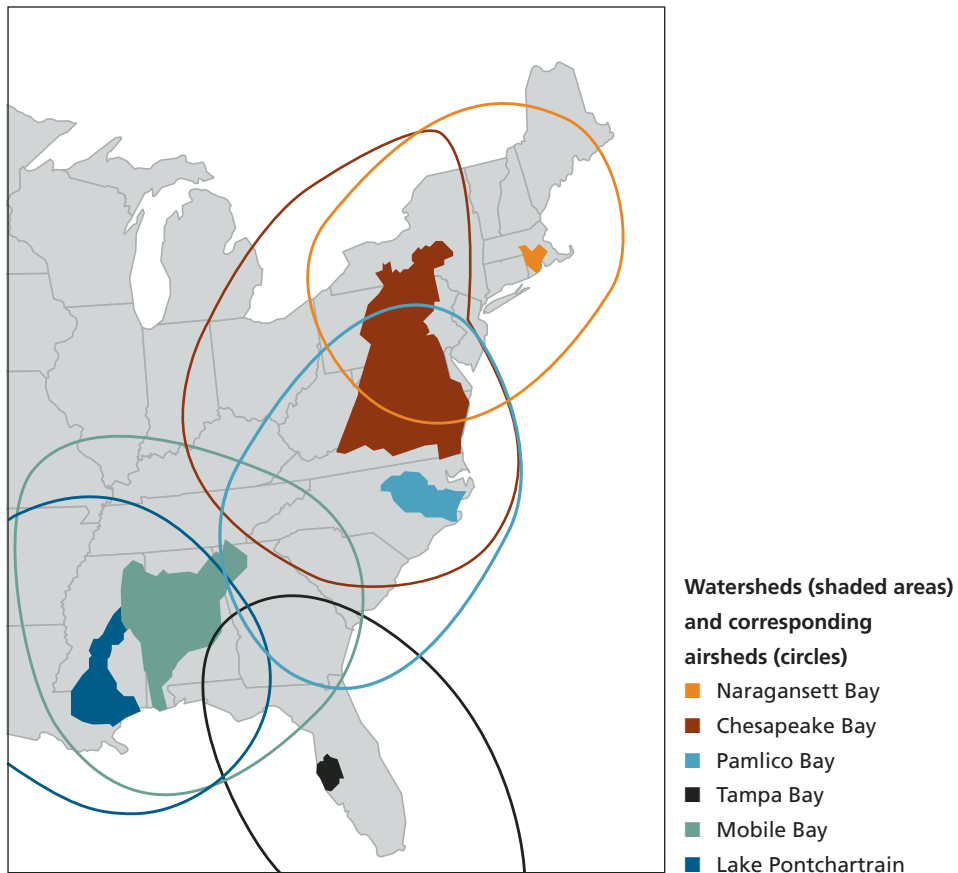
Figure 14.5 Thirty States Contribute to the “Dead Zone” in the Gulf of Mexico



The Mississippi River Basin is the largest in North America, draining an area of 1.24 million square miles, or about 41 percent of the continental United States. Polluted waters from the basin flow into the Gulf of Mexico, affecting coastal areas. Increased nutrients have resulted in a low-oxygen zone (known as the “dead zone”) off the Louisiana coast.

Source: Committee on Environment and Natural Resources. *Integrated Assessment of Hypoxia in the Northern Gulf of Mexico*. Washington, DC: National Science and Technology Council, 2000.

**Figure 14.6 Looking Skyward: Accounting for Airshed Deposition**

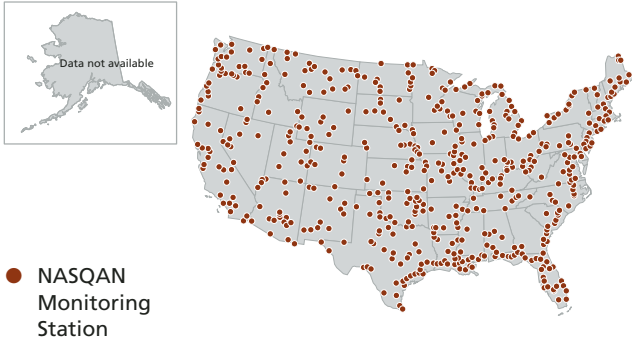


The atmospheric area affecting water quality within a watershed may be ten to several hundred times larger than the watershed itself. As shown here for oxidized nitrogen contributions along the East Coast, the extent of the calculated airsheds illustrates the states, regions, and nations that must coordinate in order to effectively manage atmospheric contributions to water quality.

Source: U.S. Environmental Protection Agency. <<http://www.epa.gov/owow/oceans/airdep/air1.html>> (Accessed January 2004).

**Figure 15.1 Watershed Monitoring Has Been Reduced Near the Coasts**

1974–1994



15.1 A. The National Stream Quality Accounting Network program was created in 1974 to develop baseline water chemistry data for the nation. Although the network started with over 500 sampling stations, by 1994 the program had been reduced to approximately 275 stations throughout the United States. (Not shown are the 13 stations in Alaska, 8 in Hawaii, 6 in Puerto Rico, and 1 in Guam.)

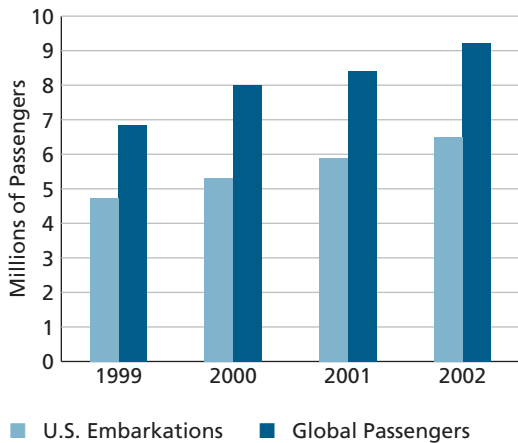
2002



15.1 B. Today, the program consists of only 32 stations focused on the nation's five major river basins, leaving almost the entire coastal region unmonitored.

Source: U.S. Geological Survey. <<http://water.usgs.gov/nasqan/progdocs/index.html>> (Accessed January 2004).

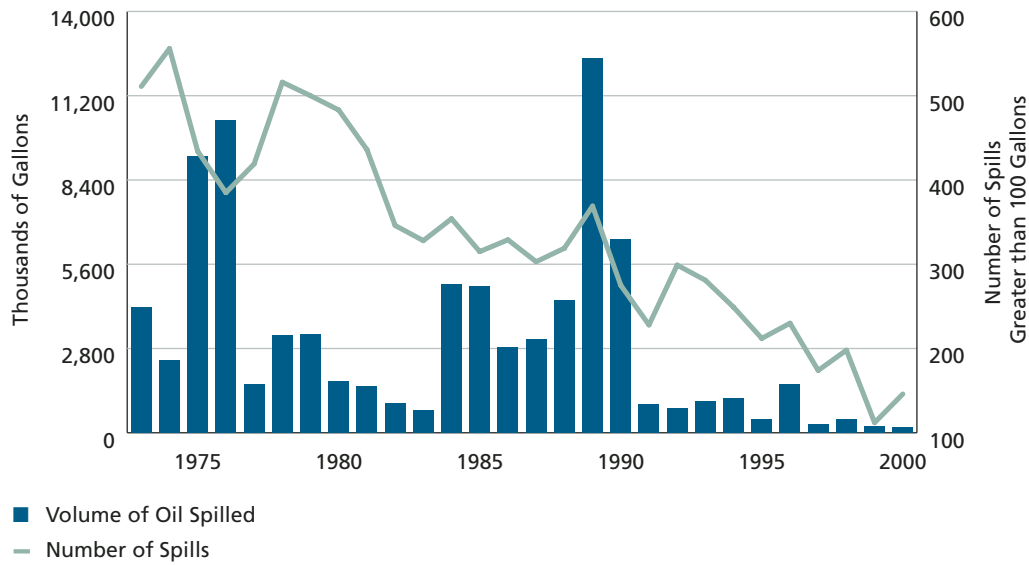
**Figure 16.1 Most Cruise Ship Travel Originates in U.S. Waters**



Passengers boarding cruise ships at U.S. ports account for over 70 percent of global passengers. Due to the continued growth of U.S. cruise ship operations, appropriate treatment and disposal of wastewater discharges from these ships will continue to be a concern for maintaining water quality and preventing harm to marine organisms.

Source: Business Research & Economics Advisors. *The Contribution of the North American Cruise Industry to the U.S. Economy in 2002*. Exton, PA: International Council of Cruise Lines, August 2003.

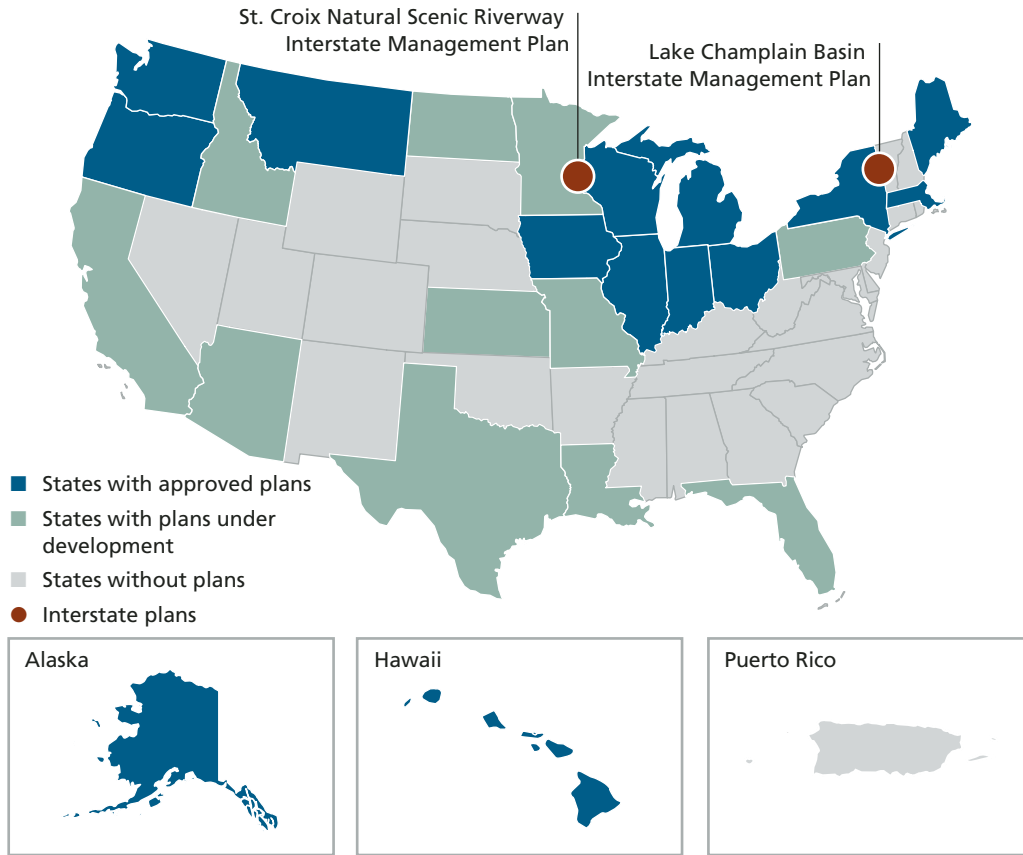
**Figure 16.2 The Oil Pollution Act Curbs Spills in U.S. Waters**



While the number of oil spills has decreased steadily since the early 1970s, the volume of oil spilled fluctuated significantly between 1973 and 1990. However, following the *EXXON Valdez* spill in 1989 and the resulting passage of the Oil Pollution Act of 1990, the amount of oil released into the environment has been significantly reduced.

Source: Environmental Research Consulting, Cortlandt Manor, NY.

## Figure 17.1 Great Lakes States Take Lead in Implementing Aquatic Invasive Species Management Plans

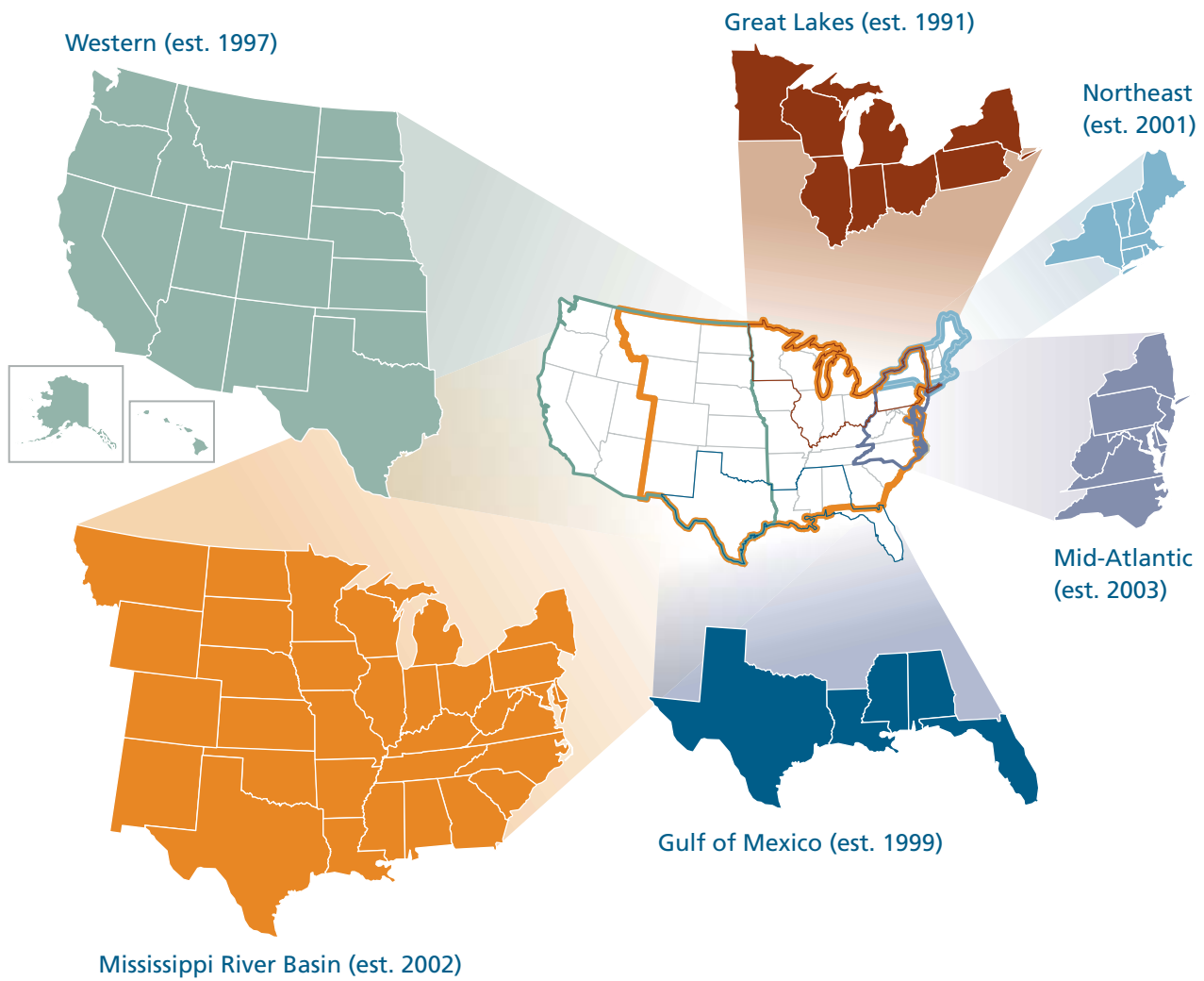


The Aquatic Nuisance Species Task Force encourages states to develop management plans for detecting and monitoring aquatic invasive species, educating the public, and encouraging collaborative mitigation efforts. Of the fourteen states that currently have plans approved by the Task Force, six border the Great Lakes. And while other coastal states such as California, Texas, Louisiana, and Florida are developing plans, the majority of East Coast states are not currently pursuing aquatic nuisance species management plans.

Source: U.S. Fish and Wildlife Service, Arlington, VA.



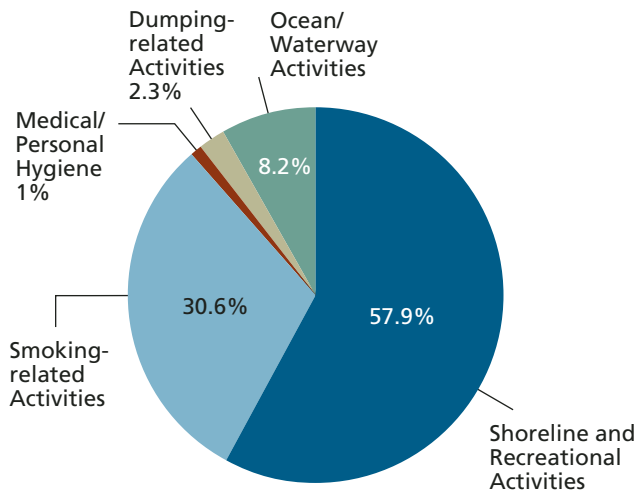
**Figure 17.2 Addressing Aquatic Invasive Species Regionally**



Created under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, six overlapping regional panels work to limit the introduction, spread, and impacts of aquatic invasive species in their waters.

Source: U.S. Fish and Wildlife Service, Arlington, VA.

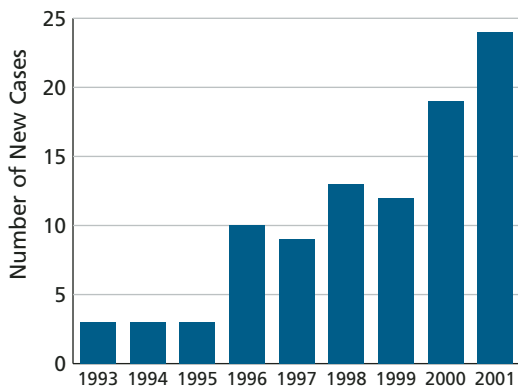
**Figure 18.1 Trash at the Beach Comes from Many Sources**



In 2002, more than 8.2 million pounds of debris were collected and analyzed as part of a worldwide beach cleanup effort. The largest source of marine debris was from land-based human activities; shoreline and recreational activities alone contributed almost 58 percent of the number of items collected. Over 1 million cigarette butts, 444,000 food wrappers or containers, 220,000 bottles, 190,000 plastic bags, 32,000 pieces of fishing line, and 8,000 tires were collected.

Source: The Ocean Conservancy. *The 2002 International Coastal Cleanup*. Washington, DC, 2003.

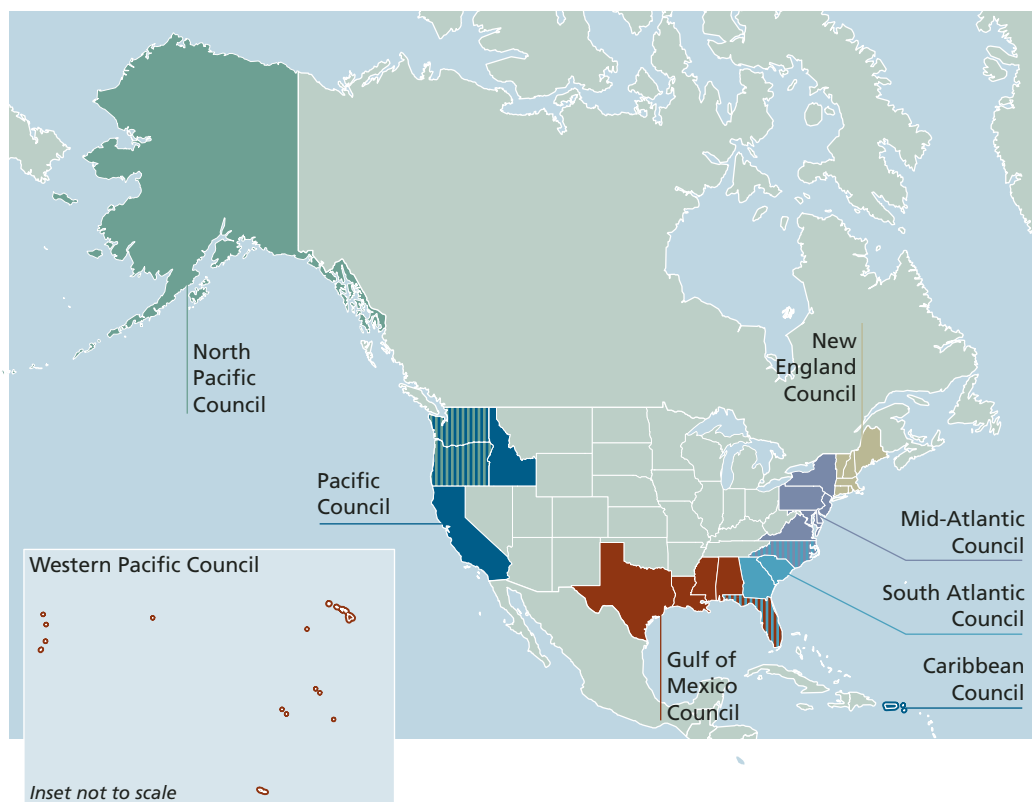
**Figure 19.1 Fishery Litigation Grows as Interests Clash**



From 1993 to 2001, the number of new lawsuits brought against NOAA's National Marine Fisheries Service increased eightfold. Many cases involved disputes about the validity of stock assessments and resulting catch limits.

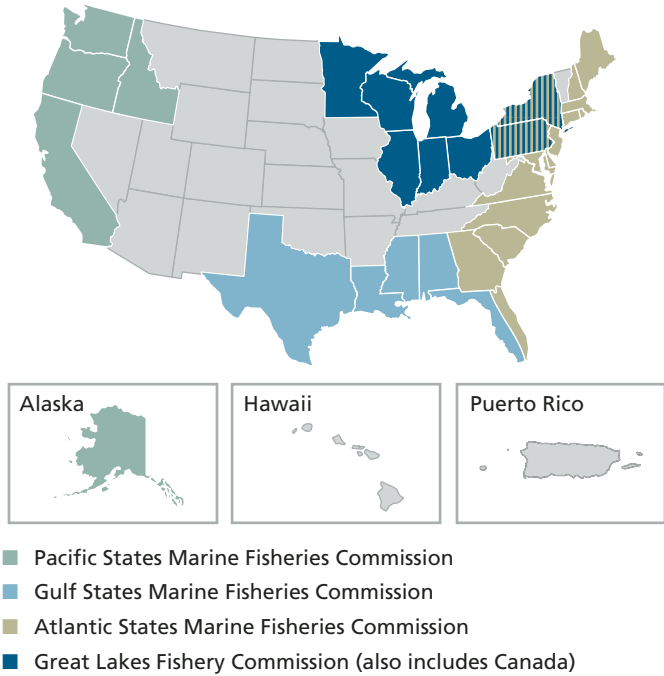
Source: National Academy of Public Administration. *Courts, Congress, and Constituencies: Managing Fisheries by Default*. Washington, DC, July 2002.

**Figure 19.2 U.S. Fisheries Are Managed at the Regional Level**



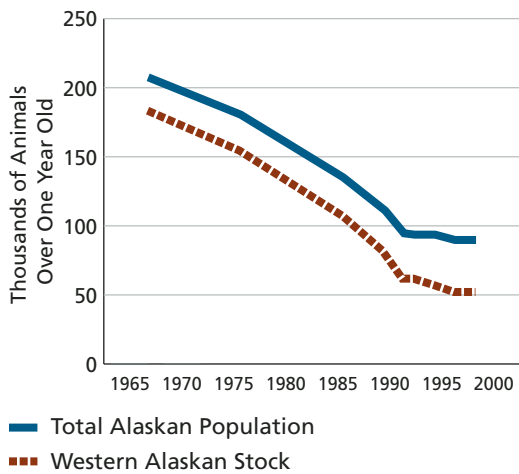
Eight regional fishery councils manage the harvest of living marine resources. The councils are responsible for developing sustainable domestic fisheries and linking the fishing communities more directly to the management process. Several states, illustrated with vertical lines, belong to more than one council. For example, Oregon and Washington are members of both the Pacific Council and the North Pacific Council.

**Figure 19.3 Migratory Fish Require Coordination Across Multiple Jurisdictions**



The four interstate marine fishery commissions are critical to managing and conserving migratory fish that traverse the jurisdictional waters of multiple states. Pennsylvania and New York are members of both the Atlantic States and Great Lakes Commissions.

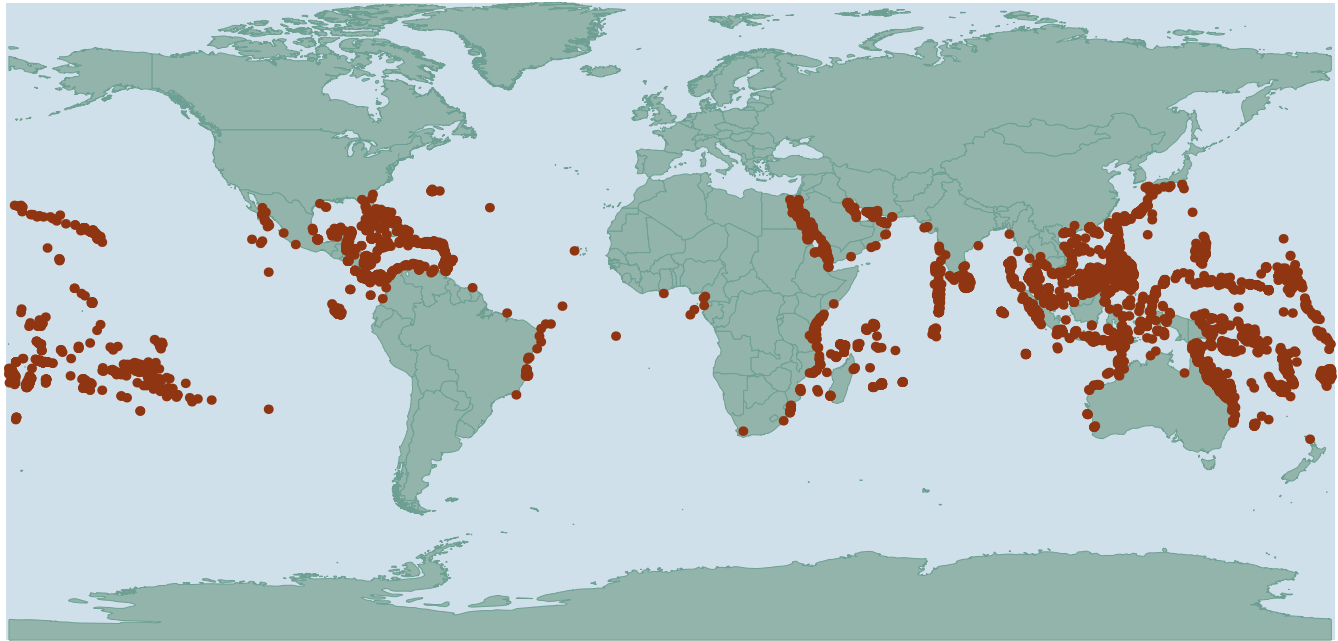
**Figure 20.1 Sea Lion Populations in Danger**



Although Steller sea lions have been protected since the early 1970s, the Alaskan populations have continued to decline, particularly those located along the Aleutian Islands. This decline cannot be traced to a single cause, underscoring the need for an ecosystem-based approach for protecting these animals.

Source: National Oceanic and Atmospheric Administration. <<http://stellersealions.noaa.gov/>> (Accessed January 2004).

Figure 21.1 Tropical Waters Are Home to the Majority of Known Reefs



● Coral reef (reef area not to scale)

Most of the world's known reefs are found in tropical and semitropical waters, between 30° north and 30° south latitudes. Because these reefs are often in shallow water and close to shore, their health is easily threatened by human impacts, such as increases in sedimentation, polluted runoff, and damage caused by fishing and recreation.

Source: National Oceanic and Atmospheric Administration. <<http://www.coris.noaa.gov>> (Accessed January 2004).

Figure 21.2 Deep, Cold-Water Coral Reefs Found Throughout U.S. Waters



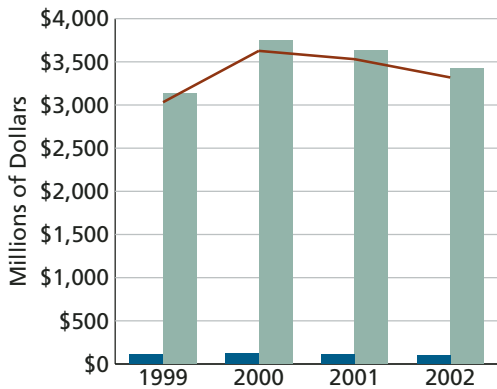
● Known deep, cold-water reefs (reef area not to scale)

Although most Americans are aware of the coral reefs that exist in the warm waters off Florida, Hawaii, and the U.S. island territories, few realize that deep, cold-water reefs are also found throughout U.S. waters. While scientists continue to discover new deep-sea coral communities, little is known about their true extent. Learning more about these species is necessary to manage them wisely.

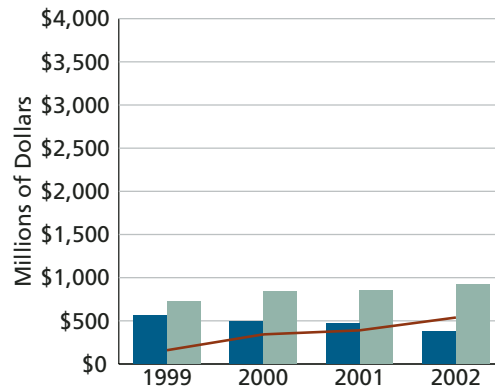
Source: Oceana. "Deep Sea Corals: Out of Sight, But No Longer Out of Mind."  
[http://northamerica.oceana.org/uploads/oceana\\_coral\\_report\\_final.pdf](http://northamerica.oceana.org/uploads/oceana_coral_report_final.pdf) (Accessed June 2004).

**Figure 22.1 The United States Imports More Seafood Than It Exports**

**Sales of Shrimp**



**Sales of Salmon**



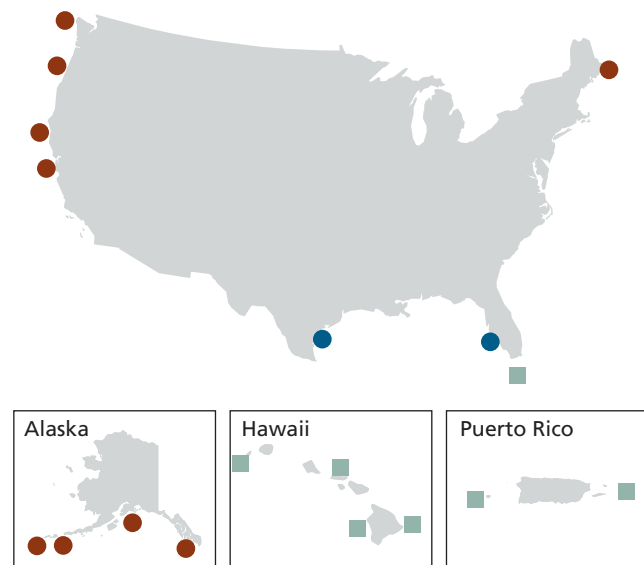
■ Exports   ■ Imports   — Trade Deficit

The values of U.S. imports and exports for both shrimp and salmon illustrate the trade deficits caused by the nation's inability to harvest or culture enough seafood to meet consumer demand.

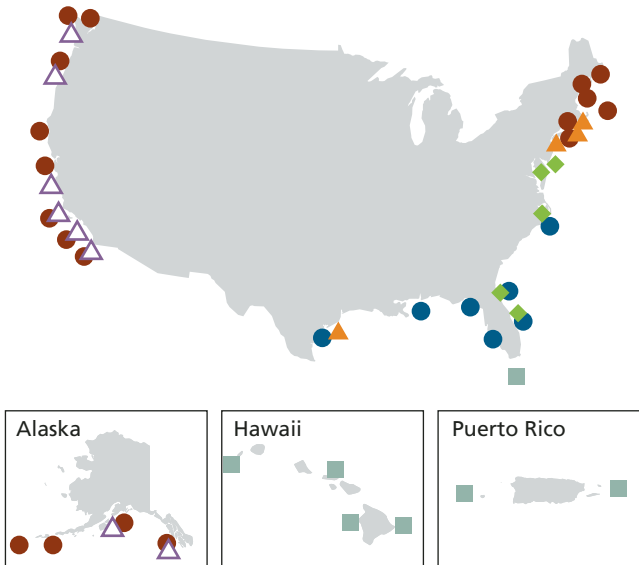
Source: U.S. Department of Agriculture, Economic Research Service. *Aquaculture Outlook 2003*. LDP-AQS-17. Washington, DC, March 14, 2003.

**Figure 23.1 Harmful Algal Blooms on the Rise**

**Pre-1972**



**Post-1972**



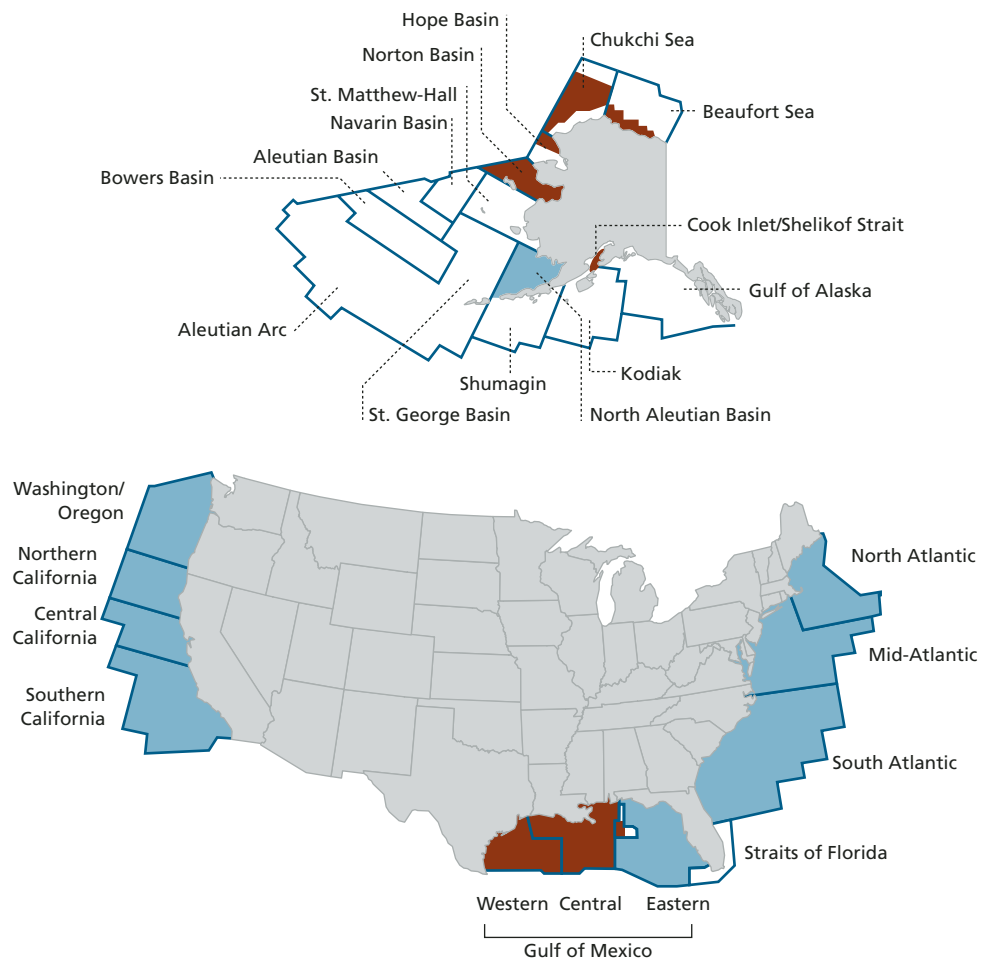
**Type of Outbreak Observed**

- ◆ Pfiesteria Complex
- Neurotoxic Shellfish Poisoning
- Paralytic Shellfish Poisoning
- Ciguatera
- ▲ Brown Tide
- △ Amnesic Shellfish Poisoning

Outbreaks of harmful algal blooms and related events, such as fish kills and marine mammal mortalities, have become more prevalent over the past thirty years. This can be attributed to many causes, including increases in nutrient runoff that enhance the growth of these types of organisms. However, a portion of the rise in reported bloom events may simply reflect better detection methods and more observers.

Source: National Office for Marine Biotoxins and Harmful Algal Blooms, Woods Hole Oceanographic Institution, Woods Hole, MA.

**Figure 24.1 Offshore Oil and Gas Leasing Has Been Limited to a Few Planning Areas**



- Planning area boundaries
- Proposed for leasing in the MMS 2002–2007 leasing program
- Area withdrawn from leasing through 6/30/12
- Area neither withdrawn nor proposed for leasing

Shown above are the outer Continental Shelf planning areas in the Minerals Management Service's 2002–2007 leasing program. The entire West Coast and almost all of the East Coast have been restricted from leasing through 2012, leaving only areas of the central and western Gulf of Mexico (and a small area of the eastern Gulf) and virtually all areas off the Alaskan coast available for development.

Source: Minerals Management Service, Washington, DC.



**Figure 24.2 A “Process Rich” but Clear Path to Offshore Leasing, Exploration, and Development Activities**

Develop 5-Year Program											
Pre-Lease	Solicit Comments	45-day Comment Period	Draft Proposed Program Published	60-day Comment Period	Proposed Program	90-day Comment Period	Proposed Final Program	60-day Waiting Period	5-Year Program Announced		
					Draft EIS Published		Final EIS				
Planning for Specific Sale											
Pre-Lease	Call for Information Published	45-day Comment Period	Define Sale Area	Draft EIS	45-day Comment Period	Final EIS Published	30-day Pre-decision Period	Notice of Sale	30-day Comment Period	Sale	Leases Issued
						CD to States	90-day Review*				
						Proposed Notice Distributed	60-day Comment Period				
Exploration Plan Approval											
Post-Lease	Exploration Plan Submitted	Environmental Assessment	Exploration Plan Approved	90-day CZM Review Approved	APD Approved	Exploration Drilling Starts	First Exploration Well Completed	Delineation Drilling			
		CZM Review Starts			Permits Granted						
Development and Production Plan Approval											
Post-Lease	Development and Production Plan	CZM Consistency Review Starts	Draft EIS Published	90-day Comment Period	Final EIS Published	CZM Consistency Obtained	Production Well Application	First Oil/Gas Production			
						Development & Production Plan Approved					

**Abbreviations:**

APD: Application for Permit to Drill

CZM: Coastal Zone Management

CD: Consistency Determination

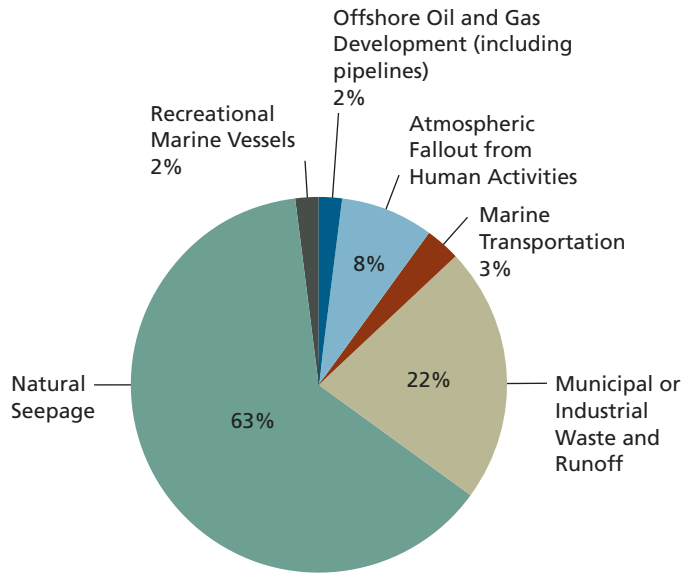
EIS: Environmental Impact Statement

The process for companies and other stakeholders to comment on proposed sales, and to lease, explore, and develop the outer Continental Shelf, is clearly defined in the Outer Continental Shelf Lands Act. Although the process involves many steps, its comprehensiveness and transparency not only set out clear comment periods for coastal states and other interested stakeholders, but also provide companies greater predictability about the procedures they must follow to receive approval for their exploration and production work.

\* Includes 60-day comment period and 15-day automatic extension. Unless state concurs, no decision can be made until 90 days after beginning of state review.

Source: Minerals Management Service, Washington, DC.

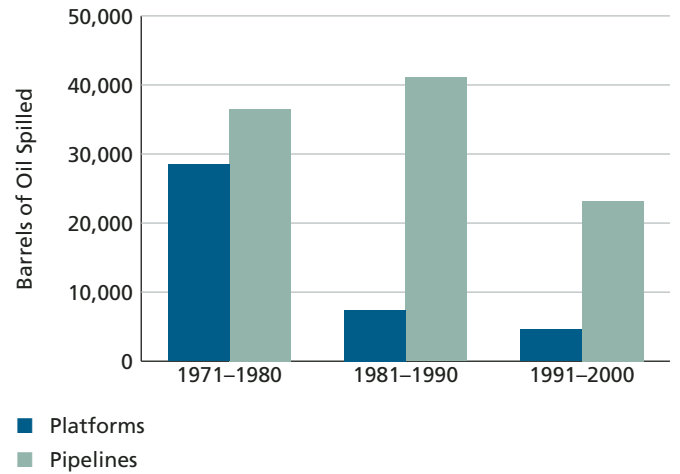
**Figure 24.3 Oil Inputs to the North American Marine Environment**



Offshore oil and gas development contributes only 2 percent of the 1.8 million barrels of oil released into North American waters each year. Natural seepage from the seafloor is by far the largest input, while runoff and waste from human land-based activities contribute roughly a quarter of the oil present in the marine environment. On a worldwide basis, the oil released from offshore oil and gas development still only accounts for 4 percent of the total 8.9 million barrels. (One barrel is equal to 42 gallons.)

Source: Minerals Management Service. "OCS Oil Spill Facts, 2002." <[http://www.mms.gov/stats/PDFs/2002\\_OilSpillFacts.pdf](http://www.mms.gov/stats/PDFs/2002_OilSpillFacts.pdf)> (Accessed March 2004).

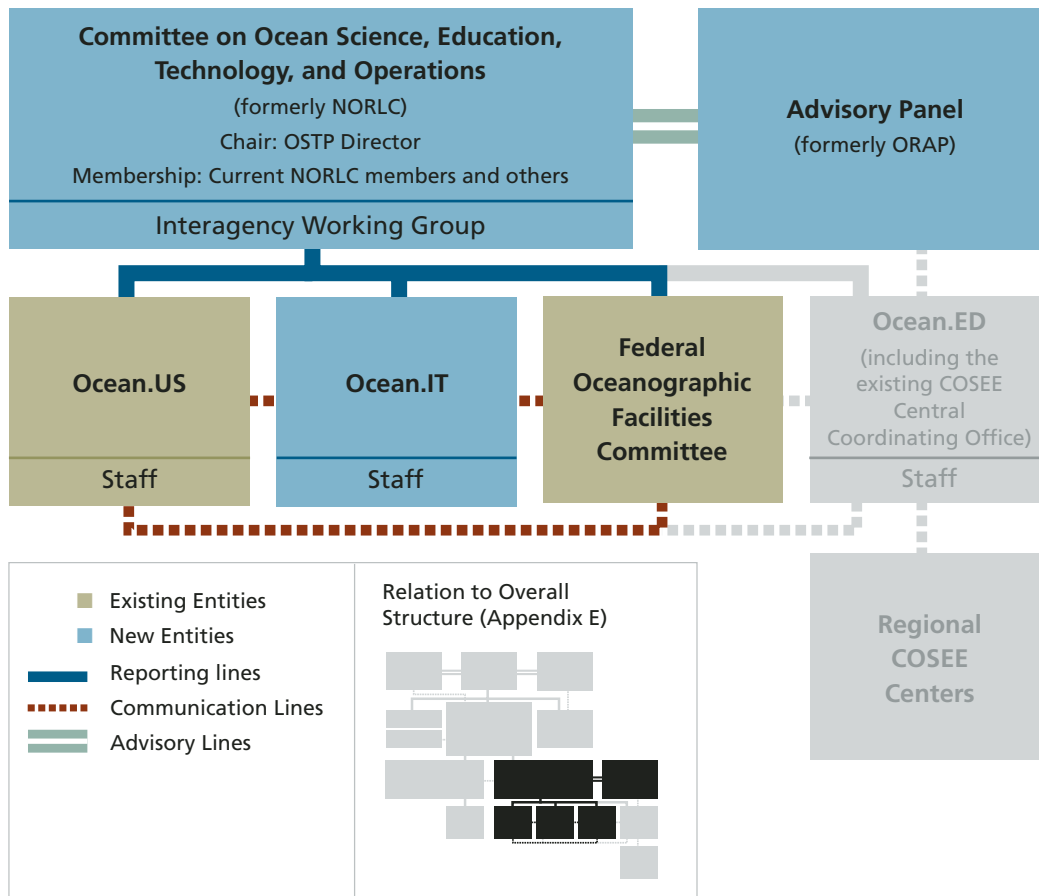
**Figure 24.4 Pipelines Are a Leading Source of Oil Leaks from OCS Infrastructure**



In the last thirty years, the amount of oil spilled from OCS platforms and pipelines has continued to decrease. The large disparity between the number of barrels spilled from platforms versus pipelines is indicative of improvements in platform technology and operations and the greater susceptibility of pipelines to third party damages, natural hazards, and structural failure brought on by corrosion and materials fatigue.

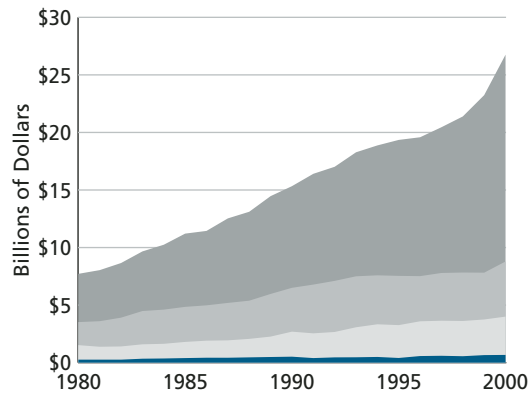
Source: Minerals Management Service. "OCS Oil Spill Facts, 2002." <[http://www.mms.gov/stats/PDFs/2002\\_OilSpillFacts.pdf](http://www.mms.gov/stats/PDFs/2002_OilSpillFacts.pdf)> (Accessed March 2004).

**Figure 25.1 Proposed Structure for the Coordination of Federal Ocean Science Activities**



Shown here are the institutional components that should be established under the National Ocean Council's Committee on Ocean Science, Education, Technology, and Operations (COSETO) recommended in Chapter 4. COSETO's purpose is to improve federal leadership and coordination in ocean science, education, technology, and marine operations. This diagram also illustrates the organizational links between existing and planned units under COSETO, discussed in subsequent chapters. Entities shaded in gray are discussed in Chapters 4 and 8.

**Figure 25.2 Ocean Research Is Neglected as Part of the National Research Budget**

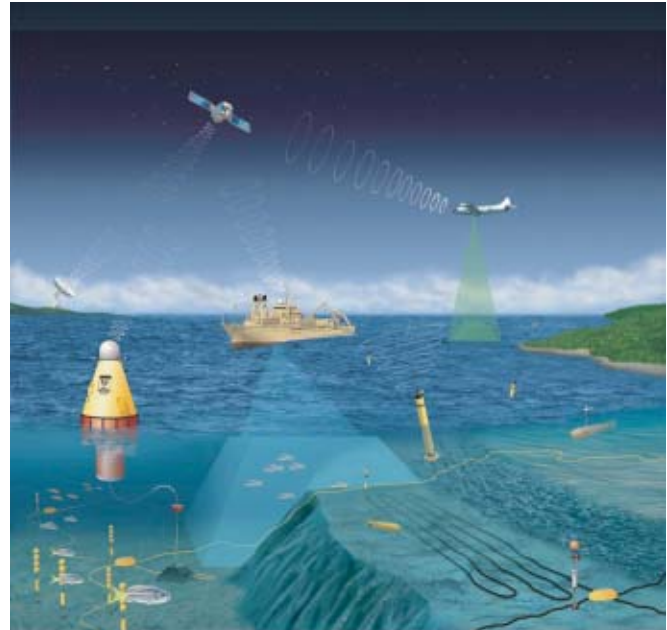


- Life Sciences, Total
- Physical Sciences, Total
- Environmental Sciences, Total
- Oceanography

Funding for oceanography has remained stagnant for twenty years, while similar scientific disciplines have experienced steady increases in research funding.

Source: National Science Foundation. "Federal Funds for Research and Development, Detailed Historical Tables: Fiscal Years 1951–2002." <<http://www.nsf.gov/sbe/srs/nsf03325/>> (Accessed January 2004).

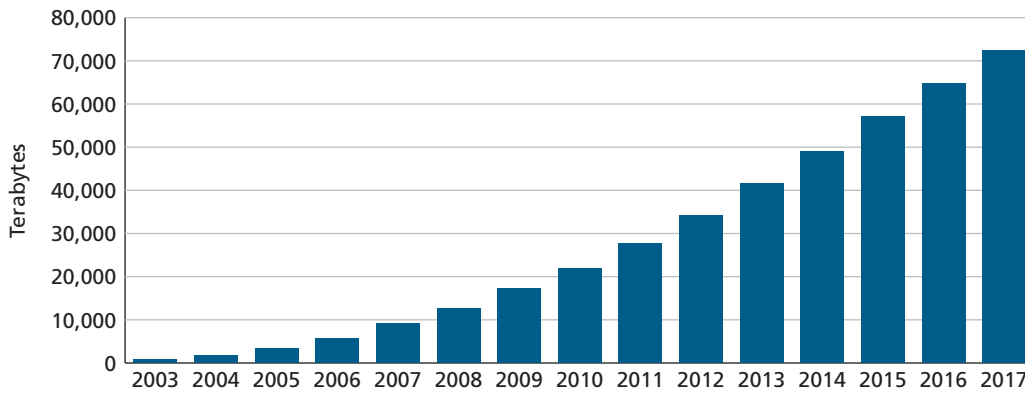
**Figure 26.1 Many Different Platforms Collect Data as Part of the IOOS**



This picture is an artist's rendering of the various water-, air-, and space-components of ocean observing systems. The data collected by each of these different sensors are transmitted via seafloor fiber optic cables and satellites to a central location on land.

Source: HARRIS Corporation Maritime Communications, Melbourne, FL.

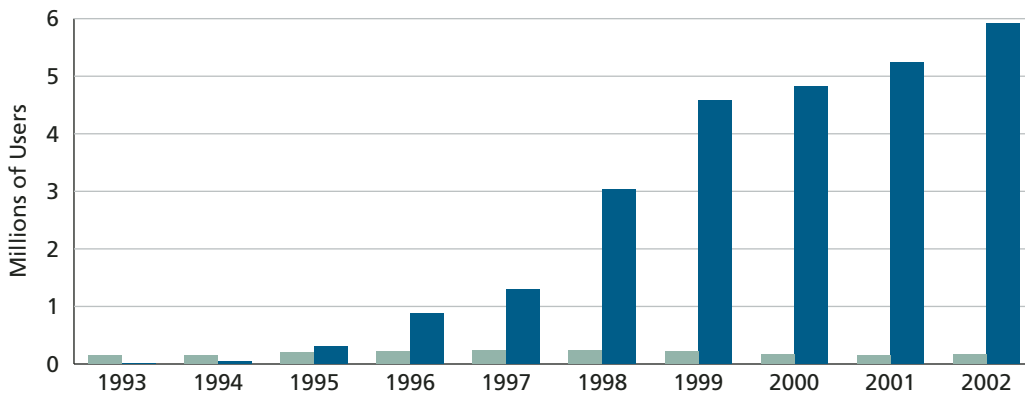
**Figure 28.1 The Flood of Ocean and Coastal Data into NOAA**



Between 2002 and 2017, NOAA's data holdings are expected to grow by a factor of 100, to 74 million gigabytes. (One gigabyte equals about one billion bytes; one terabyte equals about one thousand gigabytes.)

Source: National Oceanic and Atmospheric Administration. *The Nation's Environmental Data: Treasures at Risk: A Report to Congress on the Status and Challenges for NOAA's Environmental Data Systems*. Washington, DC: U.S. Department of Commerce, 2001.

**Figure 28.2 The Growing Demand for Ocean Data**



■ Offline Users    ■ Online Users

Online users are requesting increasing amounts of environmental data and information from NOAA each year. Improved data management practices are needed to address the growing volume of requests.

Source: National Oceanic and Atmospheric Administration. *The Nation's Environmental Data: Treasures at Risk: A Report to Congress on the Status and Challenges for NOAA's Environmental Data Systems*. Washington, DC: U.S. Department of Commerce, 2001.